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A

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—Ringers, see Transformers, Miniature; Lighting and Power Systems, Electric, Signaling, etc.
 —Traps, see Drains, Floor, Yard, etc.

Bells

Including: Church, Tower, Clock, Fire Alarm, School, Peal, etc.
 Deagan, J. C., Inc. C3222
 McShane Bell Foundry Co. C3224
 Menely Bell Co. C3225
 Menely & Co. C3226
 Belfry Construction Data C3224

Bells and Buzzers, Electric

Edwards and Co., Inc. C3007
 Gaynor Electric Co., Inc. C2935
 Schwarze Electric Co. C3011
 Signal Engineering & Mfg. Co. C3012
 Standard Electric Time Co. C3392
 See also page C3396
Cadet C3007
Cyclone C3011
Lungen C3007

Bells and Buzzers, Electric—Cont.

Recti C3007
Vigilant C3007

Belt Conveyors

See Conveyors, Power—Belt, Chain, Slat, etc.

Belts, Window Cleaners'

See Window Cleaners' Safety Devices

Benches**—Garden**

See Furniture, Garden

—Greenhouse and Conservatory

See Greenhouses and Conservatories

—Steel, Factory

See page B2093

Bends, Pipe

See pages A787; C3209

Bends and Extensions, Water Closet

See Closets, Water, Bends and Fittings for

Billiard Tables

Brunswick-Balke-Collender Co. C3324
 Space Required C3324

Binders**—Floor—Expanded Metal**

See page A128

—Road

See page A396

Binding Bars—Floor and Cove Base

See Bars, Binding—Floor and Cove Base

Bins

—Storage, Steel, see Shelving, Steel
 —Storage, Steel Plate, see Steel Plate Construction
 —Wine or Bottle Storage, see Bottle Racks; Wine Racks

Bins or Bunkers, Coal

See page C2416

Birch

—Flooring, see Flooring, Wood

Bird

—Baths, see Furniture, Garden
 —Cages, see Fencing, Wire or Woven Wire

Blackboard**—Chalk Rail Covers**

Logan Co. C3240

—Chalk Rails

Beckley-Cardy Co. C3228
 Dudfield Mfg. Co. C3239
 Flanagan, A., Co. C3230
 Richsto Mfg. Co. B1320
 Weber Costello Co. C3236
 See also pages B1300; B1314

—Cloth

New York Silicate Book Slate Co. C3231
Lapilinum C3231

—Joining Strips

Beckley-Cardy Co. C3228
 Blastel Mfg. Co. C3334
 Flanagan, A., Co. C3230
Simplex C3228

—Mouldings

Beckley-Cardy Co. C3228
 Dudfield Mfg. Co. C3239
 Flanagan, A., Co. C3230
 Richsto Mfg. Co. B1320
 Rowles, E. W. A., Co. C3234
 Weber Costello Co. C3236

—Slatting—Liquid

New York Silicate Book Slate Co. C3231
Black Diamond C3231

—Tack Strips

Armstrong Cork Co. C3329
 Beckley-Cardy Co. C3228
 Blastel Mfg. Co. C3334
 Rowles, E. W. A., Co. C3234
 Valleyco Co. C3344
Simplex C3228

Blackboards**—Portable Revolving**

New York Silicate Book Slate Co. C3231

—Slate

Knickerbocker Slate Corp. A450
 Natural Slate Blackboard Co. C3232

Blackboards—Cont.**—Slate—Cont.**

Pyramid C3232
 Heights, Widths and Areas Required C3232
 Specifications C3232

—Wood Fibered or Veneered

Beckley-Cardy Co. C3228
 Flanagan, A., Co. C3230
 New York Silicate Book Slate Co. C3231
 Rowles, E. W. A., Co. C3234
 Southwestern Seating Co. C3238
 Weber Costello Co. C3236
Asbesto-slate C3234
Duroplate C3234
Everlast C3238
Old Reliable Hyloplate C3236
Perfecto-Plate C3230
Permaroc C3234
Rock-Plate C3230
Slatebestos C3228
Slatelock C3228
Slatoplate C3228
Sterling Lifelong C3236
 Specifications C3228; C3230; C3234; C3236; C3238

Blinds**—Awning**

Swedish Venetian Blind Co. B2290
 Wilson, J. G., Corp. B2291

—Porch

See Shades, Window, Skylight, etc.; Blinds, Venetian

—Rolling, Outside

Swedish Venetian Blind Co. B2290

—Sliding—Wood

See page B2288

—Venetian

Bostwick-Goodell Co. B2286
 Burlington Venetian Blind Co. B2288
 Swedish Venetian Blind Co. B2290
 Western Venetian Blind Co. B2292
 Wilson, J. G., Corp. B2291
Diffusallite B2291
Victoria B2286

—Venetian—Cloth

Simon Ventiligher Co., Inc. B2285
Ventiligher B2285

—Ventilating

See Shades, Window, Skylight, etc.—Ventilating

—Window, Wood

See page B1138

—Window, Wood—Hinges for

See Hinges, Blind or Shutter

Blocks**—Asphalt**

See Blocks, Paving, Asphalt

—Brick

See Brick, Paving

—Chain

See Hoists, Chain

—Cinder Concrete

National Building Units Corp. A373
Cincrete A373

—Flashing

See Flashing Blocks

—Gypsum

See Tile, Hollow, Gypsum; Floor Voids, Gypsum Filler Tile

—Hollow Concrete

See Tile, Hollow, Concrete

—Hollow Tile

See Tile, Hollow, Clay or Terra Cotta; Tile, Hollow, Gypsum; Tile, Hollow, Concrete; Tile, Hollow or Solid, Cinder Concrete

—Insulating

Carey, Philip, Co. A210
 Celite Products Co. A46
 Serviced Products Corp. A79
 Universal Gypsum & Lime Co. A198
 See also page A213
Carocel A210
Insulux A198
Sil-O-Cel A46
 Specifications A210

Blocks—Cont.**—Nailing Concrete**

See Nailing Concrete; Tile, Hollow or Solid, Cinder Concrete

—Paving, Asphalt

Asphalt Block Pavement Co.....B1556
Asphalt Brick Co.....B1557
Hastings Pavement Co.....B1558
A-B-C.....B1557
Eightfour.....B1558

—Paving, Granite

Fletcher, H. E., Co.....A300
See also pages.....A296; A302
Fletcher might.....A300

—Paving, Rubber

Wright Rubber Products Co.....B1531

—Roof

See Tile, Roof

—Wood, Flooring and Paving—Built-up

Carter Bloxonend Flooring Co.....B1559
Bloxonend.....B1559
Specifications.....B1559

—Wood, Flooring and Paving—Creosoted or Treated

Carter Bloxonend Flooring Co.....B1559
Jennison-Wright Co.....B1560
Republic Creosoting Co.....B1563
Southern Wood Preserving Co.....B1564
See also page.....C3384
Bloxonend.....B1559
Creo-pine.....B1564
Kreolite.....B1560
Specifications.....B1560; B1563; B1564

—Wood, Flooring and Paving—Natural

Carter Bloxonend Flooring Co.....B1559
Jennison-Wright Co.....B1560
Bloxonend.....B1559
Kreolite.....B1560
Specifications.....B1560

—Wood, Tongue and Grooved—Parquetry

Hasbrouck Flooring Co.....B1568

Blowers**—Draft, for Buckwheat Burners**

See Blowers, Turbo; Blowers, Pressure or Volume; Coal Burning Systems, Buckwheat

—Organ

See page.....C3354

—Positive Pressure

See Compressors, Air—Centrifugal or Rotary

—Pressure or Volume

American Blower Co.....C2788
Bishop & Babcock Sales Co.....C2789
Buffalo Forge Co.....C2790
Ilg Electric Ventilating Co.....C2791
Johnson Fan & Blower Co.....C2792
Pyramid Iron Products Corp.....C2690
Sturtevant, B. F., Co.....C2793
Typhoon Fan Co.....C2796
Wing, L. J., Mfg. Co.....C2794
See also page.....C2780
B & B Massachusetts.....C2789
Niagara.....C2790
Wind-Scruplex.....C2794
Specifications.....C2690

—Turbo

Wing, L. J., Mfg. Co.....C2794
See also page.....C3354

Blue Print**—Cabinets**

See Cabinets, Blue Print and Plan

—Dryers and Ironers

Pease, C. F., Co.....A2

—Machines

Pease, C. F., Co.....A2
Wickes Brothers.....A4
Junior.....A2

—Paper

See Paper, Blue or Brown Print

—Room Accessories

Hamilton Mfg. Co.....A1
Pease, C. F., Co.....A2
Wickes Brothers.....A4

—Washers

Pease, C. F., Co.....A2

Bluestone

American Blue Stone Co.....A319
Genesee Valley.....A319

Boards**—Asbestos**

See Wall Board, Asbestos; Lumber, Asbestos

—Black

See Blackboards

—Bulletin

Akins, B. L., Inc.....C3330
Armstrong Cork Co.....C3329
Beckley-Cardy Co.....C3228
Blasteel Mfg. Co.....C3334
Flanagan, A., Co.....C3230
Kennedy, David E., Inc.....B1519
New York Silicate Book Slate Co.....C3231
Rowles, E. W. A., Co.....C3234
United Cork Cos.....B1530
Valleyco Co.....C3344
See also pages.....A205; A765; A778;
A784; C3335; C3336; C3340

Crescent.....B1530

Jointite.....A205

Kencor.....B1519

Simplex.....C3228

Specifications.....B1519; C3329

—Bulletin—Changeable Letter or Strip

(See also Directories, Building)

Akins, B. L., Inc.....C3330

Hamilton & Cord Co.....C3338

Liberty Mfg. Co.....C3340

Tablet & Ticket Co.....C3341

H & C.....C3338

—Directory

See Directories, Building

—Drawing

See Drawing Boards

—In-and-Out

See In-and-Out Boards

—Ironing

See Ironing Boards

—Plaster

See Plaster Board

—Sounding

See page.....B2298

—Stucco

Celotex Co.....B1239

—Wall

See Wall Board

—Wall—Tiled

See Tile, Sheet or Board Form

Boiler**—Breechings**

Stover Steel Tank & Mfg. Co.....C2416

—Compounds

Sullivan Co.....A81

Vinco Co., Inc.....C2717

Sulco.....A81

Specifications.....C2717

—Coverings

See Coverings, Pipe and Boiler

—Low Water Protection Switch

Absolute Con-Tac-Tor Corp.....C2828

Con-Tac-Tor.....C2828

Plugs switch.....C2828

—Plate Work

See Steel Plate Construction

—Settings, Brick

Custodis, Alphons, Chimney Construction Co.....C3176

Heinicke, H. R., Inc.....C3177

Summerhays, Wm., Sons Corp.....C3180

See also page.....C3174

—Tube Cleaners

See Soot Blowers and Cleaners

—Tubes

See Tubes, Boiler

Boilers**—Clothes**

Chicago Dryer Co.....C3305

Dahlquist Mfg. Co.....C2400

See also page.....C3298

—Heating, Fire Tube or Water Tube

Brownell Co.....C2639

Fitzgibbons Boiler Co.....C2646

Heggie-Simplex Boiler Co.....C2648

Keeler, E., Co.....C2656

Boilers—Cont.**—Heating, Fire Tube or Water Tube—Cont.**

Kewanee Boiler Co.....C2658

Spencer Heater Co.....C2682

Titusville Iron Works Co.....C2684

See also page.....C3365

Perfection.....C2684

—Heating, Fire Tube or Water Tube—Gas Fired

Mears-Kane-Ofeldt, Inc.....C2655

Kane.....C2655

Ofeldt.....C2655

—Heating, Locomotive Firebox

Brownell Co.....C2639

Kewanee Boiler Co.....C2658

Titusville Iron Works Co.....C2684

Acme.....C2684

Tico.....C2684

—Heating, Sectional

Burnham Boiler Corp.....C2640

Cox, Abram, Co.....C2642

Hart and Crouse Co.....C2650

National Radiator Corp.....C2667

Richardson & Boynton Co.....C2671

Smith, H. B., Co.....C2678

Spencer Heater Co.....C2682

Thatcher Co.....C2686

See also page.....C3365

H & B.....C2678

Mills.....C2678

Novelty.....C2642

Perfect.....C2671

Progress.....C2686

Royal.....C2650

—Heating, Sectional—Gas Fired

Mears-Kane-Ofeldt, Inc.....C2655

Mueller, L. J., Furnace Co.....C2666

Peerless Heater Co.....C2670

Richardson & Boynton Co.....C2671

Gas-Era.....C2666; C2671

Kane.....C2655

—Heating—Smokeless

Cox, Abram, Co.....C2642

Hart and Crouse Co.....C2650

Kewanee Boiler Co.....C2658

National Radiator Corp.....C2667

Richardson & Boynton Co.....C2671

Smith, H. B., Co.....C2678

Novelty.....C2642

Perfect.....C2671

Royal.....C2650

—Hot Water Supply

See Heaters, Water, Coal Fired

—Power—Fire Tube or Water Tube

Brownell Co.....C2639

Fitzgibbons Boiler Co.....C2646

Keeler, E., Co.....C2656

Titusville Iron Works Co.....C2684

Perfection.....C2684

—Range—Copper

Badger, E. B., & Sons Co.....C2398

Dahlquist Mfg. Co.....C2400

Gerstein, H., & Sons.....C2399

Randolph-Clowes Co.....C2402

See also pages.....C2397; C2558

Aquatherm.....C2400

Brown and Brothers.....C2402

Specifications.....C2398; C2400

—Range—Heater Combination

See Heaters, Water, Gas—Combination

Range Boiler and Heater; Heaters,

Water, Electric—Combination Range

Boiler and Heater; Heaters, Water,

Kerosene—Combination Range Boiler

and Heater

—Range—Relief Valves for

See Valves, Range Boiler Relief

Bolts**—Barrel**

Corbin, P. & F.....B1891

Russell & Erwin Mfg. Co.....B1958

See also page.....B1859

Russwin.....B1958

—Casement Window

Casement Hardware Co.....B2076

Hagstrom Mfg. Co.....B2080

Monarch Metal Products Co.....B2082

Bolt-Fast.....B2076

Win-Dor.....B2076

Bolts—Cont.**—Cremone**

- Corbin, P. & F. B1891
 Phenix Mfg. Co. B1823
 Richards-Wilcox Mfg. Co. B1827
 Russell & Erwin Mfg. Co. B1824; B1958
 Stanley Works. B1843
Russwin. B1824; B1958

—Door, Emergency Exit

See Exit Devices, Fire or Panic

—Expansion

- Ackerman-Johnson Co. A146
 Ankyra Mfg. Co. A147
 Chicago Expansion Bolt Co. A140
 See also pages. A132; B1814
Ankor A147

—Flattened End—Hanger, etc.

Kohler Die & Specialty Co. A141

—Foot, Chain, etc.

- Corbin, P. & F. B1891
 McKinney Mfg. Co. B1820; B1880
 Phoenix Mfg. Co. B1823
 Richards-Wilcox Mfg. Co. B1827
 Russell & Erwin Mfg. Co. B1958
 Stanley Works. B1843
 See also page. B1859
Russwin B1958

—Garage Door

See Bolts, Cremone; Bolts, Foot, Chain, etc.

—Lavatory Door

- Chicago Spring Hinge Co. B1869
 Corbin, P. & F. B1891
 Milwaukee Stamping Co. B1874
 Russell & Erwin Mfg. Co. B1958
 See also pages. A1102; B1866
Russwin B1958
Triplex B1869

—Night

See page. A1102

—Sliding Door

Richards-Wilcox Mfg. Co. B1827

—Toggle

Chicago Expansion Bolt Co. A140

Bonding Compounds**—Concrete**

- Adensite Co., Inc. A47
 Anti-Hydro Waterproofing Co. A50
 Concrete Surface Corp. A104
 Genfire Steel Co. A62
 Living-Stone Co. A93
 North American Cement Corp. A90
 Par-Lock Co. A76
 See also page. A64
Bondsit A64
Cal A90
Con-Tex A104
Par-Lock Plaster Key. A76
 Specifications. A47; A93; A104

—Plaster, Bituminous

See Plaster Bond, Bituminous

Bookcases, Wood

(See also Cabinet Work; Mill Work)

See page. B1138

Book Lifts

See Lifts, Light, Hand and Power; Dumbwaiters

Bookstacks, Metal

- Art Metal Construction Co. B2176
 Sneed & Co. B2182
 Van Dorn Iron Works Co. B2186

Booths**—Telephone**

Bunnell, J. H., & Co. B2166

—Telephone Receding Door—Hardware for

See Hangers, Door, Receding; Hinges, Receding Door

—Telephone and Ticket

Newman Mfg. Co. A784
 See also pages. A765; A776

Border Lights

See Stage Fittings and Lighting

Boring Test—Foundation

Hunt, Robert W., Co. A5

Bottle Racks

- Soellner, Herman. C3381
Honeycomb C3381

Bowling Alleys

- Brunswick-Balke-Collender Co. C3324
 Space Required C3324

Bowls, Stock Watering—Automatic

- James Mfg. Co. C3384
 Loudon Machinery Co. C3385

Boxes**—Feed**

See Barn Equipment

—Fire Alarm

See Fire Alarm Systems

—Flower

- Andre-White Corp. C2734
 Galloway Terra Cotta Co. A338
 See also pages. A616; A802
Dixie C2734

—Gutter

Canton Foundry & Machine Co. A606

—Ice

See Refrigerators

—Letter, Apartment House

See Letter Boxes, Apartment House

—Mail Chute

See Chutes, Mail

—Mail—Forged

See page. B1878

—Mail—Telephone Unit

See Telephone Letter Box Units, Vestibule

—Meter, Steel

Donley Brothers Co. A610

—Outlet—Electric Conduit

- General Electric Co. C2938
 National Metal Molding Co. C2900
 See also page. C2896

—Outlet—Electric, Fan Hanger

- Adam, Frank, Electric Co. C2880
 Fullman Mfg. Co. C2937
F-A C2880
Latrobe C2937
 Specifications C2880

—Outlet—Electric, Floor Adjustable

- Adam, Frank, Electric Co. C2880
 Fullman Mfg. Co. C2937
F-A C2880
Latrobe C2937
 Specifications C2880

—Outlet, Electric—Switch and Receptacle

- General Electric Co. C2938
 Hart & Hegeman Mfg. Co. C2944
H & H. C2944

—Register

See Registers, Heating and Ventilating

—Safe Deposit

- Diebold Safe & Lock Co. A1092
 Mosler Safe Co. A1097
 York Safe and Lock Co. A1101
 See also pages. A1094; A1096

—Steel

See pages. B2093; C2416

—Switch

- General Electric Co. C2938
 See also page. C2896

—Wall, Metal

- Duplex Hanger Co. A584
 Van Dorn Iron Works Co. A586

Brackets**—Closet—Garment Rod**

Corbin, P. & F. B1891

—Column

See Caps and Bases, Column

—Electric Wiring

National Metal Molding Co. C2900

—Lamp

See Standards and Brackets, Lamp; Lighting Fixtures, Electric

—Lavatory

See Lavatory Brackets or Chairs

—Pipe

See Hangers, Pipe; Rolls, Pipe

—Radiator

See Radiator Hangers

—Shelving, Adjustable

See Shelving, Adjustable—Hardware for

Brackets—Cont.**—Sliding Door**

See Hangers, Door

—Stair Rail

- Richards-Wilcox Mfg. Co. B1827
Holdtite B1827

—Water Closet

See Closet Brackets or Chairs

—Window Shade

See Shades, Window—Brackets for

Brass

—Architectural, see Ornamental Metal Work

—Extruded, see Extruded Metal Shapes

—Pipe, see Pipe, Brass or Copper

—Rods, see Rods, Brass, Bronze, Copper or Nickel Silver

—Sheets, see Sheet Metal, Brass, Bronze, Copper or Nickel Silver

Breakfast**—Nooks**

- Built-in Fixture Co. B2188
Peerless B2188

—Rooms—Fold-away

(See also Dining Rooms—Fold-away)

- Built-in Fixture Co. B2188
 Fain Mfg. Co., Inc. B2254
 Nichols & Cox Lumber Co. B2256
 Wasmuth-Endicott Co. B2220
 "White" Door Bed Co. B2246
Dinofold B2256
Pullmanook B2220

—Tables—Door Combination

- Farley & Loetscher Mfg. Co. B2224
In-the-door B2224
Qualitybilt B2224

Brick**—Asphalt**

See Blocks, Paving, Asphalt

—Asphalt—Felt Composition

Servicised Products Corp. A79

—Cinder Concrete

National Building Units Corp. A373
Cincrete A373

—Cleaning Compounds

- Building Chemicals Corp. A103
BriXope A103
 Specifications A103

—Common

- Common Brick Mfrs.' Assn. of America A214
 Sayre & Fisher Co. A239
 Western Brick Co. A242
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—Cork

See Cork Brick

—Enameled

American Enameled Brick & Tile Co.

- Co. A219
 Gladding, McBean & Co. A469
 Hydraulic-Press Brick Co. A230
 Ketcham, O. W. A339
 Sayre & Fisher Co. A239
Hy-tex A230

—Face or Front

- Acme Brick Co. B1496
 American Enameled Brick & Tile Co. A219
 Carlyle-Labold Co. A218
 Finzer Bros. Clay Co. A224
 Fiske & Co., Inc. A226
 Gladding, McBean & Co. A469
 Hanley Co., Inc. A227
 Hocking Valley Products Co. A228
 Hydraulic-Press Brick Co. A230
 Ketcham, O. W. A339
 Medal Brick & Tile Co. A236
 Metropolitan Paving Brick Co. A233
 Sayre & Fisher Co. A239
 Western Brick Co. A242
 Wyandot Clay Products Co. A243
 See also pages. A372; A468
Agcroft Oldstyle A236
Caledonian A226
Clatone A218
Cloister A242
Doric A242

Brick—Cont.**—Face or Front—Cont.**

<i>Empire</i>	A242
<i>Gothic</i>	A242
<i>Greendale</i>	A228
<i>Hy-tex</i>	A230
<i>Metro</i>	A233
<i>Old English</i>	A239
<i>Persiantex</i>	B1496
<i>Rain-washed</i>	A239
<i>S. & F.</i>	A239
<i>Tapstry</i>	A226

—Fire

Bannon, P., Pipe Co.	A351
Maurer, Henry, & Son.	A255
Sayre & Fisher Co.	A239
See also pages.	A219; A469; C2858
<i>Flue</i>	A239
<i>Phoenix</i>	A239

—Fireplace or Mantel

See Brick, Face or Front

—Floor—Packing House, Battery Room, etc.

Athena Glazed Brick Co.	A222
Ketcham, O. W.	A339

—Hollow

Delaware Clay Co.	A244
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—Hollow—Special

Fiske & Co.	A226
Hoosier Building Tile & Silo Co.	A358
Sayre & Fisher Co.	A239
<i>Fisklock</i>	A226
<i>Holo-Brick</i>	A358

—Insulating

See Blocks, Insulating; Insulation

—Paving

National Paving Brick Mfrs. Assn.	A384
See also pages.	A230; A339

—Radial, Perforated

Whitacre-Greer Fireproofing Co.	A370
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—Salt Glazed—Smooth

Athena Glazed Brick Co.	A222
Hydraulic-Press Brick Co.	A230
Ketcham, O. W.	A339
Stark Brick Co.	A240
<i>Athena</i>	A339
<i>Hy-tex</i>	A230

—Special Shapes—Moulded Arch, etc.

American Enameled Brick & Tile Co.	A219
Hydraulic-Press Brick Co.	A230

Brick Size Wall Ventilators

See Ventilators, Wall—Common Brick Size

Brick Veneer Base

See Wood Lath and Insulation Combination

Bricklayers' Cement

See Cement, Bricklayers'

Bridges, Steel

See Structural Steel Fabricators and Designers

Bridging, Wood Joist

Blaw-Knox Co.	A686
Youngstown Pressed Steel Co.	B1309
<i>Tru-Tye</i>	A686
<i>YPS</i>	B1309

Broilers

Gloekler, Bernard, Co.	C3290
Michigan Stove Co.	C3256
Van, John, Range Co.	C3284
See also pages.	C3263; C3267
<i>Garland</i>	C3256
<i>Pix</i>	C3284

Bronze**—Architectural**, see Ornamental Metal Work**—Extruded**, see Extruded Metal Shapes**—Rods**, see Rods, Brass, Bronze, Copper or Nickel Silver**—Sheets**, see Sheet Metal, Brass, Bronze, Copper or Nickel Silver**—Tablets**, see Tablets, Cast Bronze**Broom Closets**

See Closets, Broom

Brownstone

See Sandstone

Brushes, Floor Polishing

See Polishers, Floor

Bubbling Cups

See Fountains, Drinking

Buckets**—Clamshell, Dragline, etc.**

See page. C2416

—Fire

See Fire Extinguishing Apparatus

—Garbage

See Cans, Garbage

Bucks, Door

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Buckwheat Coal Burning Systems

See Coal Burning Systems, Buckwheat; Grates, Buckwheat Coal

Building**—Cleaning**, see Cleaning, Building Exteriors**—Directories**, see Directories, Building**—Paper**, see Paper, Building**Buildings****—Glass**

See Glass, Corrugated Wire; Greenhouses and Conservatories

—Mill Construction

E-Z-Bilt Mfg. Co., Inc. A564

See also page. A560

—Portable—Wood

See Houses, Portable—Wood

—Schoolhouses

See Schoolhouses

Bull Pens

See Pens, Live Stock

Bulletin**—Board Frames**, see Directories, Building; Ornamental Metal Work**—Boards**, see Boards, Bulletin**Bulletproof Glass**

See Glass, Bulletproof

Bumpers and Coat Hook Combination—Lavatory Door

Milwaukee Stamping Co. C1874

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Bumpers and Stops, Door

Bommer Spring Hinge Co.	B1866
Corbin, P. & F.	B1891
Milwaukee Stamping Co.	B1874
Russell & Erwin Mfg. Co.	B1958
<i>Russwin</i>	B1958

Bunker Pans

Market Forge Co. C3086

Maforco C3086**Burglar Alarms, Electric**

American District Telegraph Co.	A1106
Edwards and Co., Inc.	C3007
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- Breakfast Nook**
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- Lavatory**
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- Library**
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Sikes Co. B2172
- Special**
Irving & Casson-A. H. Davenport Co. B2168
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- Water Closet**
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- Chalk**
 - Trough Covers, see Blackboard Chalk Rail Covers
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- Check Room Equipment—Hotel, Club, etc.**
Vogel-Peterson Co. C3345
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- Checks and Closers, Door**
Corbin, P. & F. B2040
Larimer Co. B2042
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Richards-Wilcox Mfg. Co. B1827
Russell & Erwin Mfg. Co. B2048
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- Chemical**
 - Stoneware**
Knight, Maurice A. C3316
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 - Caps and Pots—Cinder Concrete**
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 - Caps and Pots—Terra Cotta**
Atlantic Terra Cotta Co. A334
Bannon, P., Pipe Co. A351
Cambridge-Wheatley Co. B1430
Galloway Terra Cotta Co. A338
 - Ornaments, Forged**
Earle Hardware Mfg. Co. B1952
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 - Repairing and Remodeling**
American Chimney Corp. C3174
Continental Chimney Co., Inc. C3175
Custodis, Alphons, Chimney Construction Co. C3176
Heinicke, H. R., Inc. C3177
Summerhays, Wm., Sons Corp. C3180
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 - Tops—Sheet Metal**
Globe Ventilator Co. A537
- Chimneys**
 - Common Brick**
American Chimney Corp. C3174
Continental Chimney Co., Inc. C3175
Summerhays, Wm., Sons Corp. C3180
 - General**
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 - Radial Brick**
American Chimney Corp. C3174
Continental Chimney Co., Inc. C3175
Custodis, Alphons, Chimney Construction Co. C3176
Heinicke, H. R., Inc. C3177
Kellogg, M. W., Co. C3178
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 - Steel**
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China Cabinets

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Chlorine Control Apparatus

(Water, sewage and swimming pool purification, antiseptics, disinfectants, bleaches, deodorizers, etc.)

Marsh Electro Chlorination Co., Inc. B1487
 Paradon Mfg. Co. B1490
 Wallace & Tiernan Co., Inc. B1492
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Chlorinator B1492
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Chromium Plating

Chromium Corp. of America C2524
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 Canton Foundry & Machine Co. A606
 Donley Brothers Co. A610
 Gabriel Steel Co. A612
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 Majestic Co. A616
 Mesker Brothers Iron Co. A1071
 Peerless Mfg. Co., Inc. A630
 Sykes Metal Lath Co. A629
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Dalite A1071
Economy A629
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YPS A613
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—Gravity—Straight or Spiral

Haslett Chute and Conveyor Co. C3194
 Lamson Co. C3196
 Olson, Samuel, & Co. C3198
 Otis Elevator Co. C3108
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—Ice Recording

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—Laundry

Metal-Vitrix Co. C3312
 Olson, Samuel, & Co. C3314

—Laundry, Aluminum

Haslett Chute and Conveyor Co. C3194
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—Laundry, Steel—Glass Lined

Pfaudler Co. C3315

—Mail

Cutler Mail Chute Co. C3320
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—Waste

Haslett Chute and Conveyor Co. C3194
 Metal-Vitrix Co. C3312
 Olson, Samuel, & Co. C3314
 Pfaudler Co. C3315
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 —Sills, see Sills, Cinder Concrete
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Circuit Breakers

General Electric Co. C2888
 Westinghouse Electric & Mfg. Co. C2862

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—I-Beam—Pipe Hanger, see Hangers, Pipe
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Hillyard Chemical Co. B1535
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 Atlantic Terra Cotta Co. A334
 —Systems—Compressed Air
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Cleats, Prepared Roofing

Barber Asphalt Co. A398
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—Bar—Concrete Reinforcing
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 —Beam Reinforcement
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 —Floor Sleeper
 Blastel Mfg. Co. A149
 Bull Dog Floor Clip Co. A150
 Dayton Sure Grip & Shore Co. A148
 Kalman Steel Co. A130
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—Floor Sleeper, Sound Deadening

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—Furring—Ceiling, Stucco Reinforcement, etc.

Concrete Engineering Co. A110
 Dayton Sure Grip & Shore Co. A148
 Goldsmith Metal Lath Co. B1298
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—Furring—Suspended Ceiling

Concrete Clip & Wire Co. A124
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—Fuse

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—Plaster Board—Ceiling and Partition Systems

Simplex Steel Products Co. B1324

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—Stucco Reinforcement

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—Electric—Secondary
 Connecticut Telephone & Electric Co. C3022
 Landis & Gyr, Inc. C3391
 McClintock, O. B., Co. A1107
 Standard Electric Time Co. C3392
 Time Systems Co. C3396
 Warren Telechron Co. C3400
Detroit C3396
Magneta C3391
Telechron C3400
 Specifications C3396
 —Pneumatic—Secondary
 Time Systems Co. C3396
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 —Watchman's
 American District Telegraph Co. C3016
 Edwards and Co., Inc. C3007
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Clocks**—Bank—Pedestal, Bracket, etc.**

Howard, E., Clock Co. C3390
 McClintock, O. B., Co. A1107
 Standard Electric Time Co. C3392
 Thomas, Seth, Clock Co. C3394
 Warren Telechron Co. C3400

—Electric

Landis & Gyr, Inc. C3391
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Rich-Wil B1827
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—Swinging Door

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Fee and Mason Mfg. Co. C2480

—Flush Valves

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—Garment Carriers

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—Lining, Cedar

Brown, George C., & Co. B1127
 Bruce, E. L., Co. B1565
Ceda'line B1565
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—Partitions

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—Rods—Garment

Corbin, P. & F. B1891
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 Brunswick-Balke-Collender Co. C2500
 Church, C. F., Mfg. Co. C2505
 Heap, William, & Son. C2504
 Luzerne Rubber Co. C2509
 Never Split Seat Co. C2510
 Phenolic Products Corp. C2512
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Sani-WhiteC2505
Whale-Bone-IteC2500
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 Behrer & Co., Inc.C2498
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 Cabranette Corp.B2193
 Coppes Bros. & Zook.B2194
 Farley & Loetscher Mfg. Co.B2196
 H. M. C. Sales Corp.B2200
 Jones & Kirtland, Inc.B2204
 Kozy-Kitch Kitchenet Co.B2206
 Majestic Steel Cabinet Co.B2214
 McDougall Co.B2210
 Peterson and Neville, Inc.B2216
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—Water, Bends and Fittings for

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- Hopper
 Crane Co.C2546

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—Ball—Water Closet Tank

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—Fur Fixtures, see Fur Fixtures, Cold Storage

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Clinton Metallic Paint Co.A247

Horn, A. C., Co.A64

Master Builders Co.A96

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Crex Patent Column Co.A580

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—Metal—Porch, Pergola, etc.

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Hartmann-Sanders Co.B1230

Somerset Door & Column Co.B1236

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—Wood—Porch, Pergola, etc.

Hartmann-Sanders Co.B1230

Somerset Door & Column Co.B1236

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- Anti-freeze Compounds, see Anti-freeze Compounds, Concrete
- Blocks, Cinder, see Blocks, Cinder Concrete
- Brick, Cinder, see Brick, Cinder Concrete
- Bonding Compounds, see Bonding Compounds, Concrete
- Contraction Joints, see Joints, Contraction
- Expansion Joints, see Joints, Expansion, Concrete
- Floor Sleeper Clips, see Clips, Floor Sleeper
- Forms, see Forms
- Gypsum, see Cement, Gypsum—for Gypsum Concrete
- Hardeners, Densifiers and Dustproofers, see Hardeners and Densifiers, Cement and Concrete
- Hollow Cinder Tile, see Tile, Hollow or Solid, Cinder Concrete
- Hollow Tile, see Tile, Hollow, Concrete
- Lintels, Cinder, see Lintels, Reinforced Cinder Concrete
- Inserts, see Inserts, Concrete
- Nailing Base, see Nailing Concrete; Tile Hollow or Solid, Cinder Concrete
- Piles, see Piles, Concrete
- Roof, Tile, see Tile, Roof, Reinforced Cement
- Roofing Tile, see Tile, Roofing, Concrete
- Sills, see Sills, Cinder Concrete
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 - Armstrong Cork Co. B1758
 - Armstrong Cork & Insulation Co. B1508
 - Bonded Floors Co., Inc. B1588
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 - Creswell, Samuel J., Iron Works. A608
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- Trench, Gutter, etc.
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- Cistern
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 - Creswell, Samuel J., Iron Works. A608
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 - Canton Foundry & Machine Co. A606
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- Granite
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 - Judd, H. L., Co., Inc. B2261
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 - Clark, Peter, Inc. C3212
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 - American Foundry & Furnace Co. C2805
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- Fireplace
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McClintock, O. B., Co. A1107

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 Harsch, John, Bronze & Foundry Co. A768
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 Michaels Art Bronze Co., Inc. A778
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—Ash Trap

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McLauthlin, George T., Co. C3144
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Ferro Studio Inc.....	A761
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Heath, J. S., Co.....	A770
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Adams Co.....	A943
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—Horizontal Folding	
Kinnear Mfg. Co.....	A898
Peelle Co.....	A879
Richmond Fireproof Door Co.....	A884
Security Fire Door Co.....	A888
See also pages.....	A842; A854; A892; A896
<i>Horifold</i>	A888

—Horizontal Trolley

Ogden, J. Edward, Co.....	A892
Overhead Door Corp.....	B1822
Richmond Fireproof Door Co.....	A884

—Industrial

(Doors with channel or tubular stiles and rails primarily designed for industrial use)

Allison Steel Products Co.....	A1059
Bayley, William, Co.....	A1060
Bogert & Carlough Co.....	A1068
Detroit Steel Products Co.....	A955
Federal Steel Sash Co.....	A1076
Genfire Steel Co.....	A948
Lupton's, David, Sons Co.....	A1044
Truscon Steel Co.....	A1082
See also page.....	A1080
<i>Boca</i>	A1068
<i>Fenestra</i>	A955
Specifications	A955; A1060

—Ironing Board Combination

See Ironing Boards, Door Combination

—Kalamein

See Doors, Metal Covered

—Mausoleum

Cincinnati Mfg. Co.....	A752
Detroit Mausoleum Equipment Works	A758
Heath, J. S., Co.....	A770
Illinois Bronze & Iron Works....	A767
Newman Mfg. Co.....	A836
See also pages.....	A750; A757; A765; A768; A774; A776; A778; A782; A789; A792; A794; A798; A801; A804

—Mechanically Operated

(Including: Horizontal and Vertical Sliding; Horizontal Folding and Trolley; Counter-balanced and Telescoping; Rolling Steel; etc.)

Allen & Drew, Inc.....	A913
Cornell Iron Works, Inc.....	A894
Kinnear Mfg. Co.....	A898
Peelle Co.....	A879
Variety Fire Door Co.....	A842
Wilson, J. G., Corp.....	A910

—Metal Covered

Architectural Metal Products, Inc..	A848
Automatic Power Door Mfg Co....	B2050
Chesley, A. C., Co.....	A850
Cincinnati Mfg. Co.....	A814
Empire Fireproof Door Co.....	A852
Firecraft Corp.....	A854
Friedrich, E. H., Co.....	A856
Howell, Field & Goddard, Inc.....	A860
Illinois Bronze & Iron Works....	A767
Leonard Sheet Metal Works, Inc..	A924
Mahon, R. C., Co.....	A859
Mesker Brothers Iron Co.....	A1071
Metal Clad Doors, Inc.....	A862
Moesch-Edwards Corrugating Co., Inc.	A908
Newman Mfg. Co.....	A836
New York Kalamein Co.....	A866
Philipp Mfg. Co.....	A868
Reliance Fireproof Door Co.....	A863
Richmond Fireproof Door Co.....	A884
Syracuse Fire Door Corp.....	A870
Thorp Fire Proof Door Co.....	A871
Variety Fire Door Co.....	A842
See also pages.....	A503; A513; A877; A896; B1808

<i>Leedor</i>	A848
<i>Lion</i>	A877
<i>Mecco</i>	A908
<i>Metcla</i>	A862
<i>Standwell</i>	A860
Specifications..	A850; A856; A863; A866

Doors—Cont.**—Motor Operated**

See Doors, Mechanically Operated

—Pipe Shaft or Access

See Doors, Access

—Power

See Specific Type of Door; Doors Mechanically Operated; Operators, Door

—Receding or Disappearing, Hardware for

See Hangers, Door, Receding; Hinges, Receding Door

—Refrigerator

See Doors, Cold Storage or Refrigerator

—Revolving—Automatic Panicproof

Atchison Revolving Door Co.....	A916
Revolving Doors, Inc.....	A919
Van Kannel Revolving Door Co....	A920
Specifications	A916; A920

—Rolling Steel

Acme Partition Co., Inc.....	B2156
Cornell Iron Works, Inc.....	A894
Johnson, Geo. W., Mfg. Co.....	A896
Kinnear Mfg. Co.....	A898
Majestic Iron Works, Inc.....	A893
Moeschl-Edwards Corrugating Co., Inc.	A908
Swedish Venetian Blind Co.....	B2162
Variety Fire Door Co.....	A842
Wilson, J. G., Corp.....	A910
See also page.....	B2159
<i>Akbar</i>	A898
<i>Mecco</i>	A908

—Rolling Steel, Motor Operated

See Doors, Mechanically Operated

—Rolling Wood

Acme Partition Co., Inc.....	B2156
Grant Pulley and Hardware Co....	B2160
Kinnear Mfg. Co.....	A898
Wilson, J. G., Corp.....	A910

—Screen

See Screens, Insect

—Service Cabinets for

Servidor Co.....	B1170
Specifications	B1170

—Sheet Steel

Firecraft Corp.....	A854
North American Iron Works, Inc..	A787
Reliance Fireproof Door Co.....	A863
Richmond Fireproof Door Co.....	A884
See also pages.....	A565; A704; A714; A798; A896; A1071

All Steel..... A876*Massillon*..... A565**—Showcase**

See pages B1752; B1758; B1763

—Shower Stall—Glass

Coco Brothers, Inc.....	C2525
Crist & Schilken Co., Inc.....	C2526
Lehman, L. H.....	C2530
S. M. Shower Door Co.....	C2529
Zahner Mfg. Co.....	C2532
Zouri Drawn Metals Co.....	C2534
<i>C & S</i>	C2526
Specifications	C2532

—Sidewalk, Illuminating

See Doors, Sidewalk, Vault Light

—Sidewalk, Metal

American Abrasive Metals Co....	A666
American Bar Lock Co., Inc.....	A386
Canton Foundry & Machine Co....	A606
Morris, Herbert, Inc.....	C2852
Richards & Kelly Mfg. Co.....	A392
See also pages.....	A608; A648; A649; A696; A703; A714; A726; A787; A798; A802; C2857; C3148

Alumalun*Bar Lock*..... A386**—Sidewalk, Metal or Vault Light, Safety Guarded — Automatically Opened and Closed**

Elian, Frank, & Co.....	C2844
Ernst, C. K., Specialty Co.....	C2846
Gillis & Geoghegan.....	C3183
Morris, Herbert, Inc.....	C2852
See also page.....	C2857
<i>Dean</i>	C2858
<i>G & G</i>	C3183
Specifications	C2846; C2858; C3183

Doors—Cont.**—Sidewalk—Opening and Closing Devices for**

Elian, Frank, & Co.	C2844
Ernst, C. K., Specialty Co.	C2846
Gillis & Geoghegan	C3183
Morris, Herbert, Inc.	C2852
Washburn & Granger, Inc.	C2858
See also page	C2857
Dean	C2858
G&G	C3183
Specifications	C2858; C3183

—Sidewalk, Vault Light

American Bar Lock Co., Inc.	A386
Canton Foundry & Machine Co.	A606
Richards & Kelly Mfg. Co.	A392
See also page	A388
Bar Lock	A386

—Sound Retarding

Boston Acoustical Engineering Co.	B1131
Hamlin, Irving	B1146
Evanston	B1146
Trimount	B1131

—Stack

See Doors, Ash Pit or Clean-out

—Steel, Tubular or Channel

See Doors, Industrial

—Tin Clad—Sliding or Swinging

Lyon-Carr Fire Door Co.	A877
Metal Clad Doors, Inc.	A862
Richards-Wilcox Mfg. Co.	B1827
Richmond Fireproof Door Co.	A884
Security Fire Door Co.	A888
Syracuse Fire Door Corp.	A870
Variety Fire Door Co.	A842
Willis Mfg. Co.	A933
See also pages A503; A552; A850; A852;	
A854; A896; A908; B1808; C3144	
Lion	A877
Metcla	A862

—Toilet, Steel

Hart & Hutchinson Co.	B2106
Sanymetal Products Co.	B2120
Weis, Henry, Mfg. Co., Inc.	B2124
Veneer-Steel	B2106
Weisteel	B2124
Specifications	B2106

—Tubular Steel

See Doors, Hollow Metal; Doors, Industrial

—Vault Front

Diebold Safe & Lock Co.	A1092
Hall's Safe Co.	A1094
Herring-Hall-Marvin Safe Co.	A1096
Mosler Safe Co.	A1097
Schwab Safe Co.	A1098
York Safe and Lock Co.	A1101
Specifications	A1094; A1097; A1098

—Veneered—Fireproof (Asbestos and Wood Combination)

Compound and Pyrono Door Co.	A847
See also page	B1210
Pyrono	A847
Specifications	A847

—Veneered—Flush and Paneled

Carnahan Mfg. Co.	B1132
Compound and Pyrono Door Co.	B1134
Crooks, W. D., & Sons	B1136
Farley & Loetscher Mfg. Co.	B1140
Hardwood Products Corp.	B1141
Hyde-Murphy Co.	B1144
Indiana Quartered Oak Co.	B1145
McMillen, R., Co.	B1148
Morgan Woodwork Organization	B1150
Paine Lumber Co., Ltd.	B1154
Radford Co.	B1156
Roddis Lumber and Veneer Co.	B1151
Wheeler, Osgood Co.	B1158
See also page	B1138
Aristocrat	B1156
Belle Porte	B1158
Blue Diamond	B1141
DuraDor	B1145
Evans	B1132
Flushwood	B1150
Key-Veneered	B1134
Klimax	B1154
Korelock	B1154
Laminex	B1158

Doors—Cont.**—Veneered—Flush and Paneled—Cont.**

Max-Royal	B1148
Miracle	B1154
No Warp	B1144
Nuart	B1140
Sterling	B1151
Specifications	B1134; B1150; B1151; B1154; B1156

—Vertical Lift

Lupton's, David, Sons Co.	A1044
Burgett	A1044

—Vertical Sliding

Kinnear Mfg. Co.	A898
Richmond Fireproof Door Co.	A884

—Wood, Laminated

Automatic Power Door Mfg. Co.	B2050
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—Wood, Solid

Automatic Power Door Mfg. Co.	B2050
McMillen, R., Co.	B1148
Morgan Woodwork Organization	B1150
Radford Co.	B1156
Wheeler, Osgood Co.	B1158
See also pages	B1138; B1141
Max-Royal	B1148
Woco	B1158

Draft Apparatus

See Blowers; Fans; Mechanical Draft Apparatus

Drafting Room Accessories

Hamilton Mfg. Co.	A1
Pease, C. F., Co.	A2

Drain**—Boards—Copper, White Metal, etc.**

Trageser, John, Steam Copper Works	C2558
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—Boards—Slate

Structural Slate Co.	B1378
Pyramid	B1378
Specifications	B1378

—Pipe

See Pipe, Drain

—Tile

See Tile, Drain

Drainers, Cellar

See Ejectors, Hydraulic, Automatic; Pumps, Bilge, Automatic Electric

Drains**—Backwater Valve**

Boosey, Norman, Mfg. Co.	C2339
Compound Injector & Specialty Co.	C2342
Crampton-Farley Brass Co.	C2344
Donovan, John J.	C2346
Josam Mfg. Co.	C2350
Wade Iron Sanitary Mfg. Co.	C2349
Acme	C2342
Eclipse	C2346
San-Seal-O	C2344
Signet	C2344

—Double Drainage

Josam Mfg. Co.	C2350
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—Floor, Yard, etc.

Boosey, Norman, Mfg. Co.	C2339
Canton Foundry & Machine Co.	A606
Compound Injector & Specialty Co.	C2342
Covert, H. W., Co.	C2348
Crampton-Farley Brass Co.	C2344
Creswell, Samuel J., Iron Works	A608
Donovan, John J.	C2346
Elkay Mfg. Co.	B2104
Josam Mfg. Co.	C2350
Rile Co., Inc.	C2334
Superior Skylight Co., Inc.	C2336
Wade Iron Sanitary Mfg. Co.	C2349
See also pages	A622; A798; C2318
Acme	C2342
Anti-clog	C2348
Eclipse	C2346
Josam-Duriron	C2318
Noxall	C2344
Peerless	C2342
San-Seal-O	C2344
Signet	C2344

—Flushing

Wade Iron Sanitary Mfg. Co.	C2349
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—Garage, Mud Arresting

Compound Injector & Specialty Co.	C2342
Covert, H. W., Co.	C2348

Drains—Cont.**—Garage, Mud Arresting—Cont.**

Donovan, John J.	C2346
Josam Mfg. Co.	C2350
Wade Iron Sanitary Mfg. Co.	C2349
Anti-clog	C2348
Dehn's Peerless	C2342
Eclipse	C2346

—Refrigerator Drip

See pages C2342; C2350

—Roadway

See Gratings, Drainage, Roadway

—Roof

Aeolus Dickinson Co.	A597
Barrett Co.	C2333
Boosey, Norman, Mfg. Co.	C2339
Josam Mfg. Co.	C2350
Mahon, R. C., Co.	C2338
Rile, Co., Inc.	C2334
Superior Skylight Co., Inc.	C2336
Wade Iron Sanitary Mfg. Co.	C2349
Dickinson	A597
Holt	C2333
Specifications	C2334

—Roof, Strainers for

See Strainers, Roof

—Scupper

See Scuppers

—Shower or Urinals

See Drains, Floor, Yard, etc.

—Stable Gutter

See page C3385

—Swimming Pool

Josam Mfg. Co.	B1486
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Draperies, Theater—Stage and Auditorium

See Furnishings and Equipment, Theater

Drawer Pulls

See Pulls, Drawer

Drawers**—Bench, Steel**

See page B2093

—Steel Shelving

See Boxes, Steel; Shelving, Steel

Drawing**—Board Parallel Rule Attachment**

See Parallel Rule Attachment

—Boards

Hamilton Mfg. Co.	A1
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—Instruments and Materials

Pease, C. F., Co.	A2
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—Paper

See Paper, Drawing

—Room Stools

See Stools, Drafting Room

—Tables

See Tables, Drawing

Dressers, Kitchen

See Cabinets, Kitchen

Dressing**—Cabinets, see Cabinets, Dressing**

—Tables, see Tables, Dressing

Dressings, Floor

See Paint; Varnish; Oil, Floor Finishing; Cleaners, Polishers and Preservatives; Preservatives, Wood Floor, etc.

Drilling of Wells

See Well Driving and Drilling

Drills, Electric—Portable

Ryerson, Joseph T., & Son Inc.	A132
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Drinking Water

—Fountains, see Fountains, Drinking

—Systems, see Fountains, Drinking; Refrigerating and Ice Making Machinery and Plants; Coolers

Driving of Wells

See Well Driving and Drilling

Drums, Tanners

See page C2421

Dryers**—Air, Fan Blast**

See Fans, Ventilating or Exhaust; Blowers, Pressure or Volume; Air Conditioning Apparatus

—Blue Print

See Blue Print Dryers and Ironers

Dryers—Cont.

—Clothes—Centrifugal

American Laundry Machinery Co. C3296
Smith Laundry Machinery Co. C3304
Troy Laundry Machinery Co., Inc. C3302
Perry Boltz. C3304

—Clothes—Coal, Electric, Gas or Steam Heated

Chicago Dryer Co. C3305
Domestic Laundry Equipment Corp. C3298
Hill Clothes Dryer Co. C3310
See also page. C3243
American C3298
Chicago C3305
Chicago-Francis C3305
Chicago-Rapido C3305

—Clothes, Folding—Built-in

Peterson and Neville, Inc. C2581

—Clothes, Outdoor

Chicago Dryer Co. C3305
Hill Clothes Dryer Co. C3310
Kunkler, F. J. C3293
Champion C3310
Chicago-Sun C3305

—Clothes—Tumbler

American Laundry Machinery Co. C3296
Troy Laundry Machinery Co., Inc. C3302
Aladdin C3296

Dumbwaiters

(See also Elevators; Hoists; Lifts)

—Doors for

See Doors, Dumbwaiter

—Electric—Push Button or Cable Control

Active Elevator Co. C3148
Beckwith Elevator Co., Inc. C3138
Capital Lift & Mfg. Co. C3096
Chelsea Elevator Co. C3140
Electric Dumbwaiters, Inc. C3142
Elevator Supplies Co., Inc. C3122
Energy Elevator Co. C3152
Lagerquist, Gust., & Sons. C3103
Marshall Brothers Co. C3104
McLauthlin, George T., Co. C3144
Payne, F. S., Co. C3146
See also pages. C3095; C3097; C3098;
C3099; C3100; C3105; C3114
Universal C3144
Specifications C3140

—Hand

Active Elevator Co. C3148
Beckwith Elevator Co., Inc. C3138
Chelsea Elevator Co. C3150
Energy Elevator Co. C3152
Kiesling, John W., & Son, Inc. C3158
Lagerquist, Gust., & Sons. C3103
Massa, George. C3157
Matot, D. A. C3162
Sedgwick Machine Works. C3167
See also pages. C3096; C3098; C3099
FDCG C3167
Little Beauty. C3152
Little Giant. C3152
Specifications. C3150; C3158; C3612;
C3167

—Hydraulic

Beckwith Elevator Co., Inc. C3138

—Light Duty—Book, Newspaper, Parcel, etc.

See Lifts, Light Hand and Power

—Under Counter

See Dumbwaiters, Hand; Dumbwaiters, Electric

Dumps, Ash—Fireplace

Adams Co. A622
Bawden, J. H., & Co. A623
Creswell, Samuel J., Iron Works. A608
Donley Brothers Co. A610
Gabriel Steel Co. A612
Jackson, Edwin A., & Bro., Inc. A628
Majestic Co. A616
Peerless Mfg. Co., Inc. A630
Sykes Metal Lath Co. A629
Economy A629
Jaxon A628

Dust Collecting Systems

See pages. C2790; C2801

Dustproofing Compounds, Cement and Concrete

See Hardeners and Densifiers, Cement and Concrete

Dyes, Wood

See Stains, Wood

E

Eaves Trough

See Gutters, Roof; Sheet Metal Work

Ecclesiastical Furniture and Accessories

—Brass

McGann, T. F., & Sons Co. A776
Vilsack, Martin Co. A802
See also pages A745; A765; A794; A1048

—Changeable Letter Boards

See Boards, Bulletin; Directories, Building

—Marble

Daprato Statuary Co. B2298
See also page. A265

—Wood

Irving & Casson-A. H. Davenport Co. B2168
Thomas and Co., Inc. B2299

Edgings, Stair

See Nosings, Stair

Efflorescence Cleaning Compounds

See Brick Cleaning Compounds

Ejectors

—Hydraulic, Automatic—Cellar Draining

Penberthy Injector Co. C2441
Specifications C2441

—Sewage

(See also Pumps, Bilge)
Automatic Primer Co. C2427
Chicago Pump Co. C2428
Economy Pumping Machinery Co. C2432
Nash Engineering Co. C2439
Quimby Pump Co., Inc. C2442
Taber Pump Co. C2444
Yeomans Brothers Co. C2446
Apco C2427
Flush-Kleen C2428
Jennings C2439
Shone C2446
Specifications C2428

Elbows

—Conductor Pipe

See Pipe, Conductor

—Flanged or Screwed

See Fittings, Pipe

—Union—Ball Check Water Seal

O-E Specialty Mfg. Co. C2768
Richardson & Boynton Co. C2770
—Union—Standard
American Radiator Co. C2718

Electric and Electrical

—Annunciators, Elevator, see Signal Systems, Elevator

—Annunciators, House, see Annunciators, House, Electric

—Bell Ringers, see Transformers, Miniature; Lighting and Power Systems

—Bells and Buzzers, see Bells and Buzzers, Electric

—Boxes, Outlet, see Boxes, Outlet

—Boxes, Switch, see Boxes, Switch

—Burglar Alarms, see Burglar Alarms, Electric

—Cable Terminal Lugs, see Cable Terminal Lugs

—Cables, see Wire and Cables, Electric

—Clock Systems, see Clock Systems

—Conduit, see Conduit, Electrical

—Conduit Fittings, see Conduit, Electrical, Fittings for

—Conduit Outlets, see Boxes, Outlet—Electrical Conduit

—Controllers, Elevator, see Elevators, Electric

—Cut-outs, see Cut-outs, Electric

—Dishwashers, see Dishwashers

—Door Controls, see Operators, Door

Electric and Electrical—Cont.

—Drills, see Drills, Electric—Portable

—Dumbwaiters, see Dumbwaiters, Electric

—Elevators, see Elevators, Electric

—Emergency Lighting and Power Systems, see Lighting and Power Systems, Electric, Emergency and Exit Lighting

—Exit Lighting Systems, see Lighting and Power Systems, Electric—Emergency and Exit Lighting

—Fire Alarms, see Fire Alarm Systems, Electric

—Fireplace Grates, see Heaters, Air, Electric—Fireplace or Mantel

—Floodlights, see Floodlights

—Floor Finishing and Polishing Machines, see Polishers, Floor; Flooring, Finishing, Waxing, Cleaning and Polishing Machines

—Fuses, see Fuses, Electric

—Generator Sets, see Generating Sets

—Generators, see Generators, Electric

—Heaters, Air, see Heaters, Air, Electric

—Heaters, Water, see Heaters, Water, Electric

—Horns, see Horns, Electric

—Hospital Signal Systems, see Signal Systems, Hospital—Electric

—Hypochlorite Control Apparatus, see Hypochlorite Control Apparatus

—Incandescent Lamps, see Lamps, Incandescent

—Instrument Sterilizers, see Sterilizers, Instrument—Electric

—Interlocks, Elevator Door, see Interlocks, Elevator Door

—Ironing Machines, see Ironing Machines

—Lifts, Light Duty, see Lifts, Light, Hand and Power

—Lighting, Emergency or Exit, see Lighting and Power Systems, Electric, Emergency and Exit Lighting

—Lighting Fixtures, see Lighting Fixtures, Electric

—Lighting Systems, Lighting and Power Systems

—Lighting Units, see Lighting Fixtures, Electric

—Loom, Flexible, see Conduit, Electrical, Flexible—Non-Metallic

—Motors, see Motors, Electric

—Mouldings, see Conduit, Electrical, Metal Moulding

—Panelboards, see Panelboards, Electric

—Plate Warmers, see Plate Warmers, Electric

—Push Buttons, see Push Buttons, Electric

—Radiators, see Heaters, Air, Electric

—Radiators—Steam or Hot Water, see Radiators, Electric—Steam or Hot Water

—Radio Outlet Receptacles, see Receptacles, Electric, Radio Outlet

—Ranges, see Ranges, Electric

—Receptacle and Indicating Switch, see Receptacles, Electric, Switch Combination—Indicating

—Receptacles, see Receptacles, Electric

—Reflectors, Lighting, see Reflectors, Lighting

—Rosettes, see Rosettes

—Safety Switches, see Switches, Electric

—Saws, see Saws, Electric—Portable

—Sewing Machines, see Sewing Machines

—Signal Systems, see Signal Systems

—Sockets, see Sockets, Electric

—Spotlights, see Spotlights

—Stage Fittings and Lighting, see Stage Fittings and Lighting, Electrical

—Switchboard Instruments, see Switchboard Instruments

—Switchboards, see Switchboards

—Switches, see Switches, Electric

—Telephones, see Telephone

—Time Control Switches, see Switches, Electric, Time Control

—Vacuum Cleaners, see Vacuum Cleaners

—Wall Base and Conduit Combination, see Base Combined with Electrical Conduit

—Wall Cases, see Boxes, Outlet

Electric and Electrical—Cont.

- Washing Machines, see Washers, Clothes
- Watchman's Clock Systems, see Clock Systems, Watchman's
- Wire, see Wire and Cables, Electric
- Wiring, see Wiring, Electrical

Electroliers

- See Standards and Brackets, Lamp; Lighting Fixtures

Electro-therapeutic Appliances

- See Therapeutic Appliances

Elevating and Conveying Machinery

- Capital Lift & Mfg. Co.....C3096
- Haslett Chute and Conveyor Co...C3194
- Lamson Co.....C3196
- Olson, Samuel, & Co.....C3198
- Otis Elevator Co.....C3108
- Standard Conveyor Co.....C3201

Elevator

- Annunciators, Electric, see Signal Systems, Elevator
- Cable Locks, see Locks, Elevator Cable
- Collapsible Gate Curtains, see Curtains, Elevator—Collapsible Gate
- Dispatching Controllers, see Signal Systems, Elevator—Dispatching
- Door Closers, see Closers, Door, Elevator
- Door Hangers, see Hangers, Door
- Door Interlocks, see Interlocks, Elevator Door
- Door Locks, see Locks, Elevator Door
- Door Operators, see Operators, Door Elevator
- Door Switches, see Switches, Electric, Elevator Door
- Doors, see Enclosures, Elevator; Doors, Hollow Metal; Doors, Metal Covered; Doors, Veneered—Fireproof
- Gates, see Gates, Elevator; Gates, Folding
- Guide Rails, see Guide Rails, Elevator
- Hatch Door Levers, see Levers, Hatch Door, Elevator
- Indicators, Mechanical, see Signal Systems, Elevator
- Signal Systems, see Signal Systems, Elevator

Elevators

- (See also Dumbwaiters; Hoists; Lifts)

- Ash
 - See Hoists, Ash; Elevators, Sidewalk
- Automatic—Inclined or Vertical
 - Haslett Chute and Conveyor Co...C3194
 - Olson, Samuel, & Co.....C3198
 - Standard Conveyor Co.....C3201
 - See also pages.....C3108; C3196
 - Subveyor*C3198
- Automatic Push Button
 - See Elevators, Electric
- Automobile or Carriage
 - Energy Elevator Co.....C3152
 - Marshall Brothers Co.....C3104
 - Sedgwick Machine Works.....C3167
 - See also pages.....C3095; C3150
- Belt Driven
 - Marshall Brothers Co.....C3104
 - Otis Elevators Co.....C3108
- Bucket
 - Olson, Samuel, & Co.....C3198
- Electric
 - A. B. See Elevator Co., Inc.....C3094
 - Active Elevator Co.....C3148
 - American Elevator & Machine Co..C3095
 - Beckwith Elevator Co., Inc.....C3138
 - Capital Lift & Mfg. Co.....C3096
 - Chelsea Elevator Co.....C3140
 - Eastern Machinery Co.....C3097
 - Elevator Co. of America.....C3098
 - Energy Elevator Co.....C3152
 - Houser Elevator Co.....C3099
 - Kaestner & Hecht Co.....C3102
 - Kimball Brothers Co.....C3100
 - Lagerquist, Gust., & Sons.....C3103
 - Marshall Brothers Co.....C3104
 - Montgomery Elevator Co.....C3105
 - Ohio Elevator and Machine Co....C3106
 - Otis Elevator Co.....C3108

Elevators—Cont.

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—Door, Garage—Right Angle Sliding

McKinney Mfg. Co.....	B1820
Richards-Wilcox Mfg. Co.....	B1827
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SlydaSyde	B1827

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Coburn Trolley Track Mfg. Co....	B1808
McKinney Mfg. Co.....	B1820
Richards-Wilcox Mfg. Co.....	B1827
Topping Mfg. Co.....	B1846
Easyfold	B1846
Slidetite	B1827
Specifications	B1846

—Door, Parallel Sliding

Allith-Prouty Co.....	B1800
Richards-Wilcox Mfg. Co.....	B1827

—Door, Parlor or House

McCabe Hanger Mfg. Co.....	B1814
Richards-Wilcox Mfg. Co.....	B1827
Advance	B1827
Hero	B1827
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Trojan.....	B1827
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Specifications	B1814

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(For Wardrobes, Clothes Closets, Lavatories, Telephone Booths, Toilets, etc.)	
Garden City Plating & Mfg. Co....	B2262
McCabe Hanger Mfg. Co.....	B1814
Richards-Wilcox Mfg. Co.....	B1827
Topping Mfg. Co.....	B1846
Easyfold	B1846
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—Door, Sliding, Flush

Richards-Wilcox Mfg. Co.....	B1827
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—Door, Sliding Folding Partition

McCabe Hanger Mfg. Co.....	B1814
Richards-Wilcox Mfg. Co.....	B1827
Topping Mfg. Co.....	B1846
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(For Barns, Warehouses, Factories, etc.)	
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Coburn Trolley Track Mfg. Co....	B1808
McCabe Hanger Mfg. Co.....	B1814
Richards-Wilcox Mfg. Co.....	B1827
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—Door, Straight Sliding—Light Weight

McCabe Hanger Mfg. Co.....	B1814
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—Furring—Suspended Ceiling

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Judd, H. L., Co., Inc.....	B2261
Knape & Vogt Mfg. Co.....	B2264
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Peterson.....	C3345
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Beaton & Cadwell Mfg. Co.....	C2746
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—Screen, Storm Sash, etc.

Casement Hardware Co.....	B2076
Phenix Mfg. Co.....	B1214
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—Shaft

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<i>Crysteel</i>	A52
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Warm Air Furnace Fan Co.C2636

MilesC2636**Heating and Ventilating Apparatus**

American Blower Co.C2788

Bishop & Babcock Sales Co.C2789

Buckeye Blower Co.C2780

Buffalo Forge Co.C2790

Grinnell Co., Inc.C3209

Ilg Electric Ventilating Co.C2791

Johnson Fan & Blower Co.C2792

Nelson, Herman, Corp.C2782

Nesbitt, John J., Inc.C2786

Peerless Unit Ventilating Co., Inc.C2777

Sturtevant, B. F., Co.C2793

Typhoon Fan Co.C2796

Wing, L. J., Mfg. Co.C2794

Heating and Ventilating Apparatus and Specialties**—Air Conditioning Apparatus, see Air Conditioning Apparatus****—Air Filters, see Filters, Air****—Air Valves—Radiator Venting, see Valves, Air Vent, Automatic—Radiator****—Air Vents or Eliminators, see Vents, Air, Heating System****—Air Washers, see Washers, Air****—Blowers, see Blowers****—Fans, see Fans****—Furnaces, Warm Air, see Furnaces, Warm Air****—Gages, Pressure, see Gages, Pressure or Vacuum****—Heaters, Air, Pipe Coil, see Heating and Ventilating Units, Combined; Radiators; Coils, Pipe****—Heaters, Garage, see Heaters, Garage****—Heaters, Hot Blast, see Heaters, Air, Direct Fired—Fan Blast****—Humidifiers, see Humidifiers, Air****—Mushroom Ventilators, see Ventilators, Mushroom****—Pumps and Receivers, Condensation, see Pumps and Receivers, Condensation****—Radiator Covers, see Radiator Covers****—Radiator Hangers, see Radiators Hangers****—Register Covers, see Register Shields****—Registers, Heating and Ventilating, see Registers, Heating and Ventilating****—Regulators, Temperature, see Controllers, Temperature****—Separators, Oil and Steam, see Separators****—Temperature Indicators, see Indicators, Temperature; Thermometers****—Thermometers, see Thermometers; Indicators, Temperature****—Thermostats, see Thermostats****—Traps, Steam, see Traps, Steam****—Valves, see Valves****—Valves, Air Line Return, see Valves, Air Line Return—Radiator****—Vents, Air, Heating System, see Vents, Air, Heating System****Heating and Ventilating Units, Combined**

American Blower Co.C2788

Buckeye Blower Co.C2780

Buffalo Forge Co.C2790

Ilg Electric Ventilating Co.C2791

Johnson Fan & Blower Co.C2792

Heating and Ventilating Units, Combined—Cont.

Modine Mfg. Co.C2724

Nelson, Herman, Corp.C2782

Nesbitt, John J., Inc.C2786

Peerless Unit Ventilating Co., Inc.C2777

Sturtevant, B. F., Co.C2793

Wing, L. J., Mfg. Co.C2794

Breeze-FinC2790*Heatavent*C2780*Ilgair*C2791*PeerVent*C2777*Thermoline*C2724*Thermosent*C2780*Univent*C2782*Venturafin*C2788*Universal*C2786

SpecificationsC2780

Hinges**—Blind or Shutter**

See pageB1859

—Butt—Anti-friction

McKinney Mfg. Co.B1853

—Butt—Ball Bearing

Corbin, P. & F.B1850

McKinney Mfg. Co.B1853

Russell & Erwin Mfg. Co.B1958

Stanley Works.B1859

RusswinB1958**—Butt—Double Acting**

Bommer Spring Hinge Co.B1866

Chicago Spring Hinge Co.B1869

Milwaukee Stamping Co.B1874

Ever ReadyB1866*Nu*B1874**—Butt—Plain, Ornamental, Parliament, etc.**

Corbin, P. & F.B1850

McKinney Mfg. Co.B1853

Russell & Erwin Mfg. Co.B1958

Stanley Works.B1859

RusswinB1958**—Casement—Sash Lifting**

See Hardware Casement Window—Sash Lifting Butts

—Casement Window

See Hardware, Casement Window

—Closet Seat

Van Arnam Mfg. Co.C2514

See also pageB1869

—Sanitex*Sanitex*B1869**—Forged**

Bullard, Ralph C.B1878

Corbin, P. & F.B1891

Earle Hardware Mfg. Co.B1952

Irving, W., Forge, Inc.B1879

McKinney Mfg. Co.B1880

Russell & Erwin Mfg. Co.B1958

Vilsack, Martin Co.A802

See also pageA781

RusswinB1958**—Garage Door**

Automatic Power Door Mfg. Co.B2050

Coburn Trolley Track Mfg. Co.B1808

McKinney Mfg. Co.B1820

Richards-Wilcox Mfg. Co.B1827

Russell & Erwin Mfg. Co.B1824

Stanley Works.B1843

Topping Mfg. Co.B1846

RusswinB1824**—Gate—Spring Pivot or Spring Butt**

Bommer Spring Hinge Co.B1866

Chicago Spring Hinge Co.B1869

Milwaukee Stamping Co.B1874

LawsonB1874*Sagless*B1869*Triplex*B1869*Universal*B1874**—Invisible**

Soss Mfg. Co., Inc.B1858

—Lavatory and Toilet Door

Bommer Spring Hinge Co.B1866

Chicago Spring Hinge Co.B1869

Corbin, P. & F.B1891

Hart & Hutchinson Co.B2106

Milwaukee Stamping Co.B1874

Russell & Erwin Mfg. Co.B1958

Sanymetal Products Co.B2120

See also pageA1102

Hinges—Cont.**—Lavatory and Toilet Door—Cont.**

<i>Lawson</i>	B1874
<i>Russwin</i>	B1958
<i>Sagless</i>	B1869
<i>Triplex</i>	B1869
<i>Universal</i>	B1874

—Pivot, Ball Bearing

Bommer Spring Hinge Co.	B1866
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—Receding Door—Toilet, Garage, etc.

Evans, W. L.	B2167
Richards-Wilcox Mfg. Co.	B1827

—Screen or Storm Sash

See Hangers, Screen, Storm Sash, etc.

—Sliding and Swinging Combined

Lehman, L. H.	B1852
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—Spring Butt

Bommer Spring Hinge Co.	B1866
Chicago Spring Hinge Co.	B1869
Milwaukee Stamping Co.	B1874
<i>Ever Ready</i>	B1866
<i>Lawson</i>	B1874
<i>Nu</i>	B1874
<i>Simplex</i>	B1869
<i>Triplex</i>	B1869

—Spring Pivot—Floor

Bommer Spring Hinge Co.	B1866
Corbin, P. & F.	B2040
Chicago Spring Hinge Co.	B1869
Milwaukee Stamping Co.	B1874
Shelby Spring Hinge Co.	B1872
<i>Ajax</i>	B1869
<i>Lawson</i>	B1874
<i>Matchless</i>	B1874
<i>Premier</i>	B1869
<i>Relax</i>	B1869
<i>Universal</i>	B1874

—Vertical Lifting—Casement Window

See Hardware, Casement Window—Sash Lifting Butts

Hog House Fittings and Fixtures

James Mfg. Co.	C3384
See also page.	C3385

Hoists

(See also Dumbwaiters; Elevators; Lifts)

—Ash, Cellar Window

Ernst, C. K., Specialty Co.	C2846
Gillespie, Robert, Co.	C2857
Morris, Herbert, Inc.	C2852
See also page.	C3119
<i>Gilco</i>	C2857
Specifications.	C2846; C2857

—Ash, Telescopic—Electric

Elian, Frank, & Co.	C2844
Ernst, C. K., Specialty Co.	C2846
Gillespie, Robert, Co.	C2857
Gillis & Geoghegan.	C3183
Washburn & Granger, Inc.	C2858
See also page.	C3104
<i>Dean</i>	C2858
<i>G&G</i>	C3183
<i>Gilco</i>	C2857
<i>Hoistwell</i>	C2844
Specifications.	C2844; C2857; C2858; C3183

—Ash, Telescopic—Hand Power

Elian, Frank, & Co.	C2844
Ernst, C. K., Specialty Co.	C2846
Gillespie, Robert, Co.	C2857
Gillis & Geoghegan.	C3183
Morris, Herbert, Inc.	C2852
Olson, Samuel, & Co.	C3198
Sedgwick Machine Works.	C3167
Washburn & Granger, Inc.	C2858
See also pages.	C3104; C3150
<i>Dean</i>	C2858
<i>G&G</i>	C3183
<i>Gilco</i>	C2857
<i>Hoistwell</i>	C2844
Specifications.	C2844; C2846; C2852; C2857; C2858; C3183

—Ash, Telescopic—Hydraulic, Steam or Compressed Air

Elian, Frank, & Co.	C2844
Washburn & Granger, Inc.	C2858
See also page.	C3104
<i>Dean</i>	C2858
<i>Hoistwell</i>	C2844
Specifications.	C2844; C2858

Hoists—Cont.**—Ash, Sidewalk Elevator**

See Elevators, Sidewalk

—Automobile or Carriage

See Elevators, Automobile or Carriage

—Blast Furnace and Mine

See page. C3108

—Chain

Ryerson, Joseph T., & Son Inc. A132

See also page. C2852

—Friction

See page. C3385

—Sidewalk

See Elevators, Sidewalk

—Skip

Otis Elevator Co. C3108

See page. C3096

—Warehouse, Non-telescopic—Electric or Hand Power

Gillis & Geoghegan. C3183

G&G C3183 |

Holdback Chains, Shower Curtain

See Curtains, Shower Bath—Holdback Chains for

Holders**—Casement Window—Stays**

(See also Hardware, Casement Window—Adjusters)

United Specialties Mfg. Co. Ltd. B2084

Casehold B2084 |

Staylock B2084 |

—Door

Caldwell Mfg. Co. B1786

Corbin, P. & F. B1891

Earle Hardware Mfg. Co. B1952

Russell & Erwin Mfg. Co. B1958; B2023

Vonnegut Hardware Co. B2036

United Specialties Mfg. Co. Ltd. B2084

See also page. B2035

Casehold B2084 |

Empire B1786 |

Russwin B1958; B2023 |

Von Duprin B2036 |

—Door, Elevator

Grant Elevator Equipment Corp. C3126

Specifications. C3126

—Door, Garage

McKinney Mfg. Co. B1820

Phoenix Mfg. Co. B1823

Russell & Erwin Mfg. Co. B1824

Stanley Works. B1843

Russwin B1824 |

—Lamp Shade

Bryant Electric Co. C2928

Moe-Bridges Co. C2990

See also pages. C2924; C2991

—Shutter

Corbin, P. & F. B1891

Earle Hardware Mfg. Co. B1952

Irving, W., Forge, Inc. B1879

—Soap, Tumbler, Tooth Brush, Sponge, Toilet Paper, etc.

See Bathroom Accessories

Hold-up Alarms

See Burglar Alarms; Signal Systems, Bank Alarm

Hollow Block or Tile

—Cinder Concrete, see Tile, Hollow or Solid, Cinder Concrete

—Clay, see Tile, Hollow, Clay or Terra Cotta

—Concrete, see Tile, Hollow, Concrete

—Gypsum, see Tile, Hollow, Gypsum; Floor Voids, Gypsum Filler Tile

Hollow Metal

—Doors, see Doors, Hollow Metal

—Partitions, see Partitions, Hollow Metal

—Trim, see Trim, Hollow Metal

—Windows, see Windows, Hollow Metal

Honor Rolls

—Cast Bronze, see Tablets, Cast Bronze; Ornamental Metal Work

—Changeable Name or Letter, see Directories, Building

Hoods

—Fume—Laboratory, see Laboratory Fixtures

—Range, see Ranges

Hooks, Robe

See Robe Hooks; Bathroom Accessories, Robe Hooks

Hoppers, Coal

See Bins and Bunkers, Coal

Horns, Electric

Schwarze Electric Co. C3011

Signal Engineering & Mfg. Co. C3012

Standard Electric Time Co. C3392

Horses, Mechanical

See Mechanical Exercisers

Hose**—Cabinets**

See Cabinets, Hose

—Connections—Siamese

See Siamese Hose Connections

—Fire, Linen

Allen, W. D., Mfg. Co. C2454

Elkhart Brass Mfg. Co. C2458

Jiffy Fire Hose Rack Co. C2462

See also page. C2466

—Nozzles, Fire

See Nozzles, Fire Hose

—Racks and Reels

See Racks and Reels, Hose

Hospital

—Admitting Office Equipment, see Office Planning and Equipment, Hotel, Club, Hospital, etc.

—Chlorine Disinfectant Apparatus, see Chlorine Control Apparatus; Hypochlorite Control Apparatus

—Cubicles, see Partitions, Cubicle—for Hospitals and Institutions

—Elevators, see Specific Type of Elevator, as: Hand, Electric, Hydraulic

—Signal Systems, see Signal Systems, Hospital

—Therapeutic Appliances, see Therapeutic Appliances

Hot Water

—Boilers, see Boilers, Heating

—Heaters, see Heaters, Water

—Paint, see Paint, Water

—Range Boilers, see Boilers, Range

Hotel

—Check Room Equipment, see Check Room Equipment

—Furniture and Furnishings, see Furnishings and Equipment, Hotel, Club and Institutional

—Office Planning Equipment, see Office Planning and Equipment, Hotel, Club, Hospital, etc.

House and Roof Insulation

See Insulation, House; Felt, Insulating and Sheathing; Paper, Building; Wall Board; Cellular Gypsum

Houses, Portable—Wood

Hodgson, E. F., Co. B1272

Humidifiers**—Air**

Johnson Service Co. C2840

See also pages. C2791; C2801

Specifications. A2840

—Radiator Pan

See Radiator Covers—Standard or Humidifying

—Warm Air Furnace

Mueller, L. J., Furnace Co. C2632

Humidostats

Johnson Service Co. C2840

Hydrants

Elkhart Brass Mfg. Co. C2458

Kennedy Valve Mfg. Co. C3204

Newtype C3204 |

Hydrated Lime

See Lime, Hydrated

Hypochlorite Control Apparatus

(Water, Sewage and Swimming Pool Purification, Antiseptics, Disinfectants, Bleaches, Deodorizers, etc.)

Marsh Electro Chlorination Co., Inc. B1487

Specifications. B1487

I

Ice

- Boxes, see Refrigerators
- Making Machinery, see Refrigerating and Ice Making Machinery and Plants
- Water Coolers, see Coolers, Drinking Water; Fountains, Drinking Combined with Refrigerating Unit
- Water Pipe Coverings, see Covering, Pipe, Brine, Ammonia, Ice Water

Illuminated Signs

- See Signs, Illuminated

In-and-Out Boards

- Akins, B. L., Inc. C3330
- Hamilton & Cord Co. C3338
- Tablet & Ticket Co. C3341
- See also pages. C3335; C3340
- H & C. C3338

Incandescent Lamps

- See Lamps, Incandescent

Incinerators

- Buffalo Co-operative Stove Co. C3356
- Duplex Hanger Co. C3357
- Guardian Gas Appliance Co. C3358
- Home Incinerator Co. C3359
- Incinerator Sales Co. C3360
- Kahn Products Co. C3361
- Kerner Incinerator Co. C3362
- Mann, Kellogg, & Co., Inc. C3364
- Mid-West Incinerator Corp. C3366
- Morse-Boulger Destructor Co. C3370
- Pittsburgh Incinerator Mfg. Co., Inc. C3372
- Stearns, E. C., & Co. C3374
- Washburn & Granger, Inc. C3376
- See also pages. A616; A695
- Amherst C3356
- Dean C3376
- Incinerite C3374
- Incineror C3359
- K M. C3364
- Kernerator C3362
- Krause C3357
- Radial C3360
- San-a-tor C3372
- Sanotype C3356
- Specifications. C3361; C3362; C3364; C3370; C3376

Incinerators, Garbage, Combination Water Heater

- Kewanee Boiler Co. C2658
- Mueller, L. J., Furnace Co. C3365
- See also page. C2648

Indicators

- Elevator, Mechanical
 - See Signal Systems, Elevator
- Rate of Flow
 - California Filter Co., Inc. C2405
- Temperature
 - American Temperature Indicating Co. C2830
 - Caliscope C2830
 - Thermoscope C2830

Inserts

- Concrete
 - Ackerman-Johnson Co. A146
 - Barton Spider-Web System, Inc. A121
 - Concrete Steel Co. A125
 - Dayton Sure Grip & Shore Co. A148
 - Dean, Olney J., & Co. A602
 - Gabriel Steel Co. A612
 - Goldsmith Metal Lath Co. B1298
 - Kalman Steel Co. A130
 - Kohler Die & Specialty Co. A141
 - Little Giant Mfg. Co. C2733
 - Truscon Steel Co. A134
 - Security Insert Co. A142
 - Sterling Foundry Co. A143
 - See also pages. A132; C2350
 - Best A143
 - Collings A141
 - Dayton A125
 - Havemeyer A125
 - Shurebond B1298

Inserts—Cont.**—Concrete—for Suspended and Furred Ceilings**

- Goldsmith Metal Lath Co. B1298
- Shurebond B1298

—Concrete—Pipe Railing

- See Railings, Pipe—Concrete Inserts for

Inspection and Testing, Structural Materials

- Hunt, Robert W., Co. A5
- Specifications A5

Insulated Metal Roof Decks

- See Roof, Construction—Insulated Metal Sheet

Insulating Materials

- Acoustical, see Acoustical Materials and Treatments
- Blocks, see Brick, Asphalt-Felt Composition
- Cellular Gypsum, see Cellular Gypsum
- Cement, see Cement, Insulating
- Cork, see Corkboard
- Gypsum, see Tile, Hollow, Gypsum; Cellular Gypsum
- Hair, see Insulation, House
- House and Roof, see Insulation, House; Felt, Insulating and Sheathing; Paper, Building; Wall Board; Cellular Gypsum.
- Magnesia, see Coverings, Pipe and Boiler
- Mineral Wool, see Mineral Wool
- Paper, see Paper, Building
- Wall Board, see Wall Board

Insulation

- Boiler
 - See Coverings, Pipe and Boiler
- Cold Storage and Refrigeration
 - Armstrong Cork & Insulation Co. A208
 - Celotex Co. B1239
 - Cork Import Corp. A204
 - Garrett, C. S., & Son Corp. A188
 - Mundet, L., & Son, Inc. A205
 - Servicised Products Corp. A79
 - Union Fibre Co., Inc. A189
 - United Cork Cos. A206
 - Universal Gypsum & Lime Co. A198
 - Wicander & Co., Inc. A207
 - See also pages. C3068; C3077
 - Crescent A206
 - Eureka A208
 - Insulex A198
 - Jointite A205
 - Lith A189
 - Nonpareil A208
 - Novoid A204
 - Thrubake A207
- Cold Storage and Refrigeration—Waterproofing Compounds for
 - See Waterproofing and Dampproofing Paint and Compounds
- Electrical—Paint, Varnish, etc.
 - American Asphalt Paint. B1610
 - Trixas B1610
- House—for Floors, Walls, Roofs and Ceilings
 - Armstrong Cork & Insulation Co. A201
 - Cabot, Samuel, Inc. A182
 - Celite Products Co. A46
 - Celotex Co. B1239
 - Cork Import Corp. A204
 - Flax-li-num Insulation Co. A184
 - Insulate Co. B1262
 - Mason Fibre Co. B1266
 - Mundet, L., & Son, Inc. A205
 - Sprayo-Flake Insulating Co. A192
 - Union Fibre Co., Inc. A189
 - United Cork Cos. A206
 - United States Gypsum Co. A200
 - United States Mineral Wool Co. A193
 - Universal Gypsum & Lime Co. A198
 - Wicander & Co., Inc. A207
 - Wood Conversion Co. A194
 - Crescent A206
 - Fibrofelt A189
 - Insulex A198
 - Jointite A205
 - Linofelt A189
 - Lith A189

Insulation—Cont.**—House—for Floors, Walls, Roofs and Ceilings—Cont.**

- Masonite B1266
- Novoid A204
- Thrubake A207
- Sil-O-Cel A46
- Thermofill A200
- Quilt A182
- Specifications. A184; A194; A201; B1262; B1266

—Paper Pulp and Water Glass

- Sprayo-Flake Insulating Co. A192

—Pipe

- See Coverings, Pipe and Boiler

—Powdered or Granular—Heat or Cold

- Celite Products Co. A46
- Sil-O-Cel A46

—Underground Pipe Coverings

- See Conduit, Underground Pipe Insulation

Intakes, Fresh Air

- (See also Grilles and Screens, Metal—Ventilating; Registers, Heating and Ventilating; Perforated Metal Grilles)
- American Warming & Ventilating Co. C2806
- Auer Register Co. C2808
- Best Register Co. C2810
- Chicago Architectural Bronze Co. C2812
- Harrington & King Perforating Co. C2814
- Hart & Cooley Mfg. Co. C2816
- Highton, Wm., & Sons Co. C2818
- Mueller, L. J., Furnace Co. C2813
- Tuttle & Bailey Mfg. Co. C2824

Intakes or Outlets, Ventilating

- Riesner, Benjamin, Inc. A557

Interceptors

- See Traps

Interior Decorators

- See Decorators, Interior

Interlocks, Elevator Door

- Elevator Locks Co. C3120
- Elevator Supplies Co., Inc. C3122
- Graham & Norton Co. C3124
- Grant Elevator Equipment Corp. C3126
- Richards-Wilcox Mfg. Co. B1827
- Security Fire Door Co. A888
- Shur-Loc Elevator Safety Corp. C3130
- Wagner Mfg. Co. C3132
- See also page. C3140
- ES C3122
- M-C-K C3120
- Norton C3124
- Seco A888
- Specifications C3120; C3126

Invisible Hinges

- See Hinges, Invisible

Iron

- Castings, see Castings
- Sheets, see Sheet Metal
- Work, Ornamental, see Ornamental Metal Work

Iron Nickel Chrome Alloys

- See Metals, Chrome Nickel Iron Alloys

Ironing Boards**—Built-in**

- Built-in Fixture Co. B2188
- Farley & Loetscher Mfg. Co. B2196
- Kozy-Kitch Kitchenet Co. B2206
- Majestic Steel Cabinet Co. B2214
- Miami Cabinet Co. C2578
- Rockford Steel Furniture Co. B2207
- Wasmuth-Endicott Co. B2220
- "White" Door Bed Co. B2246
- See also pages. B1138; B2240
- Peerless B2188

—Door Combination

- Farley & Loetscher Mfg. Co. B2224
- In-the-door B2224
- Qualitybilt B2224

—Portable Stand

- Chicago Dryer Co. C3305
- Domestic Laundry Equipment Corp. C3298
- Chicago C3305

Ironing Machines

American Laundry Machinery Co. C3296
Chicago Dryer Co. C3305
Domestic Laundry Equipment Corp. C3298
Troy Laundry Machinery Co., Inc. C3302
See also pages. C3005; C3304
Chicago C3298; C3305

Isolation, Machinery

See Machinery Isolation

J**Jacks****—Lifting**

Ryerson, Joseph T., & Son Inc. A132

—Radio

See Receptacles, Electric, Radio Outlet;
Radio Wiring Devices

Jail Construction and Equipment

Fries and Son Steel Construction
and Engineering Co., Inc. C3402
Manly Jail Works. C3401
Pauly Jail Building Co. C3404
Southern Prison Co. C3406
Stewart Iron Works Co., Inc. C3412
Van Dorn Iron Works Co. C3410
See also pages. A793; A798
Typical Layouts. C3402; C3410

Jams, Door

See Frames, Door; Trim; Doors

Jars, Pottery, Garden

See Pottery, Garden

Joints**—Contraction—Concrete Pavement**

See page. A134

—Contraction, Terrazzo or Cement Floor

See Strips, Brass or Zinc—Terrazzo
Floor, etc.

—Expansion, Concrete

Carey, Philip, Co. B1537
Servicised Products Corp. A79
Elastite B1537

—Expansion, Concrete—Cement for

Kuhls, H. B., Fred. B1746
Minwax, Co., Inc. A67
Servicised Products Corp. A79
See also page. A72
M-R A72

—Expansion—Floor and Roof Drain

See page. C2350

—Expansion, Pipe

American District Steam Co. C2747
Dahlquist Mfg. Co. C2400
Gerstein, H., & Sons. C2399
Fulton Siphon Co. C2834
Superior Skylight Co., Inc. C2336
Webster, Warren, & Co. C2772
See also page. C2764
Adscs C2747
Siphon C2834
Specifications C2834

—Floor, Connections for

See Threshold and Floor Joint Connections

—Floor and Cove Base Binding Bars

See Bars, Binding—Floor and Cove Base

—Pipe, Flanged

Grinnell Co., Inc. C3209

—Sewer Pipe

See Pipe Joints, Asphalt, Premoulded;
Pipe Joints, Asphalt Compound

Joists**—Bridging for**

See Bridging, Wood Joist

—Hangers for

See Hangers, Beam, Joist, Wall, etc

—Pressed Steel

See Lumber, Pressed Steel

—Steel Plate Girder

Genfire Steel Co. B1294
Truscon Steel Co. A578

—Steel Truss

Bates Expanded Steel Truss Co. A571
Concrete Steel Co. A572
Gabriel Steel Co. A573
Genfire Steel Co. B1294
Macomber Steel Co. A574
Rivet-Grip Steel Co. A576

Joists—Cont.**—Steel Truss—Cont.**

Truscon Steel Co. A578
Bates-Truss A571
Havemeyer A572
Massillon A574
Specifications A574; A576

K**Kalamein****—Doors, see Doors, Metal Covered****—Partitions, see Partitions, Metal Covered****—Trim, see Trim, Metal Covered****—Windows, see Windows, Metal Covered****Keene's Cement**

See Plaster, Keene's Cement

Kerosene Water Heaters

See Heaters, Water, Kerosene

Kettles**—Steam Jacketed**

Aluminum Cooking Utensil Co. C3274
Dahlquist Mfg. Co. C2400
Gerstein, H., & Sons. C2399
Gloekler, Bernard, Co. C3290
Van, John, Range Co. C3284
Specifications C3274

Kick Plates

See Plates, Door—Kick or Push

Kilns and Ovens, Brick

See Furnaces and Kilns, Brick

Kitchen**—Cabinet and Gas Range Combination**

See Ranges, Gas and Kitchen Cabinet
Combination

—Cabinet and Refrigerator Combination

See Refrigerators, Kitchen Cabinet Com-
bination

—Cabinets

See Cabinets, Kitchen

—Dishwashers

See Dishwashers

—Equipment

Aluminum Cooking Utensil Co. C3274
Anstice, Josiah, & Co. C3277
Century Machine Co. C3278
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Corbin, P. & F. B1891
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 - McKinney Mfg. Co..... B1880
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Manhole

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Cambridge-Wheatley Co. B1430
 Flint Faience & Tile Co. B1434
 Irving & Casson - A. H. Davenport Co. B2168
 Jackson, Edwin A., & Bro., Inc. B1237
 Jackson, Wm. H., Co. B1369
 Jacobson Mantel & Ornament Co., Inc. B1372
 Rookwood Pottery Co. B1454
 Walter, G. E., Inc. B1374
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Marble**—Crushed**

Appalachian Marble Co., Inc. A259

—Interior and Exterior

Alabama Marble Co. A256
 Appalachian Marble Co., Inc. A259
 Carthage Marble Corp. A258
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 Georgia Marble Co. A264
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 Chicago Panelstone Co. B1367
 Cousins, H. A., Inc. B1368
 Wise, John J., & Co., Inc. B1373
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Panelstone B1367

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Market Fixtures

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Marquises

Architectural Metal Products, Inc. A744
 Badger Wire & Iron Works. A696
 Cincinnati Mfg. Co. A752
 Friedley-Voshardt Co. A764
 Howie Co., Inc. A503
 Feine, August, & Sons, Co. A760
 Logan Co. A772
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Mats**—Leather**

Maryland Mat Co. B2266
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New York Belting & Packing Co. B2268
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Matting, Rubber

New York Belting & Packing Co. B2268
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Brunner Engineering Corp. of New
York C2692
Buffalo Forge Co. C2790
Gifford Heat Control Systems, Inc. C2694
Pyramid Iron Products Corp. C2690
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Mechanical Exercisers

Sanitarium Equipment Co. C3382

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Memorials

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ing

**Message Sending — Receiving Ap-
paratus, Printing or Writing**

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ered
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Metalace Corp. C2820
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Associated Metal Lath Mfrs., Inc. B1279
Barton Spider-Web System, Inc. A121
Berger Mfg. Co. B1286
Bostwick Steel Lath Co. B1290
Central Alloy Steel Corp. A438
Concrete Engineering Co. A110
Concrete Steel Co. A125
Consolidated Expanded Metal Cos. B1293
Genfire Steel Co. B1294
Goldsmith Metal Lath Co. B1298
Milwaukee Corrugating Co. B1300

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Penn Metal Co. B1299
Ryerson, Joseph T., & Son Inc. A132
Sykes Metal Lath Co. B1304
Truscon Steel Co. B1306
Wheeling Corrugating Co. B1308
Youngstown Pressed Steel Co. B1309
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Berloy B1286
Ceco A110
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Bostwick Steel Lath Co. B1290
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Consolidated Expanded Metal Cos. B1293
Genfire Steel Co. B1294
Goldsmith Metal Lath Co. B1298
Milwaukee Corrugating Co. B1300
North Western Expanded Metal
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Sykes Metal Lath Co. B1304
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Zee B1309
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**Metal Lath and Insulation Combina-
tion**

National Steel Fabric Co. B1312
Steeltex B1312

Metals

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—Chrome Nickel Iron Alloys

Allegheny Steel Co. C3294
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—Nickel

International Nickel Co. C3295

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International Nickel Co. C3295
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Curtis Cos. Service Bureau. B1138
Hyde-Murphy Co. B1144
Mitchell, Robert, Mfg. Co. B1149
Morgan Woodwork Organization. B1150
Smith, Geo. W., Woodworking Co. B2174
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Union Fibre Co., Inc. A189
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Eustis, J. P., Mfg. Co. C2568
Fairfacts Co., Inc. B1458
Hess Warming & Ventilating Co. C2572
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Plate Glass Mfrs. of America. B1718

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Crane Co. C2546
Hoffman & Billings Mfg. Co. C2540
Leonard-Rooke Co. C2541
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- Nailing Concrete**
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- Lifts**
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Del Turco, L., & Bros., Inc. B1410
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Burke Electric Co. C2872
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- Drawn Metal**
Lawton-Stephens Co., Inc. A825
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- Electrical Wiring**
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American Brass Co. A746
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Dahlstrom Metallic Door Co. A816
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Chicago Expansion Bolt Co. A140
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- Youngstown Pressed Steel Co. B1309
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- Hungerford, U. T., Brass & Copper Co. A488
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Natorium Design and Construction

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- Smith & Caffrey Co. A648
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—Steel

- Badger Wire & Iron Works. A696
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Nickel Copper Alloys

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- American Mason Safety Tread Co. A662
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- Guarsteel Safety Stair Co. A636
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- Elkhart Brass Mfg. Co. C2458
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- Whitney Duplicating Check Co. C3346
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- Aetna Automatic Oil Burner. C2696
- American Nokol Co. C2698
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- Combustion Fuel Oil Burner Co. C2700
- Davison, N. C., Gas Burner & Welding Co. C2701
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Operators

- Door, Elevator—Electric or Pneumatic
 - Elevator Supplies Co., Inc. C3122
 - Graham & Norton Co. C3124
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 - Allen & Drew, Inc. A913
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 - Michigan Metal Products Co. B2054
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 - Blasteel Mfg. Co. C3334
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- Theater Curtain
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- Transom
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- American Bronze Co. A742
- Antioch Art Foundry A743
- Art Brass & Wire Works, Inc. A745
- Art Metal Construction Co. B2176
- Badger Wire & Iron Works. A696
- Barnes Wire Fence Co. A695
- Braun, J. G. A748
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- Cincinnati Mfg. Co. A752
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- Flour City Ornamental Iron Co. A762
- Friedley-Voshardt Co. A764
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- Penn Brass & Bronze Works. A789
- Polachek, John, Bronze & Iron Co., Inc. A792
- Price-Evans Foundry Corp. A790
- Reliance Fireproof Door Co. A863
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- Stewart Iron Works Co., Inc. A720
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- Lead
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 - Skinner-Hill Co., Inc. C2995
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 - Jacobson Mantel & Ornament Co., Inc. B1372
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- Baking, Electric
 - Edison Electric Appliance Co., Inc. C3242
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 - American Stove Co. C3245
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 - American Asphalt Paint Co. B1610
 - Arco Co. B1744
 - Barber Asphalt Co. A398
 - du Pont de Nemours, E. I., & Co., Inc. B1624
 - Ginfire Steel Co. A62
 - Goheen Corp. B1632
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—Boiler, Stack and Gas Holder

See Paint, Stack and Boiler; Paint, Gas Holder; Paint, Metal Protective; Preservatives, Metal

—Brick, Cement, Concrete, Stucco, Stone—Preservative Finishing Coats

Aquabar Waterproofing Products.. A52
Berry Brothers, Inc......B1612
Billings-Chapin Co......B1611
Cabot, Samuel, Inc......B1614
Carpenter-Morton Co......B1616
Ceresit Waterproofing Corp......A58
Certain-teed Products Corp......B1618
Davis, H. B., Co......B1620
Detroit Graphite Co......B1622
du Pont de Nemours, E. I., & Co., Inc......B1624
General Chemical Co......A94
Genfire Steel Co......A62
Goheen Corp......B1632
Horn, A. C., Co......A64
Hydrosel Waterproofing Co......A59
Keystone Varnish Co......B1638
Kling Coat......A59
Master Builders Co......A96
McNamara, Michael, Varnish Works.....B1641
Minwax Co., Inc......A67
Mitchell-Rand Dampproofing Corp. A72
Murphy Varnish Co......B1642
Pittsburgh Plate Glass Co......B1649
Pratt & Lambert—Inc......B1656
Sherwin-Williams Co......B1658
Sonneborn, L., Sons, Inc......A82
Standard Varnish Works.....B1664
Sullivan Co......A81
Thomson Wood Finishing Co......B1667
Toch Brothers.....A86
Truscon Laboratories.....A84; B1668
U. S. Gutta Percha Paint Co......B1670
Wadsworth, Howland & Co., Inc. B1674
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Barreled Sunlight Granolith.....B1670
Bay State.....B1674
Bilchaco Cement Floor Coating.....B1611
Carmote.....B1616
Cem-Bric.....A58
Cemcoat.....A82
Cementhide.....B1649
Ceralith.....B1748
Colorseal.....A96
Conco.....A52
Concrexaltum.....B1632
Degraco.....B1622
Degraco-Tone.....B1622
Drwal.....B1611
Durock.....A64
Granitex.....B1668
Hard-n-tyte.....A94
Keystone.....B1638
Koncrex.....A64
Konkreto.....B1642
Kontite.....A81
Koverflor.....B1664
Lectrolite.....B1620
Lionoil.....B1612
Liquid Konkerit.....A86
Luxeberry.....B1612
Lyt-all.....B1656
M-R.....A72
Masteritex.....A96
Porcelite.....B1667
R.I.W......A86
Sealerine.....B1641
Sta-White.....B1622
StoneTex.....A84; B1668
StuccoTex.....A84
Symmentrex.....A64
Vitalite.....B1656
 Specifications.....A67; A72; A84; A94; A96; B1611; B1618; B1622; B1624; B1656; B1658; B1664; B1668; B1670; B1674

Paint—Cont.**—Caen Stone Finish**

See Paint, Texturing; Paint, Brick, Cement, Concrete, Stucco, Stone

—Cement Floor

See Paint, Brick, Cement, Concrete, etc.

—Cold Water

See Paint, Water

—Creosote or Bitumen Sealing

Jennison-Wright Co......B1560
Kreolite Insulating Koting.....B1560

—Deck

See Paint, House, Ready Mixed

—Enamel

See Enamel

—Fire Retardant

See pages.....A560; B1632

—Flat Wall Finish

See Paint, Wall Finish—Flat, Egg Shell or Gloss

—Gas Holder

American Asphalt Paint Co......B1610
King, E. & F., & Co., Inc......B1748
Sherwin-Williams Co......B1658
Toch Brothers.....A86
 See also pages.....B1622; B1632; B1668
Breer's.....B1748
Degraco.....B1622
R.I.W......A86
U-in-tah.....B1610
 SpecificationsB1748

—Glaze for

Bradley Stuc-O-Tint Co., Inc......B1677
Craftex Co......B1678
Hachmeister-Lind Chemical Co......B1682
Merken, M. J., Paint Co., Inc......B1686
Muralo Co., Inc......B1687
United States Gypsum Co......B1697
Wiggin's, H. B., Sons Co......B1696
Craftcoat.....B1678
Mertex.....B1686
Mural-Tex.....B1687
Rufkote.....B1696
Stuc-O-Stain.....B1677
Textone.....B1697
Wall-Kraft.....B1682
 SpecificationsB1677

—Graphite

Carpenter-Morton Co......B1616
Detroit Graphite Co......B1622
Dixon, Joseph, Crucible Co......B1628
C.M.Co.'s.....B1616
Superior.....B1622
 SpecificationsB1622; B1628

—House, Ready Mixed

Billings-Chapin Co......B1611
Cabot, Samuel, Inc......B1614
Certain-teed Products Corp......B1618
Davis, H. B., Co......B1620
du Pont de Nemours, E. I., & Co., Inc......B1624
Hockaday, Inc......B1633
McNamara, Michael, Varnish Works.....B1641
Merken, M. J., Paint Co., Inc......B1686
New Jersey Zinc Co......B1648
Pittsburgh Plate Glass Co......B1649
Sherwin-Williams Co......B1658
Standard Varnish Works.....B1664
U. S. Gutta Percha Paint Co......B1670
 See also pages.....A82; B1622; B1632; B1672

Barreled Sunlight.....B1670
Degraco.....B1622
40-40-20.....B1648
Holland White.....B1633
Koverflor.....B1664
L'Italianna.....B1620
Mac.....B1641
Merco.....B1686
Old Honesty.....B1632
Old Virginia White.....B1614
Patton's.....B1649
Plasticote.....B1686
Sun-Proof.....B1649
U.S.N. Deck Paint.....B1611
Val-Primer.....B1672
Zilo.....B1658
 Specifications.....B1618; B1624; B1633; B1649; B1664

Paint—Cont.**—Joint**

See Calking and Glazing Compounds

—Metal Protective

American Asphalt Paint Co......B1610
Aquabar Waterproofing Products.. A52
Barber Asphalt Co......A398
Billings-Chapin Co......B1611
Cabot, Samuel, Inc......B1614
Carpenter-Morton Co......B1616
Davis, H. B., Co......B1620
Detroit Graphite Co......B1622
Dixon, Joseph, Crucible Co......B1628
du Pont de Nemours, E. I., & Co., Inc......B1624
Genfire Steel Co......A62
Goheen Corp......B1632
Hydrosel Waterproofing Co......A59
King, E. & F., & Co., Inc......B1748
Lewis Asphalt Engineering Corp... A66
McNamara, Michael, Varnish Works.....B1641
Minwax Co., Inc......A67
National Lead Co......B1645
Pittsburgh Plate Glass Co......B1649
Quigley Furnace Specialties Co., Inc......B1655
Sherwin-Williams Co......B1658
Thomson Wood Finishing Co......B1667
Toch Brothers.....A86
Truscon Laboratories.....B1668
 See also pages...A61; A82; A247; A396; A483; B1541; B1554

A. T. P......A396
Amalie.....A82
Antoxide.....B1624
Bar-Ox.....B1668
Bituloid.....A67
Breer's.....B1748
C.M.Co.'s.....B1616
Carbonite.....A52
Carbonizing Coating.....B1632
Crometan.....B1622
Flexiblac.....B1614
Galvanum.....B1632
Genasco.....A398
Highway Red.....B1632
Ironhide.....B1649
Krodeproof.....A66
Kromate.....B1624
Kromik.....B1658
Mac.....B1641
Metallastic.....B1658
Prime-Rite.....B1622
R.I.W......A86
Rustnaught.....B1611
Steel Kote.....B1620
Superior.....B1622
Tockolith.....A86
Triple-A.....B1655
Triple Leadkote.....B1748
Valdura.....B1610
Zid.....B1667
 Specifications.....A67; B1622; B1624; B1628; B1632; B1649; B1658; B1668; B1748

—Mill White

Aquabar Waterproofing Products.. A52
Billings-Chapin Co......B1611
Carpenter-Morton Co......B1616
Certain-teed Products Corp......B1618
Detroit Graphite Co......B1622
du Pont de Nemours, E. I., & Co., Inc......B1624
Hilo Varnish Corp......B1634
Hockaday, Inc......B1633
McNamara, Michael, Varnish Works.....B1641
Merken, M. J., Paint Co., Inc......B1686
Pittsburgh Plate Glass Co......B1649
Pratt & Lambert—Inc......B1656
Seidlitz Paint & Varnish Co......B1666
Sherwin-Williams Co......B1658
Sonneborn, L., Sons, Inc......A82
Thomson Wood Finishing Co......B1667
Truscon Laboratories.....B1668
U. S. Gutta Percha Paint Co......B1670
White Co......A102
 See also pages.....B1632; B1674; B1748
Alba-Lux.....B1649

Paint—Cont.**—Mill White—Cont.**

<i>Barreled Sunlight</i>	B1670
<i>Britenol</i>	B1632
<i>Carmolight</i>	B1616
<i>Cemcoat</i>	A82
<i>Decolite</i>	B1611
<i>Du-Lite</i>	B1624
<i>Eg-Shel</i>	B1658
<i>Hi-Lite</i>	B1634
<i>Litho Lite</i>	B1666
<i>Lyt-all</i>	B1656
<i>Mac</i>	B1641
<i>Merco</i>	B1686
<i>Plasticote</i>	B1686
<i>Sanatone</i>	B1667
<i>Save-Lite</i>	B1658
<i>Snolite</i>	B1649
<i>Sta-White</i>	B1622
<i>Wahcolite</i>	B1674
<i>Wal-Lite</i>	B1668
<i>Wal-Lite</i>	A52
<i>Whytcote</i>	A102
Specifications.....	B1618; B1622; B1624; B1633; B1649; B1656; B1658; B1668; B1670

—Oil Resistant

See Paint, Acid, Alkali or Oil Resistant

—Plastic

See Paint, Texturing

—Porch

See Paint, House, Ready Mixed

—Portland Cement

See Paint, Water—Portland Cement

—Priming, Galvanized Iron

<i>Carpenter-Morton Co.</i>	B1616
<i>Genfire Steel Co.</i>	A62
<i>Goheen Corp.</i>	B1632
<i>McNamara, Michael, Varnish Works</i>	B1641
<i>Seidlitz Paint & Varnish Co.</i>	B1666
See also pages.....	A82; B1610; B1658
<i>Carmole</i>	B1616
<i>Galvacote</i>	A82
<i>Galvanum</i>	B1632
<i>Sealerine</i>	B1641
<i>Valdura</i>	B1610

—Priming, Plaster

See Sizing; Enamel Undercoats; Paint, Brick, Cement, Concrete, Stucco, Stone

—Priming, Wood or Metal

See Paint, House; Enamel Undercoats; Paint, Metal Protective

—Pyroxylin or Nitro-cellulose Base

See Lacquer

—Red Lead

See Red Lead

—Roof

(See also Paint, Metal Protective)

<i>American Asphalt Paint Co.</i>	B1610
<i>Aquabar Waterproofing Products</i> ..	A52
<i>Hetzel, J. G., Estate of</i>	A483
<i>Merken, M. J., Paint Co., Inc.</i>	B1686
<i>Servicised Products Corp.</i>	A79
<i>Toch Brothers</i>	A86
See also pages.....	A80; A81
<i>Azroo</i>	B1610
<i>Perfectseal</i>	B1686
<i>Valdura</i>	B1610

—Shellac

See Shellac and Shellac Substitutes

—Spraying Equipment

<i>Par-Lock Co.</i>	A76
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—Stack and Boiler

<i>American Asphalt Paint Co.</i>	B1610
<i>Goheen Corp.</i>	B1632
<i>Sherwin-Williams Co.</i>	B1658
<i>Toch Brothers</i>	A86
See also pages.....	A61; A82; A483; B1668
<i>R.I.W.</i>	A86
<i>Thermokote</i>	B1632
<i>U-in-tah</i>	B1610
<i>Valdura</i>	B1610

—Stain Preventive

See Paint, Creosote or Bitumen Sealing

—Street Marking

<i>Carpenter-Morton Co.</i>	B1616
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—Technical

<i>American Asphalt Paint Co.</i>	B1610
<i>Genfire Steel Co.</i>	A62

Paint—Cont.**—Technical—Cont.**

<i>Goheen Corp.</i>	B1632
<i>Sonneborn, L., Sons, Inc.</i>	A82
<i>Sullivan Co.</i>	A81
<i>Toch Brothers</i>	A86
<i>Truscon Laboratories</i>	B1668
<i>White Co.</i>	A102
See also page.....	B1667
<i>R.I.W.</i>	A86
<i>Valdura</i>	B1610

—Texturing

<i>Bradley Stuc-O-Tint Co., Inc.</i>	B1677
<i>Craftex Co.</i>	B1678
<i>Hachmeister-Lind Chemical Co.</i>	B1682
<i>Marb-L-Cote, Inc.</i>	B1683
<i>Merken, M. J., Paint Co., Inc.</i>	B1686
<i>Morene Products Co., Inc.</i>	B1684
<i>Muralo Co., Inc.</i>	B1687
<i>Plastene Products, Inc.</i>	B1690
<i>Sasso Art Cement Co.</i>	B1694
<i>Stonetone Co.</i>	B1695
<i>Sullivan Co.</i>	A81
<i>United States Gypsum Co.</i>	B1697
<i>Wiggin's, H. B., Sons Co.</i>	B1696
<i>Art-Cote</i>	A81
<i>Mertex</i>	B1686
<i>Mural-Tex</i>	B1687
<i>Rufkote</i>	B1696
<i>Stuc-O-Tint</i>	B1677
<i>Textone</i>	B1697
<i>Wall-Kraft</i>	B1682
Specifications.....	B1677; B1678; B1682; B1683; B1686; B1690; B1694; B1695; B1696

—Texturing—Contractors for

See Contractors, Texture Wall Finish

—Wall Finish—Flat, Egg Shell or Gloss

<i>Aquabar Waterproofing Products</i> ..	A52
<i>Arco Co.</i>	B1744
<i>Berry Brothers, Inc.</i>	B1612
<i>Billings-Chapin Co.</i>	B1611
<i>Bradley Stuc-O-Tint Co., Inc.</i>	B1677
<i>Carter White Lead Co.</i>	B1617
<i>Certain-teed Products Corp.</i>	B1618
<i>Davis, H. B., Co.</i>	B1620
<i>Detroit Graphite Co.</i>	B1622
<i>du Pont de Nemours, E. I., & Co., Inc.</i>	B1624
<i>Goheen Corp.</i>	B1632
<i>Hilo Varnish Corp.</i>	B1634
<i>Johnson, S. C., & Son</i>	B1636
<i>Keystone Varnish Co.</i>	B1638
<i>McNamara, Michael, Varnish Works</i>	B1641
<i>Merken, M. J., Paint Co., Inc.</i>	B1686
<i>Moore, Benjamin, & Co.</i>	B1644
<i>National Lead Co.</i>	B1645
<i>Pittsburgh Plate Glass Co.</i>	B1649
<i>Pratt & Lambert—Inc.</i>	B1656
<i>Seidlitz Paint & Varnish Co.</i>	B1666
<i>Sherwin-Williams Co.</i>	B1658
<i>Sonneborn, L., Sons, Inc.</i>	A82
<i>Thomson Wood Finishing Co.</i>	B1667
<i>Truscon Laboratories</i>	B1668
<i>U. S. Gutta Percha Paint Co.</i>	B1670
<i>White Co.</i>	A102
See also pages.....	A64; B1748
<i>Arcotone</i>	B1744
<i>Artone</i>	B1611
<i>Ascepticote</i>	B1668
<i>Compo Coating</i>	B1634
<i>Compo Tint</i>	B1634
<i>Degraco-Tone</i>	B1622
<i>Flat-Tone</i>	B1658
<i>Frescolite</i>	B1620
<i>Halfstone</i>	B1666
<i>Keystone</i>	B1638
<i>Luxeberry</i>	B1612
<i>Lyt-all</i>	B1656
<i>Mac</i>	B1641
<i>Mercotone</i>	B1686
<i>Oiltone</i>	B1666
<i>Patton's</i>	B1649
<i>Permacote</i>	B1636
<i>Porcelite</i>	B1667
<i>Rice's Flow-On</i>	B1670
<i>Sanatone</i>	B1667
<i>Sani-Flat</i>	B1644
<i>Sonotint</i>	A82
<i>Sta-White</i>	B1622

Paint—Cont.**—Wall Finish—Flat, Egg Shell or Gloss****—Cont.**

<i>Sterilite</i>	A52
<i>Stiploid</i>	B1622
<i>Stuc-O-Flat</i>	B1677
<i>Tegulite</i>	B1748
<i>Velumina</i>	B1649
<i>Whytcote</i>	A102
Specifications.....	B1612; B1618; B1622; B1624; B1638; B1644; B1649; B1658; B1670

—Washable Wall Finish

See Paint, Wall Finish—Flat, Egg Shell or Gloss

—Water

<i>Muralo Co., Inc.</i>	B1687
<i>Reardon Co.</i>	B1692
<i>United States Gypsum Co.</i>	B1697
<i>Wiggin's, H. B., Sons Co.</i>	B1696
<i>Cresto</i>	B1692
<i>Lumnite</i>	B1692
<i>Salamander</i>	B1687
<i>Solarite</i>	B1692
<i>Textone</i>	B1697
Specifications.....	B1687; B1692

—Water—Portland Cement

<i>Morene Products Co., Inc.</i>	B1684
<i>Muralo Co., Inc.</i>	B1687
<i>Reardon Co.</i>	B1692
<i>Sandusky Cement Co.</i>	B1689
<i>Sasso Art Cement Co.</i>	B1694
<i>Stonetone Co.</i>	B1695
<i>Sullivan Co.</i>	A81
See also page.....	B1622
<i>Alfresco</i>	B1692
<i>Bondex</i>	B1692
<i>Cemtex</i>	B1622
<i>Indelible</i>	B1687
<i>Kontite</i>	A81
<i>Medusa</i>	B1689
Specifications.....	B1692; B1694; B1695

—Waterproofing

See Waterproofing and Dampproofing Paint and Compounds

—White Lead

See White Lead

—Zinc Oxide

See Zinc Oxide

Paint Work

Specifications.....	B1617; B1634; B1636; B1645; B1648; B1649; B1658
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Paint and Varnish Removers

<i>Johnson, S. C., & Son</i>	B1636
<i>Martin Varnish Co.</i>	B1640
<i>Pratt & Lambert—Inc.</i>	B1656
See also page.....	B1634
<i>Expedite</i>	B1656

Panelboards, Electric**—Dead and Live Front**

<i>Adam, Frank, Electric Co.</i>	C2880
<i>Benjamin Electric Mfg. Co.</i>	C2954
<i>Bryant Electric Co.</i>	C2928
<i>Bull Dog Electric Products Co.</i>	C2884
<i>General Electric Co.</i>	C2938
<i>Trumbull Electric Mfg. Co.</i>	C2890
<i>Westinghouse Electric & Mfg. Co.</i>	C2862
<i>Wurdack, Wm., Electric Mfg. Co.</i>	C2892
<i>Circle T</i>	C2890
<i>F-A</i>	C2880
<i>Fusenter</i>	C2884
<i>SaftoFuse</i>	C2884
<i>Unit-Versal</i>	C2884
Specifications.....	C2880; C2884; C2928

—Metering

<i>Adam, Frank, Electric Co.</i>	C2880
<i>Bull Dog Electric Products Co.</i>	C2884
<i>Wurdack, Wm., Electric Mfg. Co.</i>	C2892
See also page.....	C2890
<i>F-A</i>	C2880
<i>Unit-Versal</i>	C2884
Specifications.....	C2880

Panels**—Door—Ventilating**

See Ventilators, Door Panel, Transom, etc.

—Veneered

See page.....B1151

Panic Exit Locks

See Exit Devices, Fire or Panic

Pans, Bunker

See Bunker Pans

Pantry Cabinets

See Cabinets

Pantry Sinks

See Sinks, Copper and White Metal

Paper**—Blue or Brown Print**

Pease, C. F., Co. A2

—Building

Bird & Son, Inc. A422

Certain-teed Products Corp. A404

Garrett, C. S., & Sons Corp. A188

Sisalkraft Co. A190

See also pages. A393; A398; A405

Garrettite A188

Liberty A188

Neposet A422

Rawhide A188

Specifications A188; A190; A422

—Drawing

Pease, C. F., Co. A2

—Toilet

See Toilet Paper

—Towels

See Towels, Paper

—Tracing

Pease, C. F., Co. A2

—Wall Coverings

See Coverings, Wall—Paper

Parallel Rule Attachment

Pease, C. F., Co. A2

Parting Beads

Sager Metal Weatherstrip Co. B1192

Partition Systems, Plaster Board—**Non-bearing, Hollow or Solid**

Simplex Steel Products Co. B1324

Specifications B1324

Partitions**—Bank and Office Cage**

See Cages, Bank and Office

—Cubicle—for Hospitals and Institutions

Hart & Hutchinson Co. B2106

Litterer Bros. Mfg. Co. B2117

Mills Co. B2148

Sanymetal Products Co. B2120

Weis, Henry, Mfg. Co., Inc. B2124

Ferrometal B2117

Veneer-Steel B2106

Weisteel B2124

Specifications B2106

—Curtain—Folding

"Quiet Zone" Folding Wall Co. B2155

Folding Products Corp. B2154

—Disappearing—Pleated Cloth

Athey Co. B2283

—Folding, Wood

(See also Hangers, Door, Accordion Folding Partition; Hangers, Door, Sliding Folding Partition)

American Folding Door and Partition Co. B2159

Wilson, J. G., Corp. B2163

See also page. B2156

Easyfold B2156

Sectionfold B2163

Specifications B2156; B2163

—Folding, Wood—Sound Retarding

Boston Acoustical Engineering Co. B1131

Hamlin, Irving. B1146

Hamlinized B1146

Trimount B1131

—Hollow Metal

Art Metal Construction Co. A805

Empire Steel Partition Co., Inc. B2136

Jamestown Metal Desk Co., Inc. B2146

Riester & Thesmacher Co. A837

See also pages. A757; A836; A1044; A1059; B2148

Jones Steel B2146

R & T. A837

—Hospital Ward

See Partitions, Cubicle—for Hospitals and Institutions

Partitions—Cont.**—Interchangeable Adjustable—Steel**

Detroit Steel Products Co. A955

Empire Steel Partition Co., Inc. B2136

Jamestown Metal Desk Co., Inc. B2146

Unit Steel Co. B2139

United Metal Products Co. A838

See also page. A816

Fenestra A955

Jones Steel B2146

Thies B2139

Specifications A955

—Interchangeable Adjustable—Wood

Circle A Products Corp. B2134

Improved Office Partition Co. B2144

Mount & Robertson, Inc. B2150

Weber Showcase & Fixture Co. B2152

See also page. B2159

Mount-Lockt B2150

Telescopartition B2144

—Interchangeable—Wire Mesh

See Partitions, Wire, Industrial

—Metal Covered

Empire Fireproof Door Co. A852

Friedrich, E. H., Co. A856

New York Kalamein Co. A866

Philipp Mfg. Co. A868

Reliance Fireproof Door Co. A863

Richmond Fireproof Door Co. A884

Thorp Fire Proof Door Co. A871

See also pages. A836; A848; A870

Specifications A856

—Rolling Wood

Acme Partition Co., Inc. B2156

American Folding Door and Partition Co. B2159

Grant Pulley and Hardware Co. B2160

Kinnear Mfg. Co. A898

Kocher Rolling Partition Co. B2161

Swedish Venetian Blind Co. B2162

Wilson, J. G., Corp. B2163

Specifications B2156; B2163

—Steel Panel—Industrial

Lyon Metallic Mfg. Co. B2093

—Steel—Rolled or Pressed

Bogert & Carrough Co. A1068

Detroit Steel Products Co. A955

Hauserman, E. F., Co. B2140

Mills Co. B2148

Sanymetal Products Co. B2120

Unit Steel Co. B2139

Watson Mfg. Co. B2184

See also pages. A1060; A1071; A1080; B2159; B2182

Boca A1068

Fenestra A955

Thies B2139

Specifications A955; B2140

—Telescoping

See Partitions, Interchangeable Adjustable

—Tile

See Tile, Hollow, Gypsum; Tile, Hollow, Clay or Terra Cotta; Tile, Hollow or Solid, Cinder Concrete

—Toilet, Shower or Urinal—Metal Covered

Fiat Metal Mfg. Co. B2116

Plymett B2116

—Toilet, Shower or Urinal—Slate

(See also Slate, Structural)

Structural Slate Co. B1378

Pyramid B1378

Specifications B1378

—Toilet, Shower or Urinal—Soapstone

Alberene Stone Co. B1401

—Toilet, Shower or Urinal—Steel

Ebinger, D. A., Sanitary Mfg. Co. B2102

Elkay Mfg. Co. B2104

Fiat Metal Mfg. Co. B2116

Hart & Hutchinson Co. B2106

Litterer Bros. Mfg. Co. B2117

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Weis, Henry, Mfg. Co., Inc. B2124

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Ebco B2102

Ferrometal B2117

Veneer-Steel B2106

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Weisteel B2124

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Marietta Mfg. Co. B1404

Vitrolite Co. B1406

Sani Onyx B1404

Specifications B1406

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Allen & Drew, Inc. A913

—Wall Board and Steel Stud

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Ryber Mfg. Co. B1261

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Cyclone Fence Co. A729

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Louden Machinery Co. C3385

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Best Register Co. C2810

Braun, J. G. C2807

Harrington & King Perforating Co. C2814

Hart & Cooley Mfg. Co. C2816

Highton, Wm., & Sons Co. C2818

Mueller, L. J., Furnace Co. C2813

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H & C. C2816

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- Composite—Wood and Concrete
 - MacArthur Concrete Pile & Foundation Co. A24
 - Raymond Concrete Pile Co. A26
 - Simplex Concrete Pile Assn., Inc. A23
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 - (Including: Premoulded, Cast-in-place Pedestal, Steel Incased, Steel Cylinders and Tubes)
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 - Baltimore Tube Co., Inc. C2303
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 - Conklin, T. E., Brass & Copper Co., Inc. C2307
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 - Randolph-Clowes Co. C2402
 - Rome Brass & Copper Co. C2310
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 - Anaconda C2301
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 - Detroit Works Co. B2067
 - Monarch Mfg. Co. B2032
 - Russell & Erwin Mfg. Co. B1958
 - Russwin B1958
- Sash—Vertical Lifting
 - Grant Pulley and Hardware Co. B1789
 - Russell & Erwin Mfg. Co. B1958
 - Steiner, C. M., Co., Inc. B2068
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 - Arco Co. B1744
 - Cabot, Samuel, Inc. B1614
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Challenge	B1359
Champion	B1359
Kings Diamond	B1359
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Beaver Products Co., Inc.	B1344
United States Gypsum Co.	B1359
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Acme	B1341
Arden	B1359
Blue Ribbon	B1362
Golden Seal	B1359
Ivory	B1359
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U. S. G. Moulding No. 1	B1359

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American Hard Wall Plaster Co.	B1339
Atlantic Gypsum Products Co., Inc.	B1340
Beaver Products Co., Inc.	B1344
Ebsary Gypsum Co., Inc.	B1352
Empire Gypsum Co., Inc.	B1354
National Gypsum Co.	B1355
Niagara Gypsum Co.	B1356
Reeb, M. A., Corp.	B1357
United States Gypsum Co.	B1359
Universal Gypsum & Lime Co.	B1362
American	B1344
Bondcrete	B1359
Gold Bond	B1355
Kon-Kreet	B1356
Peerless	B1357
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American Hard Wall Plaster Co.	B1339
Atlantic Gypsum Products Co., Inc.	B1340
Beaver Products Co., Inc.	B1344
Certain-teed Products Corp.	B1341
Ebsary Gypsum Co., Inc.	B1352
Empire Gypsum Co., Inc.	B1354
National Gypsum Co.	B1355
Niagara Gypsum Co.	B1356
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Texas Cement Plaster Co.	B1358
United States Gypsum Co.	B1359
Universal Gypsum & Lime Co.	B1362
Acme	B1341
Acolite	B1362
Adamant	B1359
Agatite	B1344
Akron	B1344
Alabaster	B1359
American	B1344
Arden Hardwall	B1359
Big Four	B1359
Blue Seal	B1340
Brownstone	B1362
Buckhorn	B1359
Crescent	B1362
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Iowana	B1362
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American Hard Wall Plaster Co.	B1339
Beaver Products Co., Inc.	B1344
National Gypsum Co.	B1355
Niagara Gypsum Co.	B1356
United States Gypsum Co.	B1359
Universal Gypsum & Lime Co.	B1362
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Acolite	B1362
Adamant	B1359
Badger	B1359
Empire	B1362
Gold Bond	B1355
Imperial	B1359
Kings	B1359
Red Band	B1362
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Universal	B1359
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Best Bros. Keene's Cement Co.	B1350
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Rochond Co.	B1376
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—Waterproofing of

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Prometheus Electric Corp.	C3243
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Franklin Pottery	C2981
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General Electric Co.	C2938
Hart & Hegeman Mfg. Co.	C2944
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- Steel Kote.....B1620
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- Tockolith.....A86
- Triple-A.....B1655
- Triple Leadkote.....B1748
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- Carbolineum Wood Preserving Co.....B1699
- Cabot, Samuel, Inc.....B1614
- Genfire Steel Co.....A62
- Northeastern Co.....B1700
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- Genfire Steel Co.....A62
- Hillyard Chemical Co.....B1535
- Minwax Co., Inc.....A67
- Scofield, Evans & Co.....B1702
- Sherwin-Williams Co.....B1658
- Sonneborn, L., Sons, Inc.....A82
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- Lignophol.....A82
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Lee.....B1789

Queen.....B1789

—Sash—Overhead

Cleveland Lock Works.....B1787

Grant Pulley and Hardware Co...B1789

Queen.....B1789

—Sash—Pressed Steel

Grand Rapids Hardware Co.....B1788

Stanley Works.....B1792

Dillon.....B1792

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Corbin, P. & F.....B1891

Earle Hardware Mfg. Co.....B1952

Irving, W., Forge, Inc.....B1879

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Richards-Wilcox Mfg. Co.....B1827

Russell & Erwin Mfg. Co.....B1958

Stanley Works.....B1843

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Russwin.....B1958

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Automatic Primer Co.....C2427

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Crane Co.....C2406

Deming Co.....C2448

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Goulds Pumps, Inc.....C2434

Myers, F. E., & Bro. Co.....C2436

Nash Engineering Co.....C2440

Quimby Pump Co., Inc.....C2442

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Yeomans Brothers Co.....C2446

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Automatic Primer Co.....C2427

Chicago Pump Co.....C2428

Economy Pumping Machinery Co..C2432

Goulds Pumps, Inc.....C2434

Quimby Pump Co.....C2442

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Yeomans Brothers Co.....C2446

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—Booster

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American Steam Pump Co.....C2426

Automatic Primer Co.....C2427

Chicago Pump Co.....C2428

Economy Pumping Machinery Co..C2423

Pumps—Cont.**—Centrifugal—Cont.**

Goulds Pumps, Inc.....C2434

Nash Engineering Co.....C2440

Quimby Pump Co., Inc.....C2442

Westco-Chippewa Pump Co.....C2445

Yeomans Brothers Co.....C2446

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Apco.....C2427

Jennings.....C2440

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—Circulating—Brine, Drinking Water, etc.

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Crane Co.....C2406

Deming Co.....C2448

Goulds Pumps, Inc.....C2434

Milwaukee Air Power Pump Co..C2451

Myers, F. E., & Bro. Co.....C2436

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—Fire Protection or Underwriters

Goulds Pumps, Inc.....C2434

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—Gasoline and Oil Distributing

See Gasoline and Oil Storage and Distributing Systems

—House or Tank—Water Supply

See Pumps, Centrifugal; Pumps, Power; Pumps, Rotary; Pumping Sets

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Deming Co.....C2448

Goulds Pumps, Inc.....C2434

Myers, F. E., & Bro. Co.....C2436

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Oil-Rite.....C2448

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Quimby Pump Co., Inc.....C2442

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Crane Co.....C2406

Delco-Light Co.....C2878

Deming Co.....C2448

Duro Co.....C2450

Goulds Pumps, Inc.....C2434

Milwaukee Air Power Pump Co..C2451

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Chicago Pump Co.....C2428

Dunham, C. A., Co.....C2750

Economy Pumping Machinery Co..C2432

Nash Engineering Co.....C2440

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Jennings.....C2440

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Dunham, C. A., Co.....C2750

Economy Pumping Machinery Co..C2432

Nash Engineering Co.....C2440

Yeomans Brothers Co.....C2446

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Push Bars, Door

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Corbin, P. & F.....B1891

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Gaynor Electric Co., Inc.....C2935

Russell & Erwin Mfg. Co.....B1958

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Russwin.....B1958

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King, E. & F., & Co., Inc.....B1748

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Plastic Products Co.....B1750

Breer's.....B1748

Plastoid.....B1750

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King, E. & F., & Co.....B1748

Plastic Products Co.....B1750

Plastoid.....B1750

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—Florist's

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—Mortuary

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—Shoe

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—Theater Ticket

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Allen, W. D., Mfg. Co.....C2454

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Jiffy Fire Hose Rack Co.....C2462

Nuhring, Chas., & Brother.....C2466

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Auer Register Co.....C2808

Bente, H. F., & Co.....C2735

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Dixie Metal Products Co., Inc.....C2737

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Gerken, J. D., Co.....	C2738
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Clow, James B., & Sons.....	C2622
<i>Gasteam</i>	C2622
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Rome Brass Radiator Corp.....	C2730
<i>Robras</i>	C2730

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Metal Stamping Co.....	C2722
Modine Mfg. Co.....	C2724
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<i>Convecto</i>	C2722
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<i>Convecto</i>	C2722
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Higgin Mfg. Co.	B1202
Watson Mfg. Co.	B1218

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Disappearing Roller Screen Co., Inc.	B1197
Rolling Screens, Inc.	B1224
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Cincinnati Fly Screen Co.	B1200
Higgin Mfg. Co.	B1202
Jamestown Screen & Mfg. Co.	B1205
Kane Mfg. Co.	B1208
Morrison-Skinner Co.	B1210
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Illinois Engineering Co.	C2764
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<i>Eclipse</i>	C2764

—Oil—for Garage Floors

Wade Iron Sanitary Mfg. Co.	C2349
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Illinois Engineering Co.	C2764
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<i>Eclipse</i>	C2764

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American Sanitary Products Co., Inc.	C2323
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Kaustine Co., Inc.	C2329
Nustone Products Corp.	C2327
Standard Cement Construction Co.	C2328
Stroudsburg Septic-Tank Co.	C2332
<i>Gold Seal</i>	C2329
<i>San-Equip</i>	C2330
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Sewage**—Disposal Systems**

American Sanitary Products Co., Inc.	C2323
Aten Sewage Disposal Co., Inc.	C2324
Kaustine Co., Inc.	C2329
New York Sewage Disposal Co.	C2326
Standard Cement Construction Co.	C2328
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Athey Co.	B2276
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Columbia Mills, Inc.	B2278
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Columbia Mills, Inc.	B2278
du Pont de Nemours, E. I., & Co., Inc.	B2277
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<i>Paragon</i>	B2281
<i>Scotch Holland</i>	B2282
<i>Sunlite</i>	B2281
<i>Tontine</i>	B2277
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Columbia Mills, Inc.	B2278
Hartshorn, Stewart, Co.	B2280
Interstate Shade Cloth Co.	B2281
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Specifications.	B2278; B2280

—Window—Rollers for

Columbia Mills, Inc.	B2278
Hartshorn, Stewart, Co.	B2280
Specifications.	B2278; B2280

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Hough Shade Corp.	B2284
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Carey, Philip, Co.	A415
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<i>Ambler</i>	A416; B1260
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—Brass, Bronze, Copper or Nickel Silver

American Brass Co.	A426
Baltimore Tube Co., Inc.	C2303
Conklin, T. E., Brass & Copper Co., Inc.	C2307
Hungerford, U. T., Brass & Copper Co.	A488
Scovill Mfg. Co.	C2311
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—Chrome Nickel Iron Alloys

Allegheny Steel Co.	C3294
<i>Ascoloy</i>	C3294

—Drawn, Stamped or Spun

Friedley-Voshardt Co.	A764
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—Ingot Iron, Galvanized, Black and Blue Annealed—Flat and Corrugated

American Rolling Mill Co.	A436
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Specifications	A436

—Iron, Copper Alloyed, Galvanized—Flat, Corrugated, Beaded, etc.

Apollo Steel Co.	A435
Newport Rolling Mill Co., Inc.	A439
<i>Apolloy</i>	A435
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United Lead Co.	A432
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International Nickel Co.	C3295
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—Nickel Copper Alloys

International Nickel Co.	C3295
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—Monel Metal

Monel Metal	C3295
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—Steel, Asbestos Covered—Flat, Corrugated, Beaded, etc.

Call, John, Co.	A535
Robertson, H. H., Co.	A510; A548
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—Steel, Copper Alloyed—Flat, Corrugated, Beaded, etc.

Apollo Steel Co.	A435
Central Alloy Steel Corp.	A438
Youngstown Sheet & Tube Co.	C2320
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<i>Apolloy</i>	A435
<i>Toncan</i>	A438
<i>Youngstown Copperoid</i>	C2320

Sheet Metal—Cont.

- Steel, Galvanized or Black—Flat, Corrugated, Beaded, etc.
- Lyon, Conklin & Co., Inc. A442
- Sheet Steel Trade Extension Committee A796
- Youngstown Sheet & Tube Co. C2320
- See also pages A132; A560; A908
- Association A796
- Tin and Terne Plate
- Lyon, Conklin & Co., Inc. A442
- Taylor, N. & G., Co. A443
- Wheeling Corrugating Co. A490
- Glendale A442
- Lyonore Metal A442
- Target and Arrow A443
- Specifications A443
- Zinc
- New Jersey Zinc Co. A430
- Horse Head A430
- Specifications A430

Sheet Metal Work

- See pages A441; A486; A488; A503; A504; A513; A519; A560; A764; A784; A856; B1300; C2400
- Gage to Use for Different Classes of Work A436; A442
- Gages and Weights A436
- Specifications A430

Sheet Tile

- See Tile, Sheet or Board Form

Shellac and Shellac Substitutes

- Johnson, S. C., & Son B1636
- Martin Varnish Co. B1640
- See also pages B1612; B1658
- Marvelac B1658
- Under-Lac B1636

Shelving

- Adjustable—Hardware for
- Garden City Plating & Mfg. Co. B2262
- Knappe & Vogt Mfg. Co. B1877
- Garco B2262
- Bathroom
- See Bathroom Accessories
- Florist's
- See Florist's Shelving and Racks
- Refrigerator or Cold Storage
- See Refrigerator Shelving
- Slate
- See Slate, Structural
- Steel
- Berger Mfg. Co. B2096
- Jamestown Metal Equipment Co. B2180
- Lyon Metallic Mfg Co. B2093
- Penn Metal Co. B2101
- Snead & Co. B2182
- Van Dorn Iron Works Co. B2186
- See also pages A586; A1044; B2148; B2176; B2184
- Berloy Wedge-Lock B2096
- Jmeco B2180
- Penco B2101
- Steel—Library
- See Shelving, Steel; Bookstacks, Metal

Shields

- Bathtub—for Showers
- Coco Brothers, Inc. C2525
- Crist & Schilken Co., Inc. C2526
- Lehman, L. H. C2530
- S. M. Shower Door Co. C2529
- C & S C2526
- Radiator
- See Radiator Covers
- Register
- See Register Shields

Shingle Stains

- See Stains, Shingle

Shingles

- Asbestos
- Asbestos Shingle, Slate & Sheathing Co. A416
- Carey, Philip, Co. A415
- Eternit, Inc. A418
- Mohawk Asbestos Slate Co., Inc. A420
- Ruberoid Co. A405
- See also page B1554
- Ambler B416
- Colonial A416

Shingles—Cont.

- Asbestos—Cont.
- English Thatch A416
- Specifications A416; A418; A420
- Asphalt—Plain or Surfaced
- Barber Asphalt Co. A398
- Bird & Son, Inc. A422
- Carey, Philip, Co. A421
- Certain-teed Products Corp. A404
- Garrett, C. S., & Son Corp. A188
- Ruberoid Co. A405
- Servicised Products Corp. A79
- Asfaltislate A421
- Garrettite A188
- Genasco Latite A398
- Genasco Sealbac A398
- Neposet A422
- Super A422
- Specifications A421
- Cement
- See Tile, Roofing, Concrete
- Copper Cover Asphalt
- Flintkote Co. A425
- Copperclad A425
- Specifications A425
- Metal
- Aluminum Co. of America A424
- Edwards Mfg. Co. A560
- Hungerford, U. T., Brass & Copper Co. A488
- Milwaukee Corrugating Co. A427
- New Jersey Zinc Co. A430
- Newport Rolling Mill Co., Inc. A439
- See also pages A546; A908
- Horse Head Zinc A430
- Milcor A427
- Reo A560
- Specifications A424; A430
- Slate
- See Slate, Roofing
- Tile
- See Tile, Roofing, Clay or Terra Cotta
- Wood—Natural
- Consolidated Shingle Mills of British Columbia, Ltd. A407
- Louisiana Red Cypress Bureau B1120
- See also page B1151
- Edgwood A407
- Specifications A407
- Wood—Stained
- Cabot, Samuel, Inc. A406
- Consolidated Shingle Mills of British Columbia, Ltd. A407
- Creo-Dept Co., Inc. A408
- Edham Co., Inc. A412
- Weatherbest Stained Shingle Co., Inc. A410
- Edgwood A407
- Specifications A407; A408; A410; A412

Ship Models

- See page C2995

Shoe Racks

- Hall, Philip, Inc. B2259

Shoes

- Ladder
- See Ladder Shoes
- Leader
- Canton Foundry & Machine Co. A606
- Creswell, Samuel J., Iron Works. A608
- Hungerford, U. T., Brass & Copper Co. A488
- See also pages A716; A790
- Universal A606

Shower Bath

- Curtains, see Curtains, Shower Bath
- Doors, see Doors, Shower Stall
- Drains, see Drains, Floor, Yard, etc.; Drains, Double Drainage
- Fixtures, see Baths, Shower or Needle
- Mixers, see Mixers, Shower Bath
- Partitions, see Partitions, Toilet, Shower or Urinal
- Shields, see Shields, Bathtub—for Showers
- Stalls, see Stalls, Shower Bath; Partitions, Toilet, Shower or Urinal

Shutter Holders

- See Holders, Shutter

Shutters

- Automatic, see Louvers, Automatic
- Rolling, see Doors, Rolling
- Sheet Steel, see Doors, Sheet Steel
- Tin Clad, see Doors, Tin Clad

Siamese Hose Connections

- Allen, W. D., Mfg. C2454
- Elkhart Brass Mfg. Co. C2458
- Jiffy Fire Hose Rack Co. C2462
- See also page C2466
- Specifications C2454; C2462

Sideboards

- Irving & Casson-A. H. Davenport Co. B2168

Sidewalk

- Doors, see Doors, Sidewalk
- Gratings, see Gratings, Sidewalk, Area, etc.
- Lights, see Lights, Vault and Sidewalk

Sidewalls

- Glass, see Glass, Corrugated Wire Glass
- Metal, see Ceilings, Metal

Siding

- Lumber, see Lumber, Asbestos
- Sheet Metal, see Sheet Metal

Signal Systems

- Bank Alarm
- American District Telegraph Co. A1106
- Holtzer-Cabot Electric Co. C3010
- McClintock, O. B., Co. A1107
- Phonetalarm A1106
- Carriage Calling
- Kliegl Bros. C3214
- Elevator
- Elevator Supplies Co., Inc. C3136
- Graham & Norton Co. C3124
- Grant Elevator Equipment Corp. C3126
- Norton-Blair-Douglass, Inc. C3135
- Randall Control & Hydrometric Corp. C3128
- Wagner Mfg. Co. C3132
- See also page C3024
- Elevator—Dispatching
- See page C3135
- Factory, School, etc.—Electric
- Signal Engineering & Mfg. Co. C3012
- See also pages C2954; C3010; C3026; C3392
- Specifications C3012
- Fire Alarm
- See Fire Alarm Systems
- Hospital—Electric
- Connecticut Telephone & Electric Co. C3022
- Holtzer-Cabot Electric Co. C3010
- See also page C3026
- Police
- Gamewell Co. C3018
- Sprinkler Alarm
- See Sprinkler System Supervisory Service
- Tank Alarm
- See Alarms, Tank
- Telephone Calling System
- See Telephone Signaling Auxiliaries

Signs

- Illuminated, Electric—Exterior
- Architectural Metal Products, Inc. A744
- Flexlume Corp. C2999
- National Theatre Supply Co. C3215
- Illuminated, Electric—Interior
- Akins, B. L., Inc. C3330
- American Bronze Co. A742
- Day-Brite Reflector Co. C2964
- Flexlume Corp. C2999
- Kliegl Bros. C3214
- National Theatre Supply Co. C3215
- Tablet & Ticket Co. C3341
- Wheeler Reflector Co. C2967
- Willey Sign Co. C3000
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- Edgeglow C3340
- Flexray C2999
- Perlite C3000
- Reflectolite C3330
- Metal
- See Ornamental Metal Work; Tablets, Cast Bronze

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—Tile, Exterior and Interior
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—Wire

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A732; A798

—Wood

Gawthmay, J. H..... A766

Sills**—Cinder Concrete**

National Building Units Corp..... A373
Concrete A373

—Door

See Thresholds and Saddles

—Stone

See Specific Type of Stone, as: Blue-
stone; Granite; Limestone; Marble, etc.

—Window, Terra Cotta

See page..... A346

Silos

—Brick, see Chimneys, Common Brick;
Chimneys, Radial Brick

Sinks**—Ceramic Tile**

Friderichsen Floor & Wall Tile Co. B1436

—Copper and White Metal

Elkay Mfg. Co..... C2555
Koven, L. O., & Brother, Inc..... C2557

Trageser, John, Steam Copper
Works C2558

Zahner Mfg. Co..... C2560

See also pages..... C2398; C2399

—Laboratory—Acid Resistant

Alberene Stone Co..... B1401
Knight, Maurice A..... C3316

U. S. Stoneware Co..... C3318

See also page..... C2318

—Laundry Tray Combination

See Tubs and Sinks, Combination

—Porcelain—Kitchen, Pantry, Slop, etc.

Ebinger, D. A., Sanitary Mfg. Co. C2554
Ebo C2554

Eddy C2554

—Porcelain Enameled—Kitchen, Pantry, Slop, etc.

Crane Co..... C2546

—Sheet Metal—Kitchen, Scullery, etc.

Elkay Mfg. Co..... C2555
Koven, L. O., & Brother, Inc..... C2557

Trageser, John, Steam Copper
Works C2558

Zahner Mfg. Co..... C2560

—Slate

Structural Slate Co..... B1378
Pyramid B1378

Specifications B1378

—Soapstone

Alberene Stone Co..... B1401

Siphons, Sewage—Automatic

Aten Sewage Disposal Co., Inc..... C2324
New York Sewage Disposal Co..... C2326

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Berry Brothers, Inc..... B1612
Carpenter-Morton Co..... B1616

Craftex Co..... B1678

du Pont de Nemours, E. I., & Co.,
Inc. B1624

General Chemical Co..... A94

Hachmeister-Lind Chemical Co..... B1682

Johnson, S. C., & Son..... B1636

McNamara, Michael, Varnish
Works B1641

Moore, Benjamin, & Co..... B1644

Muralo Co., Inc..... B1687

Pittsburgh Plate Glass Co..... B1649

Pratt & Lambert—Inc..... B1656

Reardon Co..... B1692

Toch Brothers..... A86

Truscon Laboratories..... B1668

United States Gypsum Co..... B1697

Wiggin's, H. B., Sons Co..... B2272

Alkabar B1668

Craftexsize B1678

Filtex B1656

Hard-n-tyte A94

Impervo B1644

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Kotall B1616

Luxeberry B1612

R.I.W. A86

Sealerine B1641

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Textone B1697

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Skip Hoists

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Skylights**—Automatic Ventilating**

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Shaft, etc.)

Kuhnla, August, Inc..... A520

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—Corrugated Wire Glass

Pennsylvania Wire Glass Co..... A514

—Glass and Concrete Construction

American Bar Lock Co., Inc..... A518

American 3 Way-Luxfer Prism Co. A516

Bruner, P. M., Granitoid Co..... A390

Grauer, Albert, & Co..... A388

Richards, J. Merrill..... A391

Bar Lock..... A518

Steele A516

3-Way A516

Unity A391

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—Guards for

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—Puttyless

Blaski Mfg. Co..... A492

Drouvé, G., Co..... A496

General Sheet Metal Works..... A502

Hirschman, W. F., Co., Inc..... A538

Howie Co., Inc..... A503

Jeter, A. H., & Co., Inc..... A504

Lupton's, David, Sons Co..... A1044

Milwaukee Corrugating Co..... A427

National Ventilating Co..... A506

Nonpareil Skylight Co..... A512

Richards, Glendon A., Co..... A508

Robertson, H. H., Co..... A510

Van Noorden, E., Co..... A513

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Anchor-Bar A513

Anti-Pluvius A496

Cibulas A502

Daylite A513

Drow-Ve-Lite A496

Effico A538

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Peerless A503

Simplicity A508

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—Sash Operating Devices for

See Sash Operating Devices

—Shades for

See Shades, Window, Skylight, etc.—
Ventilating; Shades, Skylight—Adjust-
justable; Blinds, Venetian

—Sheet Metal

Milwaukee Corrugating Co..... A427

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Milcor A427

—Solid Steel

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Federal Steel Sash Co..... A1076

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—Ventilating

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erating Devices)

Blaski Mfg. Co..... A492

Klauser Mfg. Co..... A546

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—Ventilators for

See Ventilators, Skylight

Slabs**—Concrete—Light Weight**

Aerocrete Corp. of America..... A151

Porete Mfg. Co..... A154

—Insulated Metal Sheet

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Sheet

—Magnesite Composition

Zenitherm Co..... A330

Slabs—Cont.**—Partition—Light Weight Concrete**

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—Pre-cast Gypsum

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—Reinforced Cement or Concrete

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Floor Construction, Reinforced Con-
crete

—Sheet Metal, Roof

See Roof Construction—Insulated Metal
Sheet

—Soapstone

See Soapstone

—Structural Glass

See Glass, Structural

—Terrazzo

See Terrazzo, Precast

Slate**—Blackboards**

See Blackboards, Slate

—Electrical

Structural Slate Co..... B1378

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—Flagging

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Slate

—Flooring

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Tile, Slate

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Chapman Slate Co..... A447

Emack, John D., Co..... A448

Klein & Kavanagh..... A441

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Norton Brothers..... A451

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Rising & Nelson Slate Co..... A452

Sheldon, F. C., Slate Co..... A459

Vendor Slate Co..... A454

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White and Colors

Structural Slate Co..... B1378

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ening Systems

Sleeping Porch Windows

See Windows, Ventilating—Sleeping
Porch, etc.

Sleeves**—Flashing, Vent Stack**

See Vent Connections, Roof

—Pipe, Adjustable

Beaton & Cadwell Mfg. Co..... C2746

Slides, Drawer

- Grant Pulley and Hardware Co....B1789
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Smoke Chambers, Fireplace

- Jackson, Edwin A., & Bro., Inc.... A628
JaxonA628

Smoke Screens

- See Partitions

Smokestacks**—Steel**

- (See also Steel Plate Construction)
 Chicago Bridge & Iron Works....C2422
 Pittsburgh-Des Moines Steel Co....C2424
 Stover Steel Tank & Mfg. Co....C2416
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HortonC2422

—Steel, Brick Lining for

- See Chimneys

Snow Guards

- See Guards, Snow

Soap**—Dispensers—Individual**

- Bradley Washfountain Co....C2562
 Imperial Brass Mfg. Co....C2492
 Palmer Co....C2613
 Procter & Gamble Co....C2619
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—Flakes

- Procter & Gamble Co....C2619

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- Gerson-Stewart Corp....C2618
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—Systems, Liquid

- Gerson-Stewart Corp....C2618
 Imperial Brass Mfg. Co....C2492
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Soapstone

- Alberene Stone Co....B1401
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Sockets**—Ceiling**

- See Inserts, Concrete

—Electric, Current Tap Combination

- See Taps, Electric Current, Socket Combination

—Electric, Key, Keyless, Pull Chain or Push Button—Brass Shell or Porcelain

- Arrow Electric Co....C2924
 Benjamin Electric Mfg. Co....C2954
 Bryant Electric Co....C2928
 General Electric Co....C2938
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Ben-oxC2954
H & HC2944
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—Sash Pull

- See Sash Pull Sockets and Poles

Soda Fountains

- See page....C3284

Sodium Hypochlorite Control Apparatus

- See Hypochlorite Control Apparatus

Soffit Clips

- See Caging, Wire—Beam and Girder

Softeners, Water

- California Filter Co., Inc....C2405
 Compound Injector & Specialty Co.C2342
 Crane Co....C2406
 Duro Co....C2408
 Everson Filter Co....B1488
 Graver Corp....C2409
 Hungerford & Terry, Inc....C2410
 International Filter Co....C2412
 Paige & Jones Chemical Co., Inc..C2414
 Permutit Co....C2415
 Refinite Co....C2420
 Stover Steel Tank & Mfg. Co....C2416
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Softeners, Water—Cont.

- Marvel*C2412
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Softening Materials

- Refinite Co....C2420

Soot Blowers and Cleaners

- See page....C3354

Sound Deadening Materials

- Cellular Gypsum, see Cellular Gypsum
 —Cinder Concrete, see Tile, Hollow or Solid, Cinder Concrete
 —Cork, see Cork; Corkboard
 —Curtain Folding Partitions, see Partitions, Curtain—Folding
 —Doors, see Doors, Sound Retarding
 —Felt, see Felt, Insulating and Sheathing
 —Floor and Wall, see Insulation, House
 —Gypsum, see Floor Construction, Gypsum; Floor Voids, Gypsum Filler Tile, Hollow, Gypsum; Cellular Gypsum
 —Mineral Wool, see Mineral Wool
 —Nailing Concrete, see Nailing Concrete
 —Partitions, Folding, see Partitions Folding, Wood—Sound Retarding
 —Quilted Felt, see Felt, Insulating and Sheathing; Insulation, House
 —Wood Fiber, see Wall Board, Fiber; Insulation, House

Sound Deadening Systems

- Stevens Sound-Proofing Co....A20
Stevens SystemA20
 SpecificationsA20

Sounding Boards

- See Boards, Sounding

Spacers

- Bar, Concrete Reinforcement, see Concrete Reinforcement Devices
 —Form, see Form Spacers
 —Furring, see Furring Spacers

Spandrels, Cast Iron

- See Castings, Iron—Architectural

Specifications

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Spiral

- Column Reinforcement, see Concrete Reinforcement, Column Spirals
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 —Gravity Chutes, see Chutes, Gravity
 —Stairs, see Stairs, Iron or Steel—Spiral

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- Moore, Benjamin, & Co....B1644
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Spot Grounds

- See Grounds, Spot

Spotlights

- (See also Floodlights)
 Kliegl Bros....C3214
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Spray Nozzles

- See Nozzles, Spray

Sprays, Hydrotherapeutic

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Spreaders, Form

- See Form Ties and Spreaders

Spring Sash Balances

- See Balances, Sash

Sprinkler**—System Supervisory Service**

- American District Telegraph Co...C3016
 Usem Co....C3019
A. D. T.C3016
WaterwatchC3019
 —Systems—Automatic, Fire
 Grinnell Co., Inc....C2461
 Viking Corp....C2470
TydenC2470

—Systems—Automatic, Fire—Air, Compressors for

- See Compressors, Air

—Systems—Automatic Fire—Pumps for

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—Systems—Lawn

- See page....C2802

Sprinkler—Cont.**—Systems—Tanks for**

- See Tanks, Elevated

Spun Metal Work

- See Sheet Metal, Drawn, Stamped or Spun

Squash Courts

- Indiana Flooring Co....B1570

Stable Fittings and Fixtures

- (See also Barn Equipment)

- Fiske, J. W., Iron Works.....A716
 James Mfg. Co....C3384
 Loudon Machinery Co....C3385
 See also page....A787

Stacks

- Book, Newspaper, etc., see Bookstacks
 —Smoke, Steel, see Smokestacks, Steel; Steel Plate Construction
 —Vent—Cast Iron Pipe, see Pipe, Cast Iron—Vent Stack

Stage**—Elevators**

- See Elevators, Theater

—Fittings and Lighting, Electrical

- (Including Footlights; Border Lights; Proscenium Lights; Strip Lights; Stage Pockets, Plugs, Receptacles and Connectors, etc.)
 Erikson, L., Electric Co....C2965
 Kliegl Bros....C3214
 National Theatre Supply Co....C3215

—Rigging

- Clark, Peter, Inc....C3212
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—Theater Curtains

- See Curtains, Theater Stage

—Ventilators

- See Ventilators, Theater Stage, etc.

Stains**—Brick and Stucco, Waterproof**

- Cabot, Samuel, Inc....B1614

—Mortar

- See Colors, Mortar, Cement and Stucco

—Shingle

- Cabot, Samuel, Inc....B1614
 Certain-teed Products Corp....B1618
 Creo-Dipt Co., Inc....A408
 Sherwin-Williams Co....B1658
 Weatherbest Stained Shingle Co., Inc.A410
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Dixie-WhiteA408
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—Wood—Acid, Oil, etc.

- Carpenter-Morton Co....B1616
 Certain-teed Products Corp....B1618
 du Pont de Nemours, E. I., & Co., Inc.B1624
 Johnson, S. C., & Son....B1636
 Minwax Co., Inc....A67
 Pittsburgh Plate Glass Co....B1649
 Pratt & Lambert—Inc....B1656
 Sherwin-Williams Co....B1658
 Standard Varnish Works....B1664
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DecolacB1611
HandcraftB1658
KleartoneB1664
PitcairnB1649
 Specifications.....A67; B1618; B1624; B1649; B1658

Stairs**—Concrete, Pre-cast**

- Babcock-Davis Corp.A633
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 SpecificationsA633

—Disappearing, Ceiling Suspended—Steel

- Bessler Disappearing Stairway Co. A684

—Disappearing, Ceiling Suspended—Wood

- Bessler Disappearing Stairway Co..B1228
 Farley & Loetscher Mfg. Co....B1227
PrestoB1227

—Emergency

- See Fire Escapes

Stairs—Cont.**—Folding—Ceiling Suspended**

See Stairs, Disappearing

—Iron or Steel—Spiral

Creswell, Samuel J., Iron Works.. A608
 Duvinage Spiral Stair Co..... A682
 Fiske, J. W., Iron Works..... A716
 Guarsteel Safety Stair Co..... A636
 Logan Co..... A772
 Taylor & Dean..... A704
 Woodbridge Ornamental Iron Co.,
 Inc. A658
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 A702; A760; A790

Specifications A636

—Iron or Steel—Standard

Art Metal Construction Co..... B2176
 Badger Wire & Iron Works..... A696
 Bois, N..... A634
 Guarsteel Safety Stair Co..... A636
 Hughes-Keenan Co..... A640
 Logan Co..... A772
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 Sexauer & Lemke, Inc..... A644
 Smith, A. L., Iron Works..... A646
 Smith, F. P., Wire and Iron
 Works A798
 Smith & Caffrey Co..... A648
 Smyser-Royer Co..... A795
 Titchener Iron Works, Inc..... A649
 Vilsack, Martin Co..... A802
 Watt Mfg. Co., Inc..... A650
 Western Architectural Iron Co.... A654
 Wolverine Iron Works..... A656
 Woodbridge Ornamental Iron Co.,
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- Elevators, see Elevators, Theater
- Emergency Lighting Systems, see Lighting and Power Systems, Electric, Emergency and Exit Lighting
- Equipment, see Furnishings and Equipment, Theater
- Equipment, Electric, see Stage Fittings and Lighting
- Light Dimmers, see Dimmers, Electric Light, Theater
- Stage Ventilators, see Ventilators, Theater Stage, etc.
- Switchboards, see Switchboards, Theater
- Ticket Booth and Equipment, see Ticket Booths and Equipment, Theater

Therapeutic Appliances

Sanitarium Equipment Co.....C3382

Thermometers

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—Indicating and Recording

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—Resistance

- American Temperature Indicating Co.C2830
- ThermoscopeC2830
- SpecificationsC2830

Thermostats

(See also Controllers, Temperature)

- Absolute Con-Tac-Tor Corp.....C2828
- American Radiator Co.....C2718
- Bishop & Babcock Sales Co.....C2749
- Fulton Sylphon Co.....C2834
- Honeywell Heating Specialties Co.C2838
- Johnson Service Co.....C2840
- Majestic Electric Appliance Co., Inc.C2626
- Powers Regulator Co.....C2842
- Simplex Heat Regulator Co., Inc..C2833
- AquaswitchC2828
- B & B.....C2749
- Con-Tac-TorC2828
- ConvoswitchC2828
- HydroswitchC2828
- MercoildC2718
- Sylphon Registherm.....C2834
- ThermoswitchC2828
- SpecificationsC2833; C2834

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—Flue—Cast Iron

- Majestic Co.....A616
- See also page.....A622

—Flue—Sheet Metal

Sykes Metal Lath Co.....A629

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—Flue—Terra Cotta

Clay Products Assn.....A245

Threshold and Floor Joint Connections

- Blasteel Mfg. Co.....A149
- BullnoseA149

Thresholds and Saddles

—Bluestone

- American Blue Stone Co.....A677
- Ambuco Non-slipA677
- SpecificationsA677

—Metal

- Braun, J. G.....A748
- Detroit Show Case Co.....B1758
- Guarsteel Safety Stair Co.....A636

Thresholds and Saddles—Cont.

—Metal—Cont.

- Hungerford, U. T., Brass & Copper Co.....B1412
- Logan Co.....A772
- See also pages.A633; A648; A742; A750; A780; A784; A789; A790; B1752; B1763; B1770

—Safety—Non-slip

- American Abrasive Metals Co.....A666
- Norton Co.....B1420
- AlundumB1420
- BronzalunA666
- FaralunA666

—Tile

(See also Tile, Ceramic; Tile, Paving)

—Weatherstrip Combination

- Accurate Metal Weather Strip Co..B1172
- American Metal Weather Strip Co..B1174
- Baker, W. J., Co.....B1196
- Chamberlain Metal Weather Strip Co., Inc.....B1180
- Hoffbauer Co., Inc.....B1183
- Niagara Metal Weather Strip Co..B1188
- Reese Metal Weatherstrip Co.....B1190
- Sager Metal Weatherstrip Co.....B1192
- WindustiteB1174
- SpecificationsB1192

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—Booths and Equipment

- Clark, Peter, Inc.....C3212
- National Theatre Supply Co.....C3215

—Cancelling Machines

Bright, H. V.....A736

Tiering Machines

- Economy Engineering Co.....C3182
- Standard Conveyor Co.....C3201
- TelescopierC3182

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—Bar, Concrete Reinforcing

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—Form

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—Wall, Metal

- Barton Spider-Web System, Inc...A121
- Bostwick Steel Lath Co.....B1290
- Concrete Clip & Wire Co.....A124
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- Sykes Metal Lath Co.....A629
- Youngstown Pressed Steel Co.....B1309
- See also pages.....A586; A798
- EconomyA629
- SecurityA125
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Tigerwood Flooring

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Knight, Maurice A.....C3316

Tile, Acoustical

- Boston Acoustical Engineering Co..A15
- Guastavino, R., Co.....A16
- AcoustexA15
- AkoustolithA16

Tile, Artificial Marble

- Chicago Panelstone Co.....B1367
- PanelstoneB1367

Tile, Asphalt and Rubber

- Rubberstone Corp.....B1505
- Rubber-Tex-Tile Flooring Co.....B1524
- Tile-Tex Co.....B1529
- Biegler'sB1524
- Specifications.....B1505; B1524; B1529

Tile, Cement

—Floor and Wall—Decorative

- National Floor Tile Co.....B1418
- AdamantileB1418
- ArtileB1418
- DiamantileB1418

Tile, Cement—Cont.**—Roof Slab**

See Tile, Roof, Reinforced Cement

—Roofing

See Tile, Roofing Concrete

Tile, Ceramic**—Decorative and Faience**

American Encaustic Tiling Co., Ltd.	B1422
Associated Tile Mfrs.	B1426
Batchelder-Wilson Co.	B1428
Cambridge-Wheatley Co.	B1430
Empire Floor & Wall Tile Co., Inc.	B1432
Flint Faience & Tile Co.	B1434
Franklin Pottery	C2981
Friderichsen Floor & Wall Tile Co.	B1436
Gladding, McBean & Co.	B1438
Jackson, Wm. H., Co.	B1481
Kraftile Co.	B1440
Matawan Tile Co.	B1443
Mueller Mosaic Co.	B1442
Nemadji Tile & Pottery Co.	B1450
Revis, William H., Inc.	B1503
Robertson Art Tile Co.	B1452
Rookwood Pottery Co.	B1454
Rossman, Robert, Co.	B1445
Sparta Ceramic Co.	B1456
Sullivan Co.	A81
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<i>Aetco</i>	B1422
<i>Amboy</i>	B1445
<i>Mueller</i>	B1445
<i>Nubian</i>	B1445
<i>Satinet</i>	B1445
<i>Sulco Niloak</i>	A81
<i>Tropico</i>	B1438
Specifications.	B1434; B1450; B1454; B1456

—Floor and Wall—Glazed, Matt, Vitreous, etc.

American Encaustic Tiling Co., Ltd.	B1422
Associated Tile Mfrs.	B1426
Batchelder-Wilson Co.	B1428
Cambridge-Wheatley Co.	B1430
Empire Floor & Wall Tile Co., Inc.	B1432
Flint Faience & Tile Co.	B1434
Franklin Pottery	C2981
Friderichsen Floor & Wall Tile Co.	B1436
Gladding, McBean & Co.	B1438
Jackson, Wm. H., Co.	B1481
Kraftile Co.	B1440
Matawan Tile Co.	B1443
Mueller Mosaic Co.	B1442
Nemadji Tile & Pottery Co.	B1450
Revis, William H., Inc.	B1503
Robertson Art Tile Co.	B1452
Rookwood Pottery Co.	B1454
Rossman, Robert, Co.	B1445
Sparta Ceramic Co.	B1456
See also page.	B1410
<i>Aetco</i>	B1422
<i>Flemish</i>	B1442
<i>Nubian</i>	B1445
<i>Satinet</i>	B1445
<i>Tropico</i>	B1438
<i>Vitreous Gres.</i>	B1434
Specifications.	B1434; B1450; B1454; B1456

—Non-slip

See Tile, Paving, Non-slip

—Quarry

See Tile, Paving, Quarry or Promenade

Tile, Cleaners

See Cleaners, Polishers and Preservatives, Tile, Marble, Linoleum, etc.

Tile, Cork

Armstrong Cork & Insulation Co.	B1508
Bonded Floors Co., Inc.	B1588
Cork Import Corp.	A204
Hasbrouck Flooring Co.	B1568
Kennedy, David E., Inc.	B1519
Special Service Flooring Corp.	B1555
United Cork Cos.	B1530
See also page.	A205
<i>Crescent</i>	B1530
<i>Gold Seal</i>	B1588

Tile, Cork—Cont.

<i>Jointite</i>	A205
<i>Novoid</i>	A204
Specifications.	B1508; B1519; B1588

Tile, Cork Composition

Armstrong Cork & Insulation Co.	B1508
Bonded Floors Co., Inc.	B1588
Hasbrouck Flooring Co.	B1568
Kennedy, David E., Inc.	B1519
United Cork Cos.	B1530
<i>Crescent</i>	B1530
<i>Everlastic</i>	B1519
<i>Gold Seal Treadlite</i>	B1588
<i>Linotile</i>	B1508
Specifications.	B1508; B1519; B1588

Tile, Drain

See pages.....A351; A469; C2332

Tile, Floor**—Asbestos and Cement**

See Flooring, Asbestos and Cement

—Gypsum

(See also Floor Construction, Gypsum; Floor Voids, Gypsum Filler Tile)	
Structural Gypsum Corp.	A162
<i>Gypsteel</i>	A162

Tile, Glazed

See Tile, Hollow, Clay or Terra Cotta, Glazed; Tile Paving; Tile Ceramic

Tile, Hollow, Clay or Terra Cotta**—Backing Up**

See Tile, Hollow, Clay or Terra Cotta, Exterior and Load Bearing

—Book

See Tile, Hollow, Clay or Terra Cotta, Partition, Furring, etc.

—Combination Reinforced Concrete and Hollow Tile Floor Construction

See Floor Construction, Reinforced Concrete and Hollow Tile (Patented)

—Exterior and Load Bearing

American Tile Engineering Co.	A348
Bannon, P., Pipe Co.	A351
Clay Products Co., Inc.	A352
Gladding, McBean & Co.	A469
Heath Cube Service, Inc.	A356
Hoosier Building Tile & Silo Co.	A358
Maurer, Henry, & Son.	A366
National Fire Proofing Co.	A360
Raritan Hollow Tile Corp.	A367
Reid, A. S., & Co.	A372
Universal Unit Tile Co.	A368
Whitacre-Greer Fireproofing Co.	A370
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<i>Caentile</i>	A352
<i>Denison</i>	A348
<i>Excelsior</i>	A372
<i>Insul-Glaz</i>	A352
<i>Natco</i>	A360
<i>Raritle</i>	A366; A367
Specifications.	A348; A360; A370

—Exterior and Load Bearing—Dovetail Keyed for Stucco or Plaster

Hoosier Building Tile & Silo Co.	A358
<i>Stucco Blox</i>	A358

—Glazed

Clay Products Co., Inc.	A352
Hoosier Building Tile & Silo Co.	A358
National Fire Proofing Co.	A360
Reid, A. S., & Co.	A372
<i>Caentile</i>	A352
<i>Insul-Glaz</i>	A352
<i>Natco Vitritile</i>	A360

—Partition, Furring, Beam and Column Covering, etc.

Bannon, P., Pipe Co.	A351
Clay Products Co., Inc.	A352
Ketcham, O. W.	A339
Maurer, Henry, & Son.	A366
National Fire Proofing Co.	A360
Raritan Hollow Tile Corp.	A367
Universal Unit Tile Co.	A368
Whitacre-Greer Fireproofing Co.	A370
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Tile, Hollow, Clay or Terra Cotta—Cont.**—Partition, Furring, Beam and Column Covering, etc.—Cont.**

<i>Natco</i>	A360
<i>Natco Vitritile</i>	A360
<i>Raritle</i>	A366; A367
Specifications	A370

—Segmental and Flat Arch

National Fire Proofing Co.	A360
Whitacre Engineering Co.	A115
Whitacre-Greer Fireproofing Co.	A370
<i>Natco</i>	A360
Specifications	A370

Tile, Hollow, Concrete**—Load Bearing**

Dunn, W. E., Mfg. Co.	A376
National Stone-Tile Corp.	A380
Western Brick Co.	A242
<i>Duntile</i>	A376
<i>Featherweight</i>	A242
<i>Stone-Tile</i>	A380

Tile, Hollow, Gypsum**—Floor Voids**

See Floor Voids, Gypsum Filler Tile

—Partition, Furring, Beam and Column Covering, etc.

Anchor Fireproofing Co.	A156
Atlantic Gypsum Products Co., Inc.	B1340
Beaver Products Co., Inc.	B1344
Certain-teed Products Corp.	B1341
Ebsary Gypsum Co., Inc.	B1352
Empire Gypsum Co., Inc.	B1354
Niagara Gypsum Co.	B1356
Reeb, M. A., Corp.	B1357
United States Gypsum Co.	A382
Universal Gypsum & Lime Co.	B1362
See also page.	A162
<i>Acme</i>	B1341
<i>American</i>	B1344
<i>Peerless</i>	B1357
<i>Plymouth</i>	B1362
<i>Pyrobar</i>	A382
<i>Rockwall</i>	B1340
Specifications.	A382; B1341; B1344; B1352

Tile, Hollow or Solid, Cinder Concrete**—Load Bearing, Partition, Furring, Floor Arch, etc.**

National Building Units Corp.	A373
<i>Cincrete</i>	A373

Tile, Light Weight Concrete

See Slabs, Concrete—Light Weight

Tile, Linoleum

See Tile, Cork Composition

Tile, Magnesite Composition

See Flooring, Magnesite Composition Slab

Tile, Marble

(See also Marble)

Appalachian Marble Co., Inc.	A259
Standard Marble Works Co.	A265

Tile, Mastic Composition

Duraflex Co.	B1511
Insulite Chemical Co.	B1546
Marbleloid Co.	B1548
Rubber-Tex-Tile Flooring Co.	B1524
Servicised Products Corp.	A79
Tile-Tex Co.	B1529
<i>Battleship</i>	B1546
<i>Biegler's</i>	B1524
Specifications	B1524; B1529

Tile, Paving**—Cement**

National Floor Tile Co.	B1418
<i>Adamantile</i>	B1418
<i>Artile</i>	B1418
<i>Diamantile</i>	B1418

—Linoleum

See Tile, Cork Composition

Tile, Paving—Cont.**—Non-slip**

- American Abrasive Metals Co..... A666
- Associated Tile Mfrs..... B1426
- Batchelder-Wilson Co..... B1428
- Flint Faience & Tile Co..... B1434
- Friderichsen Floor & Wall Tile Co..... B1436
- Mueller Mosaic Co..... B1442
- National Floor Tile Co..... B1418
- Norton Co..... B1420
- Revis, William H., Inc..... B1503
- See also page..... A468
- Alundum..... B1420
- Carborundum..... A666
- Norman-Flash..... B1442
- Sinzig..... B1503
- Revis, William H., Inc..... B1434
- Vitreous Gres..... B1434
- Specifications..... A666; B1420; B1434

—Quarry or Promenade

- Acme Brick Co..... B1496
- American Encaustic Tiling Co., Ltd. B1422
- Associated Tile Mfrs..... B1426
- Carlyle-Labold Co..... B1493
- Gladding, McBean & Co..... A469
- Hood, B. Mifflin, Brick Co..... B1497
- Murray Tile Co..... B1498
- Revis, William H., Inc..... B1503
- Rossman, Robert, Co..... B1445
- United States Quarry Tile Co..... B1500
- Aetico..... B1422
- J. C. Edwards..... B1503
- Fallston..... B1445
- Palacio..... A469
- Pottery..... B1497
- Romany..... B1500
- Ryltyle..... B1496
- Scioto..... B1493
- Sinzig..... B1503
- Sterling..... B1498
- Cleaning of..... B1500
- Specifications..... B1498; B1500

—Rubber

See Tile, Rubber—Floor

—Trim—Promenade or Quarry

See Cove Base, Tile; Tile, Paving Quarry or Promenade

Tile, Roof**—Concrete Slab**

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—Gypsum

- Ebsary Gypsum Co., Inc..... B1352
- Marks, H. E., Corp..... A180
- Structural Gypsum Corp..... A162
- United States Gypsum Co..... A166
- Gypsteel..... A162
- Pyrobar..... A166
- Specifications..... A166

—Reinforced Cement

- American Cement Tile Mfg. Co... A158
- Federal Cement Tile Co..... A160
- Porete Mfg. Co..... A154
- Rackle, Geo., & Sons Co..... A327
- Cementile..... A158
- Daylight Roof..... A160

Tile, Roofing**—Asbestos**

- Asbestos Shingle, Slate & Sheathing Co. A416
- Ambler..... A416
- Specifications..... A416

—Clay or Terra Cotta

- Acme Brick Co..... B1496
- Gladding, McBean & Co..... A469
- Ketcham, O. W..... A339
- Hood, B. Mifflin, Brick Co..... A468
- Klein & Kavanagh..... A441
- Ludowici-Celadon Co..... A473
- Mound City Roofing Tile Co..... A476
- Ageart..... A339
- Devonshire..... A468
- Habana..... A468
- Imperial..... A473
- Normandy..... A468
- Riviera..... A468
- Ryltyle..... B1496
- Sussex..... A468
- Varicolor..... A469
- Specifications..... A469; A473; A476

Tile, Roofing—Cont.**—Concrete**

- Hawthorne Roofing Tile Co..... A463
- Specifications..... A463

—Contractors

See Contractors, Roofing

—Iron—Glass Covered

- Glasiron Products Co..... A472

—Metal

- Edwards Mfg. Co..... A560
- Hungerford, U. T., Brass & Copper Co. A488
- Milwaukee Corrugating Co..... A427
- Sheet Steel Trade Extension Committee..... A440
- See also page..... A908
- Mecco..... A908
- Titelock..... A427
- Association..... A440

—Quarry or Promenade

See Tile, Paving, Quarry or Promenade

Tile, Rubber—Floor

- American Rubber Products Corp.. B1506
- American Tile & Rubber Co..... B1510
- Goodyear Tire & Rubber Co., Inc.. B1516
- Hood Rubber Products Co., Inc.. B1518
- Kennedy, David E., Inc..... B1519
- Kleystone Rubber Co., Inc..... B1520
- Marbleloid Co..... B1548
- New York Belting & Packing Co.. B1522
- Special Service Flooring Corp..... B1555
- Stedman Products Co..... B1526
- United States Rubber Co..... C1532
- Wright Rubber Products Co..... B1531
- See also page..... B1568
- Amtico..... B1510
- Interlocking..... B1522
- Rubber-Marble..... B1519
- Rubberock..... B1506
- Syra-Bord..... B1506
- U.S..... B1532
- Specifications..... B1506; B1518; B1519; B1520; B1522; B1526; B1532

Tile, Sewage Disposal, Diverting

- American Sanitary Products Co., Inc. C2323
- Aten Sewage Disposal Co., Inc.... C2324
- New York Sewage Disposal Co.... C2326

Tile, Sheet or Board Form

- Miami Cabinet Co..... C2578
- Upson Co..... B1253

Tile, Slate

(See also Slate, Roofing; Slate, Structural; Flagging)

- Rising & Nelson Slate Co..... A452
- Slate & Flagstone Co..... B1397
- Vermont Structural Slate Co..... B1396
- Williams, J. W., Slate Co..... A456
- Evanstone..... B1397
- Penryhn Stone..... A456
- Tudor Stone..... A452

Tile, Steel—Floor Forms

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Tile, Terrazzo

- Marbleithic Co..... B1417

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Time Recorders

See Recorders, Time

Timers, Electric Switch

See Switches, Electric, Time Control

Tin and Terne Plate

See Sheet Metal, Tin and Terne Plate

Toilet**—Doors**

See Doors, Toilet

—Paper

- A. P. W. Paper Co..... C2614
- Morgan Tissue Paper Co. Div.... C2615
- National Paper Products Co..... C2616
- Northern Paper Mills..... C2617

Toilet—Cont.**—Paper—Cont.**

- Palmer Co..... C2613
- De Luxe..... C2613
- Economy..... C2613
- King..... C2615
- Morganfold..... C2615
- No-Waste..... C2616
- Onliwon..... C2614
- Springfield Oval..... C2615
- Twinpax..... C2616
- Unity..... C2615

—Paper Holders

See Bathroom Accessories

—Partition Fittings

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—Partitions

See Partitions, Toilet, Shower or Urinal

—Seats

See Closet Seats

—Systems—Chemical

- Chemical Toilet Corp..... C2330
- Kaustine Co., Inc..... C2329
- San-Equip..... C2330

—Systems—Chemical, Portable

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—Systems—Septic Tank

See Septic Tanks

Tools, Cleaning

See Swimming Pool Cleaning Tools

Tops, Chimney

See Chimney Tops

Towel Bars or Racks

See Bathroom Accessories

Towels**—Paper**

- A. P. W. Paper Co..... C2614
- National Paper Products Co..... C2616
- Northern Paper Mills..... C2617
- Palmer Co..... C2613
- De Luxe..... C2613
- Economy..... C2613
- Onliwon..... C2614
- Public Service..... C2616

—Paper, Holders for

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Towers**—Transmission, Wireless, etc.**

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—Water

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Tracery**—Cast Iron**

See Castings, Iron—Architectural

—Window, Gothic—Cast Stone

- Rackle, Geo., & Sons Co..... A327
- Artstone..... A327

Track, Door

See Hangers, Door

Traffic Treads

See Treads, Traffic

Transformer and Generator Ventilation

See Air Condition Apparatus; Blowers, Pressure or Volume

Transformers**—Miniature—Bell Ringing, Night Light, etc.**

- Edwards and Co., Inc..... C3007
- Gaynor Electric Co., Inc..... C2935
- General Electric Co..... C2938
- See also page..... C3396

—Power and Lighting

- General Electric Co..... C2873
- Wagner Electric Corp..... C2875
- Westinghouse Electric & Mfg. Co. C2862

Transits

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Transom**—Catches and Chain**

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Corbin, P. & F.....B1891

Russell & Erwin Mfg. Co.....B1958

Russwin.....B1958

—Chain

See Chain, Sash

—Lights, Store Front

See Lights, Transom, Prism

—Operators and Lifters

Corbin, P. & F.....B1891

Hagstrom Mfg. Co.....B2080

Lord & Burnham Co.....A1089

Putnam, W. E., Co. Inc.....B2083

Russell & Erwin Mfg. Co.....B1958

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Duplex.....A1090*Harris*.....A190*Russwin*.....B1958*Simplex*.....A1090**—Pivot Hinges**

Corbin, P. & F.....B1891

Whitco Casement and Transom

Hardware Co.....B2089

—Ventilators

Aiolite Co.....B1162

Van Zile Ventilating Corp.....B1168

Ventilouvre Co.....B1165

See also page.....B1164

Ov-a-Door.....B1164*Panelouvre*.....B1165**Trap and Drain Combination**

Boosey, Norman, Mfg. Co.....C2339

Donovan, John J.....C2346

Josam Mfg. Co.....C2350

Traps**—Bell**

See Drains, Floor, Yard, etc.; Trap and Drain Combination

—Blast Coil or Bucket

See Traps, Steam

—Grease or Oil

Chemical Toilet Corp.....C2330

Compound Injector & Specialty Co.....C2342

Donovan, John J.....C2346

Josam Mfg. Co.....C2350

Nustone Products Corp.....C2327

Wade Iron Sanitary Mfg. Co.....C2349

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Dehn's Acme.....C2342*Gree-stop*.....C2346*San Equip.*.....C2330**—Plaster, Sink, Hair and Sediment,**

Dental-Surgical, etc.

Josam Mfg. Co.....C2350

—Plumbing

See pages.....C2339; C2518

—Radiator, Thermostatic and Vacuum—

Automatic

American District Steam Co.....C2747

Bishop & Babcock Sales Co.....C2749

Barnes & Jones.....C2748

Dunham, C. A., Co.....C2750

Haines, William S., & Co.....C2762

Hoffman Specialty Co., Inc.....C2756

Illinois Engineering Co.....C2764

McAlear Mfg. Co.....C2766

O-E Specialty Mfg. Co.....C2768

Sarco Co., Inc.....C2763

Webster, Warren, & Co.....C2772

Adco.....C2747*B & B Multiflex*.....C2749**—Radiator, Thermostatic, Combined**

with Valve

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Thermostatic Trap

—Return Steam

Barnes & Jones.....C2748

Dunham, C. A., Co.....C2750

McAlear Mfg. Co.....C2766

O-E Specialty Mfg. Co.....C2768

Webster, Warren, & Co.....C2772

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Knight, Maurice A.....C3316

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—Steam

Barnes & Jones.....C2748

Davis Engineering Corp.....C2355

Dunham, C. A., Co.....C2750

Haines, William S., & Co.....C2762

Hoffman Specialty Co., Inc.....C2756

Illinois Engineering Co.....C2764

McAlear Mfg. Co.....C2766

O-E Specialty Mfg. Co.....C2768

Sarco Co., Inc.....C2763

Webster, Warren, & Co.....C2772

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Eclipse.....C2764*Paracoil*.....C2355**Travertine Reproduction**

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Paint, Texturing

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Treads**—Asphalt**

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Mastic Composition

—Asphalt and Rubber

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Asphalt and Rubber

—Bluestone

American Blue Stone Co.....A677

Ambuco Non-slip.....A677**—Cork or Cork Combination**

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—Grating

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HAMILTON MANUFACTURING CO.

Manufacturers of Drafting Room Furniture

MAIN OFFICE AND FACTORY

TWO RIVERS, WIS.

EASTERN BRANCH AND WAREHOUSE, RAHWAY, N. J.

Products

OAK AND STEEL BLUE PRINT SECTIONAL CABINETS; ADJUSTABLE DRAWING TABLES; DRAWING BOARDS.

Also manufacturers of Collapsible Drawing Tables and Easels, Parallel Rule Attachments, Artists' Tables, Typewriter Tables, School Tables, etc.

Blue Print Sectional Cabinets in Wood

Built on the unit plan—add as requirements demand. Thoroughly well made of seasoned oak and well finished. Each drawer

is fitted with label holder, substantial pulls, and hood at back of the drawer.

Sizes—Carried in stock in two sizes. Units lettered from A to P and numbered 32 and 37.

No. 32 Units—Have drawers with inside dimensions 32x42½ in., outside dimensions 34½x45½ in.

No. 37 Units—Have drawers with inside dimensions 25x37½ in., outside dimensions 27¼x40½ in. Special sizes to order.

Bases—Bases for the above units are supplied in four different styles flush to the floor; or on legs, sanitary style.



Oak Blue Print Cabinet Units
Combination 29

Blue Print Sectional Cabinets in Steel

Built on the unit plan—add as requirements demand.

Substantially constructed of cold rolled furniture steel with joints electrically welded. Finished in olive green enamel, baked on. A beautiful and lasting finish that will harmonize with any surroundings.

Each drawer fitted with label holder, substantial pulls, patented paper weights, and hood at back of drawer.

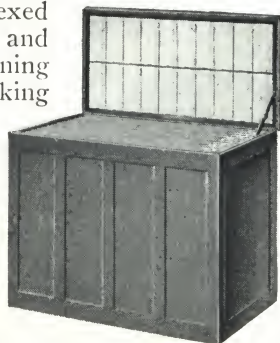
Sizes—Carried in stock in two sizes. Units numbered from 1825 to 1839 have drawers with inside dimensions 25x37 in., outside dimensions of cabinet 28½x40½ in. Units numbered from 1843 to 1857 are 6 in. wider and 7 in. deeper.

Vertical Plan Files Nos. 400 to 405

Plans are held by numerous compression springs, causing evenly distributed pressure against the plans instead of being held at the top only.

Plans are placed in indexed folders, positively held flat and smooth vertically, without fastening at top. No crumpling or breaking down of sheets so filed is possible in this plan file.

Folders are double folded at top edges for extra strength and scored for expansion. This gives stiffness at top edges, prevents tearing and makes it easier to handle folders. Cabinet made of oak, well finished.



Vertical Plan File

Drawing Tables

Perfection-Monroe Adjustable Drawing Tables

Adjustable in height from 31 to 41 in. Top tilting to any angle. White pine tops 23x31 to 36x60 in. with end cleats which allow for expansion and contraction of top.

A very practical, rigid drawing table at a moderate price. The diagonal braces insure rigidity.



Perfection-Monroe Adjustable Drawing Table

Tables Nos. 220 to 247—These tables are made in two different sizes, 36x72 and 42x84 in. The tops are made of selected white pine with end cleats screwed to board with oblong washers and heavy screws which allow for expansion and contraction of board. These tables will take any of our regular No. 32 or No. 37 units for filing purposes.



Drawing Table No. 234

Hamilton Steel Base Adjustable Drawing Tables

A new and unique drawing table. Base of steel—absolutely no breakage in shipment or while in use. Top of best white pine in sizes 36x48, 36x60, and 42x72 in. Adjusting device wonderfully simple, efficient, and positive.

Top cannot possibly drop down accidentally. Top tilts to any angle and vertically.

Finished in olive green baked enamel, attractively striped.

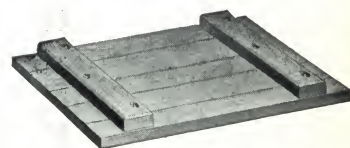


Hamilton Steel Base Adjustable Drawing Table

Drawing Boards

We manufacture six different styles of drawing boards. Made in pine and basswood in any size.

Style D—1½-in. board with 3x1¼-in. maple cleats and oblong washers staggered.



Style D, Drawing Board

Facilities and Experience

This company has had over 45 years' experience in making business furniture. It has a warehouse at Rahway, N. J. so as to insure prompt delivery in the East, as well as in the West.

Send for catalogue, H-S-E.

THE C. F. PEASE COMPANY

Blue Printing Machines, Drafting Room and Architects' Supplies

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SUPERIOR 5860

837 North Franklin Street, corner Institute Place
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BLUE PRINTING EQUIPMENT and ACCESSORIES, which include Blue Printing Machines; Blue Print Washing and Drying Machines, single sheet and continuous types; Blue Print Paper Sensitizing Machines; Blue Print and Brown Print Papers and Cloths, sensitized and unsensitized; Blue Print Room Requisites.

DRAFTING ROOM FURNITURE and SUPPLIES of all kinds; DRAWING INSTRUMENTS and DRAWING MATERIALS of every sort; all leading brands of TRACING PAPERS and TRACING CLOTHS. SURVEYING INSTRUMENTS and FIELD SUPPLIES.

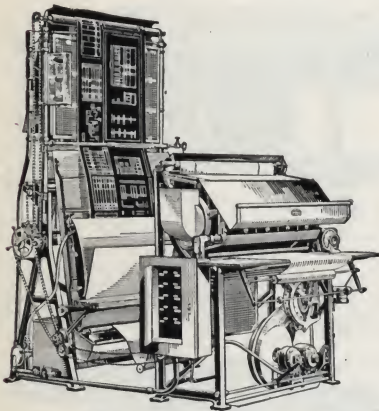
Pease Peerless Continuous Blue Printing Equipment

Saves Labor—

One boy and a Pease Peerless automatic continuous blue printing equipment can print, wash, potash and dry more and better blue prints in one hour than can be done in four hours with any other equipment using independent methods of washing and drying.

Prints, Washes, Potashes and Dries—

The Pease Peerless equipment will print, wash, potash and dry perfect blue prints in any quantity up to 120 linear yds. per hour at a lower cost per square foot than is possible by any other method. Each operation is automatic and continuous.



Pease Automatic Continuous Blue Printing Machine

Economical on Short Runs—

As short a run as from 5 to 10 yds. can be handled to distinct advantage on Peerless machines and these runs can be made by an operator who has other duties to perform.

Where Used—

Over 2000 Pease Peerless continuous blue printing equipments are in use in the

drafting rooms of architects, engineers, railroads, shipyards, commercial blue printers, industrial plants and Government offices.

Independent Units—

The Pease Peerless blue printing machine can be purchased as an independent unit if desired, and the washing and drying machine later, although the greatest economy is effected by installing the complete equipment.

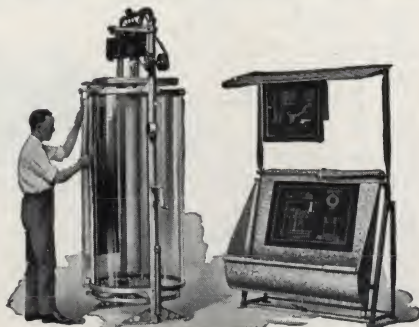
Catalogue MP-37—

This economical time and labor saving blue printing equipment is completely illustrated and described in Catalogue MP-37. Ask for your copy—it is free.

Pease Vertical Blue Printing Machine and Sheet Washer

For All Cut Sheet Requirements—

Where the demand for blue prints and continuous production does not warrant the purchase of a Pease Peerless Equipment, the Pease Vertical Blue Printing Machine and Sheet Washer, in a variety of sizes, answers every blue printing requirement.



Pease Vertical Electrical Blue Printing Machine and Pease Sheet Washer

Fast Printing Speed—

The Pease Vertical Machines are equipped with the famous Pease U-V Arc Lamps—the fastest blue printing lamps ever produced. These lamps print on either 220 or 110 volts, direct or alternating current (any cycle) with slight adjustment.

Made in Five Sizes—

The Pease Vertical Machine is manufactured in five sizes and the Sheet Washer is made in three sizes to accommodate blue prints of varied dimensions. Both Machine and Sheet Washer are sturdily constructed and can be shipped anywhere without breakage, and are so compact in design that they can be installed in a corner of the drafting room.

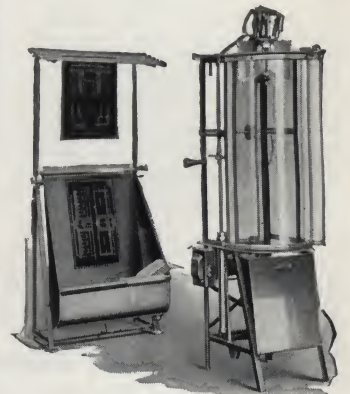
Catalogue MV-37—

Both the Pease Vertical Machine and Sheet Washer are fully illustrated and described in this special Machinery Catalogue. Ask for your copy—without obligation.

Pease "Junior" Blue Printing Machine

For Moderate Size Blue Prints and Emergency Use—

The Pease "Junior" will make perfectly finished blue prints in any size up to 24x36 in. in from one to 1½ minutes, with one drop of the lamp, whenever desired, regardless of weather conditions. The Pease "Junior" is equipped with the widely known Pease, Type P, Arc Lamp, which operates on either 110 or 220 volts AC or DC, no special electrical connections being required. The floor space occupied measures only 25x26 in.



Pease "Junior" Machine and Sheet Washer

Pease "Junior" Sheet Washer

The Pease "Junior" Sheet Washer has a tray 28 in. wide, will accommodate a blue print of any size up to 24x36 in. and requires a floor space of only 24x34 in.

Catalogue MJ-37—

Get full facts on this durably constructed, speedy operating, and moderately priced blue printing equipment. Ask for Catalogue MJ-37—sent immediately on request.

Pease Sheet Dryer

No Waiting for Prints to Dry—

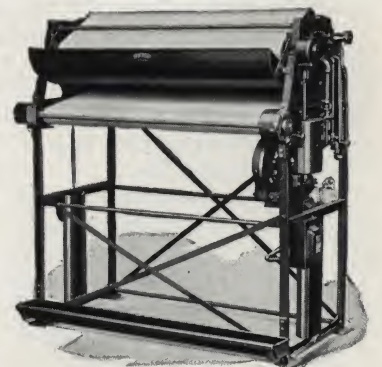
Electrically driven, will dry dripping wet prints without wrinkles at a regular rate of 8 linear ft. per minute. The Pease Sheet Dryer is equipped with a revolving copper cylinder that heats up quicker, retains heat longer and to which prints will not adhere.

Eliminates Creased Prints—

A slanting feeding apron drains water away from the point where cylinder and belt meet, thus eliminating steam pockets and resultant creasing of prints.

Pease Automatic Band Control—

All Pease Sheet Dryers are now regularly equipped with the new Pease Automatic Band Control which constantly reg-



Pease Sheet Dryer

ulates all side traveling of the band, thus reducing wear and tear and entirely eliminating the need of adjustment.

A Size for Every Need—

Pease Sheet Dryers are made in three sizes, 57 in. wide, 45 in. wide and 22 in. wide. They are equipped with either electric or gas heated elements. Gas dryers have thermostatic control. When desired, by means of a simple gear shift the dryer may be operated at 4 ft. per minute, or, with a special gear (not regularly furnished), at 2½ ft. per minute. Rear Return Attachment can be provided if desired.

Sheet Dryer Pamphlet SD-37—

Ask for this pamphlet, completely illustrating and describing all types of Pease Sheet Dryers.

Pease Blue Print Paper

Nearest Non-fading Blue Print Paper in Existence—

Pease Blue Print Paper is especially coated on machines of our own design with a scientifically prepared formula, under an improved process. Pease papers and cloths have an exceptionally good color—are coated in four printing speeds and have lasting qualities which make them excellent papers for permanent prints.

Guaranteed Rag Stock—

Every roll of Pease Blue Print Paper is guaranteed to be exactly the rag content stock specified by the customer, of full measure, and in one piece.



Pease Universal Reproduction Cloth

The cost of making prints on Pease Reproduction Cloth is very low and these reproductions can be obtained on either the Pease "Peerless" or Pease "Vertical" machine. There is no celluloid surfacing used, tracings will not crack or chip off, and dampness will not injure the cloth. In fact, it will stand up under hard usage which would practically ruin most other reproduction cloth.

Pease Drawing and Tracing Papers and Cloths

Uniformity of both surface and thickness of Pease papers and cloths is a certainty, as they are manufactured in specially equipped mills, using only high grade raw materials.

Sample books or working samples will be furnished immediately upon request, or specimens with quotations on printed sheets of either paper or cloth will be furnished if desired. Ask for sample book DTP-37.

Pease Drafting Room Furniture



No. 2253
Pease Drawing Table

Drawing Tables—

Pease Drawing Tables are sturdily constructed of the very best materials, eliminate wobbling to the greatest possible extent, and are attractively finished, combining utility and durability with appearance.

Steel and Wooden Stools—
Pease Adjustable Drafts-



Cabinet No. 2266

men's Stools are made with or without foot rest and back rest. Special construction eliminates stress and strain to a marked degree. One of the latest designed stools has a four-point suspension spring seat which is particularly comfortable and relieves fatigue.

Steel and Wooden Filing Cabinets—

Pease Steel Filing Cabinets protect valuable drawings and tracings from fire and damage and eliminate wear and tear. Joints are securely put together—there is no sagging. Finished in olive green baked enamel, they present an excellent appearance.

Pease Wooden Filing Cabinets are made of well-seasoned and thoroughly kiln-dried oak. The drawers are constructed with dovetailed joints and sliding grooves, there being no rails

between. Pease Wooden Cabinets are specially finished in a golden oak covered by three coats of varnish.

All Pease cabinets are designed on the sectional plan—all units are uniform in size and finish so that whenever purchased, all sections will fit in perfectly.

Furniture Catalogue F-37—

Send for your copy of this catalogue covering the complete line of Pease Drafting Room Furniture.

Pease Parallel Rule Attachment

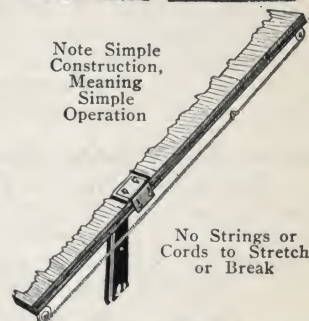
Can be used with any drawing table. Always handy—never in the way—eliminates lost motion—can be readily installed on any style of drawing board. Consists of very few parts.

Simple construction means simple operation and the complete mechanism is entirely beneath the table top. The two special clamps, designed for holding any standard straight-edge, slide smoothly and evenly on a double chain drive with connecting rod. Two screw tension regulators are provided for taking up slack in the chain.

Ask for prices on attachments—with separate prices on straightedges. State length and width of drawing board.



Note Simple Construction, Meaning Simple Operation



No Strings or Cords to Stretch or Break

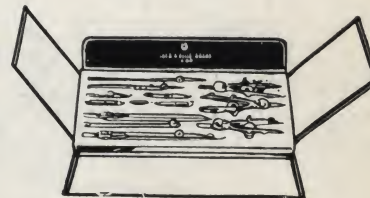
Pease Parallel Rule Attachment

Pease Imported Drawing Instruments

Pease Imported Drawing Instruments contain that proper balance and degree of precision found only in high grade instruments. Simple mechanical construction and a smooth, nickel finish insures freedom from lost movement, makes Pease instruments easy to manipulate, and insures accurate drawings and tracings.

Complete sets manufactured in two styles—semi-flat and square but various assortments or separate pieces may be obtained if desired.

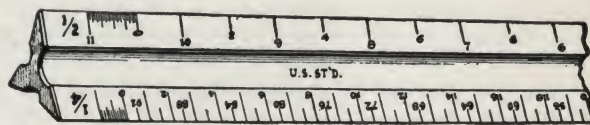
Ask for Catalogue DI-37; contains complete data and list of latest prices.



Pease Imported Drawing Instruments

Scales, Angles and T-Squares

Includes a complete line of plain, boxwood and celluloid scales, angles, T-squares, slide rules, curves, straightedges, and every requirement, in all sizes, for drafting room or field work.



Pease Scale No. 1233

Surveying and Engineering Instruments

These include several types of levels and transits, a complete line of leveling rods, measuring tapes and field books, as well as other accessories.

Catalogue G-37

This is our General Catalogue covering the complete line of Pease Blue Printing Machinery, Blue Print Paper, Drafting Room Furniture, Drawing Materials, and Surveyors' and Engineers' Supplies. In fact, Catalogue G-37 actually covers "Everything for blue-printing—everything for the drafting room!" Ask for your copy.

SAGINAW, MICH.

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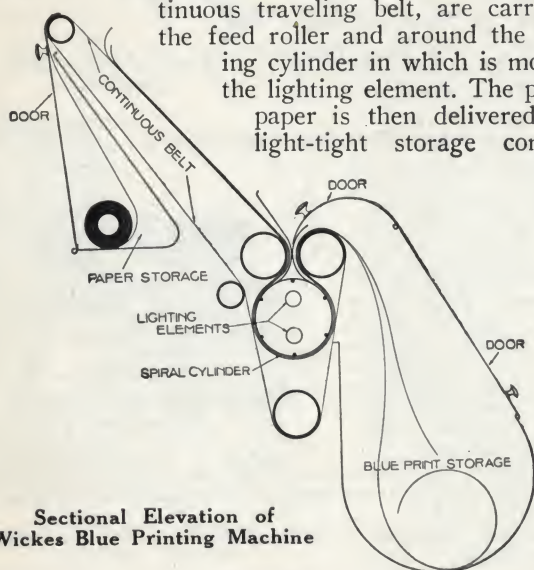
TOKYO, JAPAN, ANDREWS & GEORGE Co.

Products**WICKES CONTINUOUS ELECTRIC BLUE PRINTING MACHINES.**

Also builders of Standard Heavy Duty Engine Lathes, Crankshaft Lathes, Production Lathes, Heavy Duty Punches (vertical and horizontal), Shears (plate, bar, structural), Bending Rolls (horizontal, vertical, and angle), Radial Wall Drills, Flanging Clamps.

Wickes Blue Printing Machines

Operation—The Wickes continuous electric blue printing machine will print separately cut sheets or continuous rolls in any length and in widths varying from 2 to 48 in. The paper and tracing, placed on a continuous traveling belt, are carried to the feed roller and around the printing cylinder in which is mounted the lighting element. The printed paper is then delivered to a light-tight storage compartment.



ment and the tracing is returned to the operator or carried to the storage compartment, as desired.

The machine is entirely automatic, the only work required of the operator being the placing of the tracing and blue print paper on the traveling belt. The entire operating mechanism is controlled by three toggle switches conveniently located for the operator, one being for the motor and one for each auxiliary, thus controlling each light on a separate starting apparatus. The operator, without changing position, can start, stop, reverse or vary speed of drive. All wiring is in metallic conduit, the entire electrical mechanism being approved by the National Board of Fire Underwriters.

Lighting Elements—The light is obtained from two mercury vapor lamps of standard pattern. These lamps operate at a very low temperature and require absolutely no attention from the operator at any time.

Printing Cylinder—The printing cylinder which surrounds the lighting element is composed of longitudinal and spirally disposed wires, woven right-handed on one side of the center of the machine and left-handed on the other side. The cylinder is stationary and the tracing and blue print paper are carried around it by the traveling belt. The light is projected directly in a radial line through the tracing without having to pass

through any intervening glass, the spirally disposed wires offering much less actual obstruction to the light than any glass cylinder would. The right and left-handed spirally woven wires impart a very desirable ironing and spreading effect to the entire surface of the tracing. The tracing and paper pass over 92% of the circumference of the cylinder.

Continuous Traveling Belt—The contact between the tracing and the paper is secured by means of a single, wide, continuous belt which passes around the feed rolls and the metallic printing cylinder. The tension of this belt is regulated automatically. Its life is guaranteed for three years' service.

Advantages of the Wickes Blue Printing Machine—Blue prints are made with an absolutely uniform tone throughout.

The operator is not required to work in a darkened room, the light-tight compartments making this unnecessary.

The operation of the machine is so simple that any person, however inexperienced, can make perfect prints with it.

There is no glass cylinder to clean, break or replace, our metallic cylinder being self-cleaning and unbreakable.

The power required is exceptionally low; the consumption when running at maximum capacity being but .015 kw. per sq. yd.



Wickes Continuous Electric Blue Printing Machine

Model 20 Blue Printing Machine

The Model 20 machine carrying two lighting elements on separate starting apparatus has a capacity of 400 sq. yd. per 8-hour day. With the improved variable speed, 4-step, quick change gear box and adjustment of motor on iron driving disc, the printing speed can be adjusted to suit any grade of paper, including Van Dyck's. The machine is entirely self-contained; is 30 in. high and requires a floor space of 2 ft. 6 in. x 5 ft.

Model 15 Blue Printing Machine

The Model 15 machine is constructed exactly like the Model 20 except that it carries only one lighting element, decreasing the printing speed about one-half. It is so constructed that another lighting element can be added at any time as required, thus changing it to a Model 20 machine.

Catalogues

Catalogues fully describing the Wickes blue printing machines will be sent on request.

ROBERT W. HUNT COMPANY

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CONSULTATION SERVICES in all ENGINEERING FIELDS: MECHANICAL, CIVIL, HYDRAULIC, ELECTRICAL and CHEMICAL.

The SUPERVISION and DETAIL INSPECTION of CONCRETE CONSTRUCTION, including EXAMINATIONS and REPORTS upon the SUITABILITY of AGGREGATES.

SOIL TESTS, TEST BORINGS and REPORTS upon the SAME in CONNECTION with FOUNDATIONS.

Also, Reports on Permissible Floor Loads and on Existing Conditions of Buildings and other structures.



Pittsburgh, St. Louis, Kansas City, San Francisco, Birmingham, Montreal, Toronto, Vancouver and London.

Soil Tests, Test Borings and Reports

The scientific method of determining areas of foundations, permissible loads per square foot and the probable ultimate settlement under load, based on an analysis of direct soil loading tests and borings, as compared with our records of the results of similar investigations.

Testing, Physical, Chemical and Machinery

Strength tests of materials and systems of construction—steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

Chemical tests of all building materials, including steel, iron, cement, paint, oils, slags, limestones, marls and clays.

Duty and efficiency tests of entire plants—engines, boilers, pumps, compressors and other machinery.

Structural Steel Inspection

The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

Estimation of weights from detail drawings, and checking shipped weights of finished work.

The supervision and detail inspection of the structure during erection.

Cement Inspection

The testing of cement, including the sampling in car load or bin lots, at the mills or warehouses or when delivered on the work, and the identifying of each lot with serially numbered blue tags.

Complete cement and chemical laboratories in connection with cement testing at Chicago, New York,

Specification Forms

The following is a form for incorporation in specifications for buildings and other structures, covering the necessary arrangements for inspection and relationship between inspector and contractor:

Materials of Construction—Shall be inspected and tested by ROBERT W. HUNT COMPANY, who will act under instructions of the architect or engineer, and report to him the results of inspection and progress of the work, and otherwise facilitate prompt and early delivery of satisfactory materials. The inspectors shall also place marks of identification on accepted materials. Such inspection shall not relieve contractor from responsibility to furnish satisfactory material, but is a measure of precaution against oversights and errors. The cost of this inspection is to be borne by the contractor unless otherwise stipulated.

Structural Steel—Shall be inspected and tested at the rolling mills and also inspected at the shops during fabrication, in proper manner, to determine whether the material conforms with the plans and specifications. Contractor shall furnish inspector necessary facilities for inspecting, testing and labor for handling material.

Reinforcing Steel—Shall be inspected and tested at the mill or warehouse in proper manner, contractor furnishing, free of charge, testing apparatus and facilities for inspection.

Cement—Shall be sampled and tested before delivery to the work, in accordance with American Society for Testing Materials, or the special specifications attached.

Standard Specifications

For complete information write our nearest office and request a copy of our recent publication on "Inspection and Tests of Materials for Buildings and Structures."

Please address our Company on your own letterhead, giving title and position.

THE FOUNDATION COMPANY

120 Liberty Street
NEW YORK, N. Y.

CABLE ADDRESS
"UNDERFOUND"

BRANCH OFFICES

ATLANTA, GA., 101 Marietta Street
CHICAGO, ILL., 27 E. Jackson Boulevard

PITTSBURGH, PA., Fulton Building
SAN FRANCISCO, CAL., Kohl Building

FOREIGN OFFICES

MONTREAL, QUEBEC
LIMA, PERU
TOKYO, JAPAN

CARTAGENA, COLOMBIA
BRUSSELS, BELGIUM
ATHENS, GREECE

LONDON, ENGLAND
PARIS, FRANCE
MEXICO CITY, MEXICO, D. F.

Services

THE FOUNDATION COMPANY is an organization of Construction Engineers widely experienced in BUILDING DIFFICULT SUPERSTRUCTURES and SUBSTRUCTURES in all parts of the world. The enviable reputation gained in its early history for trustworthy underground construction has followed it into the field of GENERAL CONTRACTING.

THE FOUNDATION COMPANY has built buildings of nearly every known type such as offices, banks, stores, hotels, club houses, dwellings, and also the whole range

of industrial buildings, power plants, etc. This company is successfully building warehouses, railroad terminals, filtration and sewage plants, hydro-electric developments, highways, bridges and bridge piers, mine shafts and tunnels, river and harbor developments and complete industrial projects.

As its name would indicate, THE FOUNDATION COMPANY also specializes in underpinning and foundations. Most of the skyscrapers in lower New York City rest on foundations built by this Company.



Courtaulds, Ltd., Montreal, Can.



Forrest Hills-Ricker Hotel, Augusta, Ga.



T. Eaton Co. Ltd., Montreal, Can.



Manatee River Hotel, Bradentown, Fla.

The Foundation Company, General Contractor

JOSLIN MOTOR RAMP CO.

L. S. JOSLIN, CONSULTING GARAGE ARCHITECT

339 Newbury Street

BOSTON, MASS.

Product

SIMPLE, SIMPLEX, and DUPLEX MOTOR RAMPS for large garages maintaining level floors. All rights are fully protected by patents pending.

Service to Architects

Architects are invited to submit to us plot plans of large proposed garages, and without expense to them we will show them how our ramps will work out. If any of our systems are used, we will give them advice in all matters pertaining to a modern garage without any charge.

Level Floors

Level floors mean a better building, cheaper construction, lower operating cost and a building that can be converted to other purposes at a minimum of expense.

Ramps

All modern garages are embodying some system of ramps for interfloor travel. For the best results ramps should not exceed twelve per cent grade and should be laid out so as to make travel both up and down as safe as possible. Joslin Ramps do all this and while they are not the answer for all plots of land, they are the answer for the larger garages as a careful study will show.

Straight ramps, like the Simplex and Duplex extending from floor to floor, necessitate only one-half as much turning as ramps with staggered floors. They are not tunnels, but clear open driveways giving clear vision at all times.

Space Required

Straight ramps of the same incline and width, however arranged, will require the same amount of floor space.

Circular ramps require more room. Duplex ramps naturally require more floor space than single ramps as they do twice the work.

Street Facilities

Do not put a garage of greater capacity than the capacity of the streets on which it faces, and if it only has one entrance and exit avoid a one-way street, if possible.

Garages of capacity of over 1000 cars should have facilities for cars to enter and leave on two or more streets, with proper ramps to handle traffic both in and out on these streets.

Cost to Owner

For the use of Joslin Motor Ramps and our advisory service, a charge is made depending on the type of ramp and size of the garage.

Installations

The New Y-D Service Garage at Worcester, Mass., has the Joslin Simplex Ramp. This garage has a present capacity of 400 cars and provision is made for two additional stories and roof parking.

The New Motor Mart at Park Square, Boston, Mass., the largest and finest garage in the world, covering an area of 52,000 sq. ft., eight stories high with stores on the first floor, a capacity of 2000 cars and provision for two additional stories, is equipped with the Joslin Duplex Ramp.

A large number of others are pending at this writing.

Simple Ramp

The Simple Ramp provides independent roadways for both lines of autos; cars traveling on the floor from the end of one ramp to the end of the next ramp are always traveling in the same direction—never toward each other. This ramp is particularly suitable for boarding and truck garages with a capacity up to 500 cars.

Simplex Ramp

The Simplex Ramp varies from the Simple Ramp in that the up and down ramps are not side by side but are separated any distance required. In this arrangement cars do not have to travel as far on each floor before ascending or descending, and the up and down cars do not even see each other. Another advantage is that both ramps can be used at one time for all cars either in or out without the slightest chance of interference. This arrangement will take care of twice as many cars during the rush hours when required. This is suitable for garages up to 1000 cars capacity.

Duplex Ramp

The Duplex Ramp allows two lines of cars to ascend and two lines of cars to descend at the same time without any confusion. The two lines of ascending cars never see each other. The same is true of the two lines of descending cars. One line of each incoming and outgoing cars to one street and the other line to another street. Both incoming and outgoing cars are always traveling in the same direction. A person driving down the ramps can choose the street he wishes to go out on. If headed down so as to come out on one street, by simply driving around to the opposite side of the ramp and taking the down ramp he will come out on the other street. One or both series of ramps can be carried as many stories underground as required. For one basement one pair of ramps is sufficient. For two or three subbasements it would be advisable to use both pairs of ramps.

This system is designed for larger garages facing on two or more streets and having a capacity up to 4000 cars.

RAMP BUILDINGS CORPORATION

Consulting Garage Engineers

21 East 40th Street
NEW YORK, N. Y.

Product

D'HUMY MOTORAMPS, a patented System of Garage Design, involving a combination of ramps with staggered floor levels, the building being divided into two or more units.

Building Design as It Affects the Commercial Success of a Multi-floor Garage

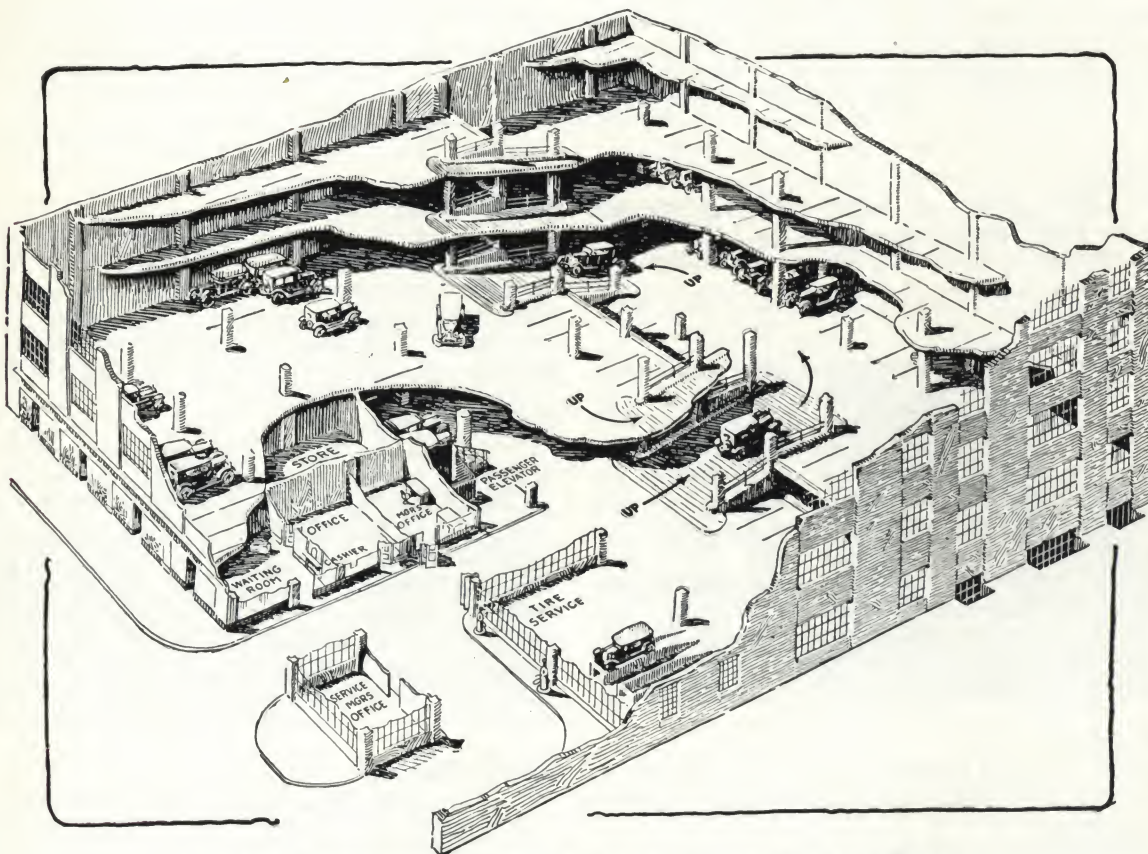
(1) Because garage revenue is directly proportioned to the number of cars stored, maximum car capacity for any given floor area is an absolute essential.



building will not show the staggered effect in its fenestration on either of two facades.

d'Humy Motoramps are adaptable for plots of any dimension greater than 50-ft. frontage and can be readily adapted to plots of irregular contour. The ramp location is as flexible as that of elevators. d'Humy Motoramps have been used in 2-story buildings and in garages as high as 10 stories—and higher buildings are contemplated.

Single roadway d'Humy Motoramps (with passing points at every floor-level aisle) are ordinarily



Cut-away Perspective Drawing of a Typical d'Humy Motoramp Garage
(Single Ramp System—up and down traffic on same ramps)

(2) Operating economy demands a building in which each car pays for its own vertical transportation—via ramps.

(3) The building must be designed to give the patron a measure of convenience, safety and service which will attract and hold business.

d'Humy Motoramps

This patented system of building design is based on the staggering of floor levels in at least two portions of a building and connecting each half-story difference in floor level with short ramp inclines.

The division line between two of the units of the structure may extend across one dimension of the building or may be arranged in a rear corner so that the

used in garages up to 4 or 6 stories high where the storage floors house 50 to 60 cars each. Generally for larger garages, or where the peak traffic load makes greater ramp capacity desirable, double roadway motoramps are advisable. The latter arrangement provides separate paths for up and for down traffic. The type of Motoramp and the ramp arrangement should in all cases be chosen in consideration of the particular conditions which obtain. This company will be glad to discuss such matters, entirely without obligation.

Advantages of d'Humy Motoramps

Storage efficiency in any building at least equal to elevators and 10 to 25% better than ordinary ramp floor layouts. Maximum possible income.



A Typical Interior Showing the Short Ramp Length, Easy Grade and Complete Visibility

Traffic capacity beyond any elevator equipment, and in excess of oldstyle floor-to-floor ramps because of better visibility and minimum possible interference in short travel through storage aisles.

Simple construction, easy formwork and no structural complications.

Building convertible into two standard type structures.

Safety for patrons. Open side ramps afford complete visibility for the turn ahead.

Specifications

The term d'Humy Motoramp in these specifications shall be understood to describe the short ramp between floor levels in one portion of the building which are mid-way between the floor levels in another part—a special and patented type of building design known as the d'Humy Motoramp System and licensed for use in this structure by RAMP BUILDINGS CORPORATION, New York, N. Y.

Essential Design Data

Car Spaces—6 ft. 8 in. to 7 ft. in width, 12 to 15 ft. in depth.

Aisles—20-ft. width in the clear.

Car Bays—Three car bays are usually most efficient.

Columns—Outside face of column set back 1 ft. from line of car spaces.

Ramp Grade—From 13% to 15%.

Story Heights—10 ft. 6 in. to 11 ft., floor to floor.

A minimum clear headroom of 8 ft. 6 in. should be maintained.

Note: For complete data ask us for Garage Design Data Sheets. The above data is necessarily approximate. Exact dimensions must be determined by local conditions and requirements. The specialized experience of this company's engineers is available to architects, as noted in a following paragraph. Consult us before your plans are laid out; we can save your time.

Ramp Buildings Corporation Services

Working with and through the architect in all matters, the company places its specialized knowledge at his disposal in furthering any project in which d'Humy Motoramps can be used.

Where desired, sketch plans (in miniature) will be prepared, without obligation, to demonstrate the relative superiority in storage efficiency of the d'Humy Motoramp design.

Complete consulting advice is available, without cost to the architect, on the establishment of critical dimensions, planning of entrance, service and control facilities, etc., upon the arrangement of a contract between the owner and RAMP BUILDINGS CORPORATION for the use of the d'Humy Motoramp System.

License Fees for Use of d'Humy Motoramp Design

The company licenses the use of its design patents after a standard scale of fees proportionate to the total floor area devoted to garage purposes. This fee is a charge made to the owner and is payable, if when and as the building is erected.

References

d'Humy Motoramps have been specified as a profitable investment in the building of well over 150 recent garages in 76 cities in three countries. Among these are:

- ALBANY, N. Y.—Albany Garage, 5 and 7 stories, 1600 cars
Double Ramp System (tandem); Fuller & Robinson, Architects
- ATLANTA, GA.—Cone Street Garage, 6 stories, 300 cars
Wide Single Ramp System, Pringle & Smith, Architects
- BALTIMORE, MD.—Downtown Garage, 5½ stories, basement and roof, 400 cars
Wide Single Ramp System, Frank S. Parker, Architect
- BOSTON, MASS.—Shoppers Garage (Jordan Marsh Co.), 8 stories, 450 cars
Double Ramp System (tandem), H. M. Haven & A. T. Hopkins, Inc., Architects
- BUFFALO, N. Y.—Statler Hotel Garage, 5 stories and basement, 600 cars
Double Ramp System (tandem), George B. Post & Sons, Architects
- CHICAGO, ILL.—Downtown Garage, 10 stories and basement, 500 cars
Double Ramp System (Concentric) Alfred S. Alschuler, Architect
- CINCINNATI, OHIO—Ninth Street Garage, 7 stories and basement, 600 cars
Wide Single Ramp System, Garber & Woodward, Architects
- DETROIT, MICH.—Whitney Office Building Garage, 4 stories, 350 cars
Double Ramp System (Concentric), Smith, Hinchman & Grylls, Architects
- KANSAS CITY, MO.—Congress Garage, 4½ stories and basement, 400 cars
Wide Single Ramp System, Robert Gornall, Architect
- LOS ANGELES, CAL.—Jonathan Club Garage, 7 stories, 500 cars
Double Ramp System (Concentric), Schultze & Weaver, Architects
- MINNEAPOLIS, MINN.—Baker Office Bldg. Garage, 3 stories and 1½ basement and roof, 300 cars
Wide Single Ramp System, Larson & McLaren, Architects
- NEW YORK, N. Y.—Brisbane's Fifth Avenue and 102 Street Garage, 6 stories, 600 cars
Double Ramp System (Concentric), Emery Roth, Architect
- PITTSBURGH, PA.—William Penn Garage, 9 stories, 550 cars
Double Ramp System (Concentric), Rubin & Ve Shancey, Architects
- SEATTLE, WASH.—Four Stores Garage, 3 and 4 stories, basement and roof, 500 cars
Double Ramp System (Concentric), Harlan Thomas & Clyde Grainger, Architects
- TAMPA, FLA.—Davis Properties Garage, 3 stories and ½ basement, 240 cars
Single Ramp System, F. O. Adams, Jr., Architect
- TORONTO, ONT.—St. James Garage, 5 stories, basement and roof, 450 cars
Wide Single Ramp System, Ross & MacDonald, Architects
- WASHINGTON, D. C.—Capital Garage, 10 stories, basement and roof, 1000 cars
Double Ramp System (Tandem), Arthur B. Heaton, Architect

GAS SERVICE AND EQUIPMENT

Recommended by Architects' and Builders' Service Committee

AMERICAN GAS ASSOCIATION

420 Lexington Avenue

NEW YORK, N. Y.

Gas in the Service of the Home

Due to recent development in the manufacture of gas appliances, gas has entered into a new era of usefulness in the home. Gas is now the most modern agent for cooking and refrigerating food, incineration of household waste, providing hot water for household cleanliness and for personal toilet, insuring comfortable house temperature at all seasons of the year, and for permitting clothes to be washed, dried and ironed in the home under conditions of known cleanliness. These services make gas the world's greatest caterer to the fundamental needs of the home.



are urged to specify and install only appliances which have been tested and approved by the American Gas Association Appliance Testing Laboratory. A list of the trade names and model numbers, as well as the names of the manufacturers of approved appliances may be secured gratis from your local gas company or from the AMERICAN GAS ASSOCIATION, 420 Lexington Avenue, New York, N. Y.

Original Installation

The increasing uses of gas make it more necessary than ever for the builder to provide the comforts and conveniences of modern gas service for the home owner at the lowest cost, by installing the proper piping and flues at the time the house is erected, which will permit the use of the various appliances thereafter.

Cost of Piping

The cost of gas piping and flues, *if put in at the time of erection*, is relatively small when compared to the total cost of the building and compared to the increased rental value of the premises so equipped. This cost varies from 0.10 to 1.0% of the total cost of the building, the latter figure covering the most elaborate piping layout required to cover every possible contingency.

Selection of Appliances

No gas appliances should be installed which are not susceptible of such adjustment as will enable the user to bring about the complete combustion of the gas supplied under all reasonable service conditions. Because it is somewhat difficult for those not experienced in the utilization of gas to judge whether or not a given appliance is designed to comply with this requirement the AMERICAN GAS ASSOCIATION established an elaborate Testing Laboratory, which tests all types of gas appliances, not only for safety, but also for efficiency and durability, and identifies all appliances meeting these requirements by the official Blue Star Laboratory Seal.

A.G.A. Appliance Testing Laboratory

The laboratory has been established for the protection of gas users, and the seal is not a manufacturer's trademark, but a symbol of quality applied to all appliances that meet the testing requirements. These requirements represent the best thought of the gas industry and of the several interested governmental bureaus on this subject. Architects and builders



Kitchen Range

The range is the most important piece of kitchen equipment. It is the most used housekeeping device. The modern gas range with oven heat control has changed cooking from drudgery to a real pleasure. No modern home is complete without one of these new heat controlled ranges, which eliminate guesswork in cooking and permit the housewife to go about her other duties, secure in the knowledge that the food will be cooked to a turn.



The Modern All-enamel Kitchen Range

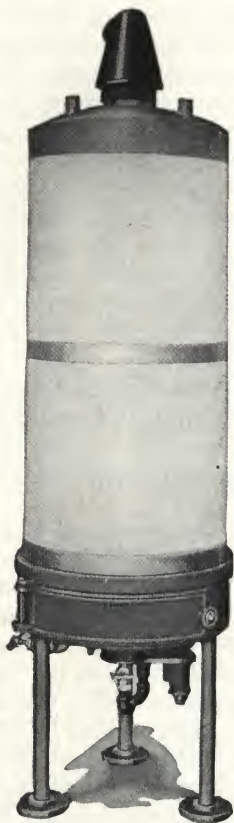
Suitable for usual household requirements. The oven is 18 in. wide and is equipped with thermostatic regulator which simplifies cooking

The following are the essential qualities of a range which will give real satisfaction to the home owner:

- (1) *Convenience*: as to size, arrangement of parts, ease of control, and simplicity in cleaning.
- (2) *Efficiency*: in the use of fuel without waste.
- (3) *Safety*: correct construction to avoid hazards, such as incomplete combustion.
- (4) *Attractiveness*: an important point in the opinion of the user.
- (5) The Blue Star Laboratory Seal of the AMERICAN GAS ASSOCIATION, which is a guarantee of satisfaction.

Hot Water Service

A plentiful and ever-ready supply of hot water is a most vital and sanitary need of any household and is essential to the comfort and cleanliness of the home and the family. Gas-fired water heaters of high efficiency and reliability are available in two main types.



Automatic Storage Type Water Heater

In this type of heater the water is always kept hot ready for use. Equipped with down-draft diverter and installed with a flue connection

One of these is the automatic instantaneous water heater which is suitable for water supply under a pressure of 10 lbs. or more at the highest faucet. On this type of heater the gas burners operate only while the water flows from the faucet (the burner being ignited by a pilot light and controlled by a valve operated by the water pressure). These heaters are both economical and efficient, but because of their large temporary demand of gas, require a larger supply of pipe and meter.

The other type of water heater is the automatic storage heater which consists of an insulated water tank, a pilot light, thermostat and gas burner, so connected that the tank is always kept full of hot water ready for use. This type can be used on low pressure water supply and requires only a $\frac{3}{4}$ -in. gas pipe and meter of corresponding size.

Where an installation is required at minimum cost, a non-automatic hot water service can be secured through the use of the circulating or tank type of gas water heater, manually controlled. Accessories can be had for this type of heater, whereby the gas can be automatically turned off after a given time. It is also possible to convert this type of heater to the automatic type later if desired.

Location of Water Heater—Water heaters should not be installed in bathrooms or other closely confined spaces, and the length of the hot water lines should not be excessive.

All automatic water heaters should be provided with flue connections.

Auxiliary Room Heating

Individual gas room heaters provide a welcome service during many days of Fall and Spring in removing chill and dampness from the room without necessitating the operation of the main furnace, which is not designed for efficiency when operated at low temperature and for short periods.

Room heaters are available in several types as follows:

- (1) The radiant heater, often called a fireplace heater.
- (2) Individual gas-fired radiators, steam or hot air type.
- (3) Portable heaters, not radiant type but flame type.
- (4) Wall heaters, flame type.

For general attractiveness the radiant heater is a superior form of room heating equipment, particularly when installed as fireplace unit.

Gas-fired steam radiators may be tied into the regular heating system, either steam or hot water, and operated either as individual heating units, or utilized to supplement the regular heating system during severe weather.

Portable heaters are available in many styles and sizes, including even a small radiant type. They are lower in cost than other auxiliary heaters and are frequently connected by means of flexible tubing, although this is not a recommended practice.

Where flexible hose connections are necessary, a safe installation can be made by providing the gas outlet nipple, heater inlet nipple and the flexible tubing utilized is of the type that has been tested and approved by the AMERICAN GAS ASSOCIATION Testing Laboratory. The shut-off cock for portable heaters should be located in the gas pipe outlet and not on the appliance.

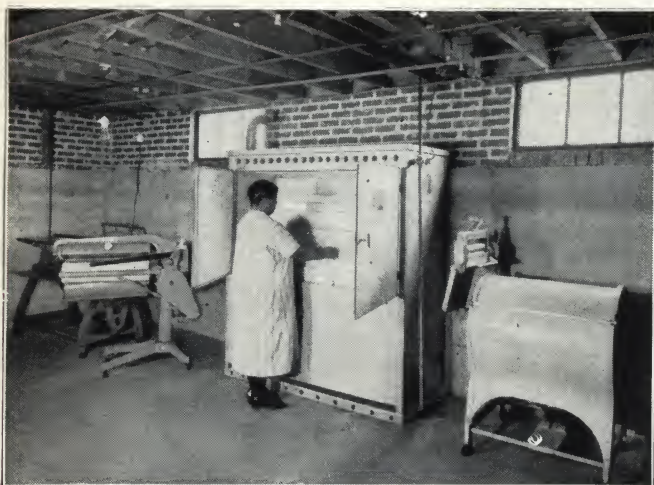


Radiant Fireplace Installation

This type of heater adds beauty and charm to any room. It is more efficient, cleaner and safer than a wood fire, and is as attractive

Laundry Equipment

Weather statistics show that less than one-half of the days of the year are suitable for drying clothes outdoors. The modern housewife appreciates nothing more than a laundry dryer, which permits her to dry



Ironer, Dryer and Washer Installation

With these gas-fired appliances, washday ceases to be a burden and ignores weather conditions

the laundry quicker and better in her own basement, independent of the vagaries of the weather. Gas-fired dryers produce the same freshness, whiteness and freedom from mildew as outdoor drying and eliminate the labor of carrying the laundry in and out of the house.

Several makes of electric washing machines are equipped with gas burners to raise the temperature of the wash water economically and quickly. Where the washing machine is not so equipped, it is advisable to install a laundry stove for boiling the wash or reheating water for the washing machine.

Ironing machines, utilizing gas for heating the rolls, operate more economically than those employing other heating methods. The home laundry provided with complete gas-fired laundry equipment carries the assurance that clothes, linens, blankets, and all household laundry can be washed, dried and ironed under sanitary home conditions with less effort than ever before possible.

Heating the Whole House by Gas

The house equipped with a gas-fired furnace gives positive assurance the home will always be kept warm and comfortable at a uniform temperature automatically, without any of the customary labor and attention. Gas furnaces are manufactured to meet all heating requirements—that is, for steam heat, vapor heat, hot water heat, or warm air systems. Each of these types has its special advantages and, as with solid fuels, the hot water heating system is slightly more efficient, sometimes running as high as 90%.

Amount of Gas Required for House Heating—The uniformity of the heating value of gas as a fuel makes it possible to predict with great accuracy the amount required to heat a home of any given size; once the climatic conditions in the particular section of the country are taken into account,

The local gas company has a complete file of this information, and with data on the size of the house, construction of the walls and roof can easily provide an accurate estimate of the cost of house heating by gas.

A recent development, which has taken place simultaneously with the use of gas for house heating, is to insulate the homes to reduce the loss of heat. The wall and roof heat losses can be cut to one-third of their normal value by the use of insulation with corresponding reduction in the amount of radiation and furnace size, as well as the operating expenses of heating the house. Oftentimes the savings in installation and cost of operation cover the added cost of insulating the house and make it possible to utilize gas for heating the home at little or no extra cost over solid fuel.

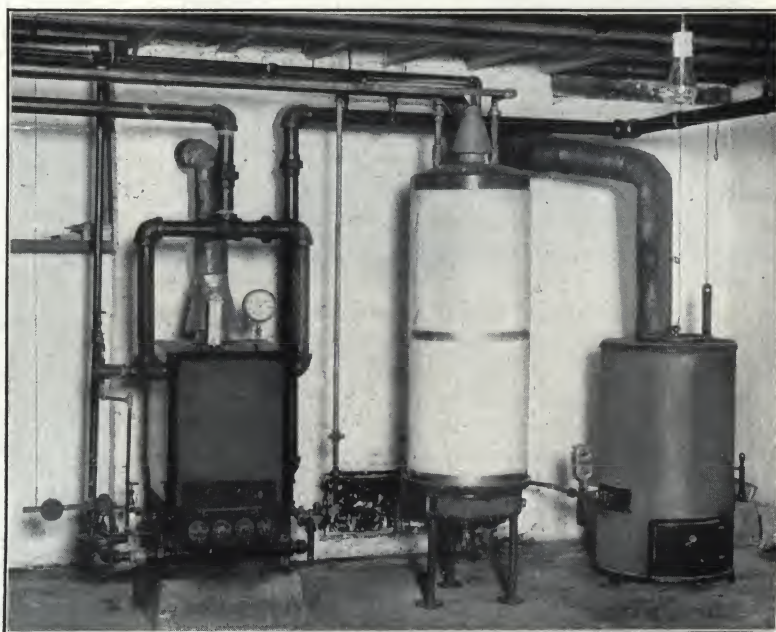
All gas-fired heating systems should be thermostatically controlled, inasmuch as the saving in fuel under these conditions and the uniform temperature made possible, more than pay for the added cost of the heat controlled equipment.

The development of automatic heating with gas as a fuel, for the first time recovers the space ordinarily required for coal bins and ash bins, and makes it available as a clean and useful part of the house.

Incineration

The gas-fired incinerator makes possible the complete disposal of household garbage, safeguards health, and saves labor and eliminates the unpleasant odors and opportunity for the spread of disease resulting from accumulation of garbage between collections by the municipality. In addition to this, the use of the incinerator avoids the fire hazard caused by the accumulation of old boxes, paper, etc., about the house.

The installation of an incinerator requires a flue, and therefore this appliance should be located as near to the chimney as possible. Oftentimes it is possible to install a chute from the kitchen, which will save all the labor of carrying the refuse downstairs to the incinerator.



A Notable Installation in a Six-room Insulated House

The heating system is hot water, using the small boiler at the left (which type is also used for water heating in other instances). Here the hot water supply is taken from the automatic storage heater (center); and the incinerator (right) disposes of all garbage and waste. This basement is used as a playroom, workshop and living room

Installation of Appliances

No less important than the quality of the appliance itself is the provision of adequate supply piping, in order to insure the safe and satisfactory performance of gas appliances. Piping of the proper size insures constant and sufficient gas pressure and results in uniform operation of the burners, giving complete combustion and insuring reliable performance.

The following table gives the gas consumption of various domestic appliances and indicates the size of outlet ordinarily necessary for each appliance:

Appliances	Size of outlet ordinarily necessary, in.	Usual maximum gas consumption per hour, cu. ft.*
For the Kitchen:		
Gas range.....	$\frac{3}{4}$	110
Gas refrigerator.....	$\frac{3}{4}$	2 for continuous type 30 for intermittent type
For the Basement:		
Gas water heaters:		
Manual	$\frac{3}{4}$	40 to 80
Instantaneous	$1\frac{1}{4}$ to $1\frac{1}{2}$	60 per gallon rating
Automatic storage.....	$\frac{3}{4}$ to 1	60 to 80
Gas incinerator.....	$\frac{3}{4}$	40 to 60
Gas boilers.....	$1\frac{1}{2}$ to $2\frac{1}{2}$	300 to 1600
		About 85 per hour per 100 sq. ft. installed cast iron steam radiation
Gas warm air furnaces..	$1\frac{1}{2}$ to $2\frac{1}{2}$	250 to 1000
		About 35 per hour per 10,000 B.t.u. hourly heat loss from the building
For the Laundry:		
Gas heated laundry dryer	$\frac{3}{4}$	20
Gas laundry stove....	$\frac{3}{4}$	30
Gas ironing machines.	$\frac{3}{4}$	20
Gas washing machines	$\frac{3}{4}$	20
For Space Heating:		
Gas radiant heaters (for fireplaces).....	$\frac{3}{4}$	30 (or 3 per radiant)
Gas room heaters (flame type).....	$\frac{3}{4}$	15 to 30
Gas radiators (warm air)	$\frac{3}{4}$	15 to 30
Gas radiators (steam)	$\frac{3}{4}$	3 per section
Gas floor furnaces....	$\frac{3}{4}$ to 1	100
Gas garage heaters....	1	50
Gas ignitors for fire- places	$\frac{3}{4}$	5
Gas wall heaters.....	$\frac{3}{4}$	15

*Note: For natural gas installation these figures should be divided by two.

General Principles of Installation

As local conditions govern to a great extent the practice and installation of gas piping it is urged that before the contract is let for this important part of your building, your local gas company be consulted. The following general conditions, however, apply in practically every community throughout the country.

Appliances shall be installed so that their continued operation will not in any way create a fire hazard because of adjacent flammable material. Vent pipes should not be run closer than 6 in. to unprotected ceilings and wooden joists.

Any appliance which consumes large quantities of gas, upon which is automatically controlled and which

depends upon a pilot light for ignition, shall be connected to an adequate flue or flue pipe.

This rule is particularly significant with regard to the very large appliances such as central heating systems. These burn such large quantities of gas that every precaution should be taken. As further protection, it is advisable to insist on thermostatic or other forms of safety pilot which shall cut off the main gas supply in event that the pilot is extinguished.

No water heating appliance shall be installed in a closed system of water piping unless a water relief valve is provided.

The presence of a water meter will serve to make it a closed system, as water meters permit the flow in only one direction. It is to be recommended, then, that all water heating systems be operated with a pressure relief valve at some point.

Proper Piping for Domestic Gas Service

Four factors determine the size of pipe needed; length of pipe, maximum gas consumption to be provided for, the allowable loss in pressure from the meter to the appliance and the specific gravity of the gas.

Your gas company will be glad to furnish the proper pipe sizes to insure good service to your installation of gas appliances, upon request and without charge.

Miscellaneous Recommendations

Piping should not be laid under tile, parquet or mosaic floors, where it is possible to avoid it. Piping should not be run along the bottom of beams that are to be covered with lath and plaster, but should be run along the top of beams or joists, where it is possible, so that it will be accessible by raising the floor boards, which, when covering such piping, should be fastened with brass screws.

All parts of piping should be securely and permanently fastened to or supported from the building itself. If this is not done, sags or undue strains may later develop and the piping may leak or condensation may accumulate in the low points of the sags and interfere with the free flow of gas.

All piping should be graded toward the meter or outlet—condensation can then be removed if necessary. Meters should be set in a clean, dry, safe place, not subject to wide variations in temperature.

Your gas company has complete information on the size, price and instruction for installing all of the equipment mentioned herein, and will be glad to supply this information upon request without obligation or cost to you.

In addition, the Architects' and Builders' Service Committee of the AMERICAN GAS ASSOCIATION will be glad to furnish specific answers to any questions relating to the design, construction and installation of gas service in the home. This data will be furnished without charge.

Of necessity, the appliances shown here are of particular makes. However, the showing of a particular manufacturer's product here expresses no preference of the A.G.A. for that particular brand.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

AND ASSOCIATED COMPANIES

An Invitation to Architects to Avail Themselves of Telephone Engineering Experience

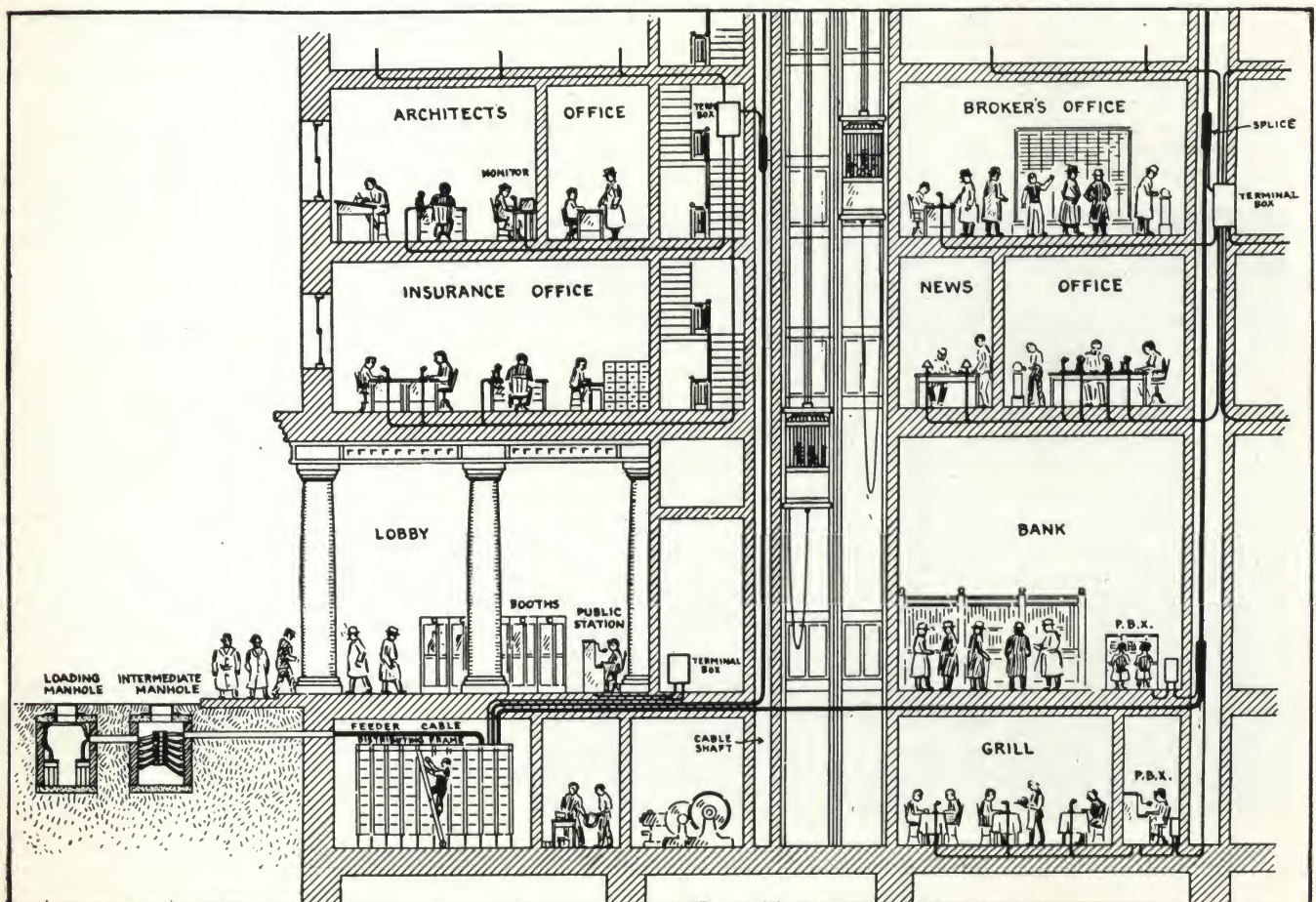
In modern office buildings, hotels and apartment houses, large numbers of telephones are required. Unless suitable facilities are provided during construction for accommodating the cables and wires and for running them through walls and floors, costly alterations may be required after the completion of the building.

It is, therefore, desirable that the probable needs of such buildings with respect to telephone service, be forecast as accurately as possible. It is also of great importance to owners and architects in preparing plans and specifications for buildings requiring extensive telephone service, that suitable arrangements be made for such telephone wiring and terminal boxes as the character and use of the building will demand.



While the general manner of wiring buildings of the same class will be similar, the particular requirements may differ considerably on account of special conditions. Every large building, to a certain extent, presents problems of its own for which advantageous and economic arrangements can frequently be suggested by those who are especially familiar with work of this kind. The engineers of the Bell System are always glad to place their experience in these matters at the disposal of architects, owners and builders, and to assist in planning the best system for each particular case. It is, therefore, suggested that architects, before completing building plans, communicate with the engineers of the Associated Bell Telephone Company operating in the locality of the building project.

Elevation Showing Telephone Feeder Cable to Building Terminals and Distribution to Subscribers' Telephones



BOSTON ACOUSTICAL ENGINEERING COMPANY

46 Cornhill

BOSTON, MASS.

Products

MATERIALS for ACOUSTIC CORRECTION and SOUND INSULATION.

ACOUSTEX—a sound absorbing slab for acoustic correction.

For Silen-Stone—a decorative artificial stone tile or slab with a high coefficient of sound absorption—see page A323; for Trimount Sound Proof Doors and Folding Partitions, see page B1131.

Acoustical Treatments for Modern Buildings

The diminution of noise is taking an increasingly prominent place in the design of modern buildings. Banks, offices, schools, churches, hospitals, courtrooms, etc., are all benefited by quiet conditions.

The large areas of hard non-sound absorbing materials used in the construction of present day buildings make it necessary that a highly sound absorbing material be introduced to compensate for the use of hard sound reflecting materials.

Acoustex, the result of many years of research and experimentation, is such a material; besides being a practical, efficient and scientifically correct sound absorbent, it has a beautiful and interesting but unobtrusive texture.



Baeco Products

Properties That Make Acoustex an Ideal Sound Absorbing Material

Acoustex is fire resisting and is not affected by extremes of temperature.

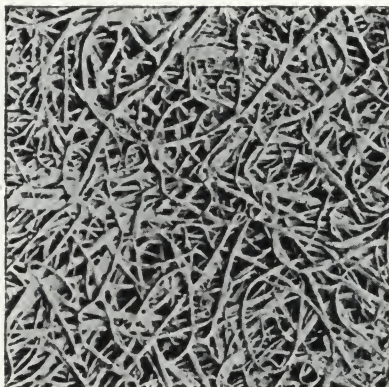
Absorption Value—Tests made by Professor W. R. Barss, Massachusetts Institute of Technology, show that Acoustex 1 in. thick has a coefficient of absorption of .51 (frequency of 512 vibrations per sec.).

Decoration—Acoustex can be sized, and spray painted with a light cream color oil paint, or with any other color desired.

It may be vacuum cleaned and redecorated by spray-painting the surface. This can be done a number of times without causing the pores to fill with paint, or without greatly impairing its acoustic efficiency.

Sizes—Acoustex is furnished in slab or tile form, 12x12, 12x24, 24x60 in. Special sizes cut to order. Standard thickness 1 in.

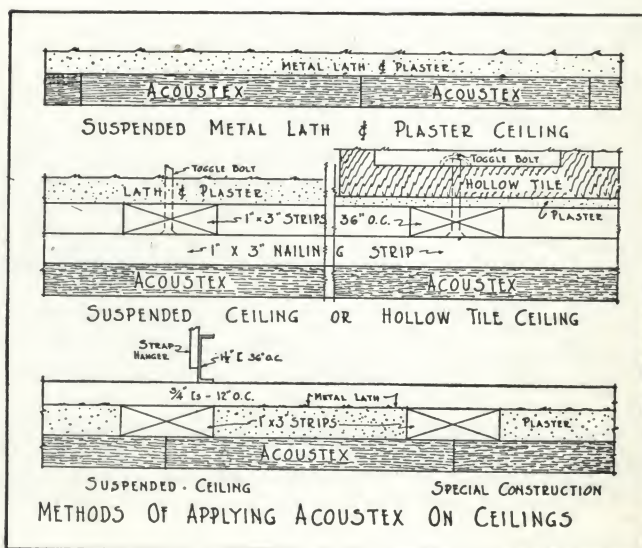
Joints—Regular type Acoustex is furnished with rough sawn square edges, which, when laid together, produce close fitting joints so desirable for ceiling treatment. It may also be furnished with beveled edges when required.



This Magnified Photograph Shows the Porosity of Acoustex



Acoustex Installation in Office and Showroom of Northampton Gas Light Co., Northampton, Mass.



R. GUASTAVINO COMPANY

INCORPORATED

Timbrel Arch Construction and Masonry Acoustical Installations

BOSTON, MASS.
40 COURT STREET

225 West 34th Street
NEW YORK, N. Y.

FACTORY
WOBURN, MASS.

Products and Services

The business of this company is that of DESIGNING and INSTALLING the SYSTEM of TIMBREL ARCH CONSTRUCTION, and the installation of fireproof acoustic material known as AKOUSTOLITH.

Also Rumford Ceramic Acoustic Tile.

Note: It is important to record that Professor Sabine and Mr. Guastavino were the first in the acoustical field to develop along correct technical lines and to bring to a point of commerciability, a masonry fireproof material having a sound absorbing or acoustical value many times greater than that of ordinary plaster, and, in view of that fact, the United States Patent Office has awarded to these inventors patents which are basic to a sound absorbing material of the character of our Akoustolith and which covers the use of that material in any form it may be prepared or used.

Co-operation

Owing to the varied uses of our construction, involving engineering and architectural features, the more satisfactory method is to send us, before the plans are fully drawn, a sketch outline of the requirements, which will enable us to indicate the most approved method of treatment and the approximate cost.

The service of our acoustical engineer is at the architect's disposal in order to determine the correct location and amounts of AKOUSTOLITH TILE or PLASTER.

Facilities

This company owns and operates for its sole use, as contractors, a factory for the manufacture of the better grades of glazed and unglazed tile and acoustic tile required as a soffit course in vaulted construction. It has, therefore, unexcelled facilities for prompt installation and the making of special pieces in connection with its contracting business.

Akoustolith Tile

Description—AKOUSTOLITH TILE is an all-masonry material having a sound absorbing or acoustical value higher than any other masonry material on the market. Its value has been demonstrated by laboratory tests made by the late Prof. Wallace C. Sabine, of Harvard University, and by many important installations.

Adaptability—Owing to its light weight (about 4 lb. per board foot) and facility of manufacture, AKOUSTOLITH is easily adapted to plain or elaborate architectural forms.

Texture—AKOUSTOLITH is made in a variety of textures, usually of a fine granular appearance, and can be made to closely resemble the usual building stone employed for interiors.

Permanency—The permanency of AKOUSTOLITH, owing to its composition of masonry, is assured. It will not disintegrate nor warp; moisture has no effect on its structure. It is genuine masonry, and non-combustible.

Color—AKOUSTOLITH is manufactured in a wide range of colors, ranging from gray white through

various shades of buff, brown, or any colors resembling those of building stones.

Stock Sizes—AKOUSTOLITH is manufactured in any size from the smaller tile dimensions—4x8, 5x10, 6x12, 8x16 and 10x20 in., all about 1 in. thick—to the larger ashlar sizes for wall work.

How It Is Installed—AKOUSTOLITH used on ceilings has primarily been installed in connection with our regular Guastavino arch construction, using it as a soffit course of tile and backing up the same with two or more layers of rough tile. It is, however, being largely used by applying it directly on the soffit of the concrete floor slabs, or wire lath and cement plaster ceilings.

For inside walls the installation can be made directly on any of the many masonry surfaces without scratch coat, if surface is reasonably true. In this case the material can be purchased f.o.b. factory and set by either the general contractor or his tile layer.

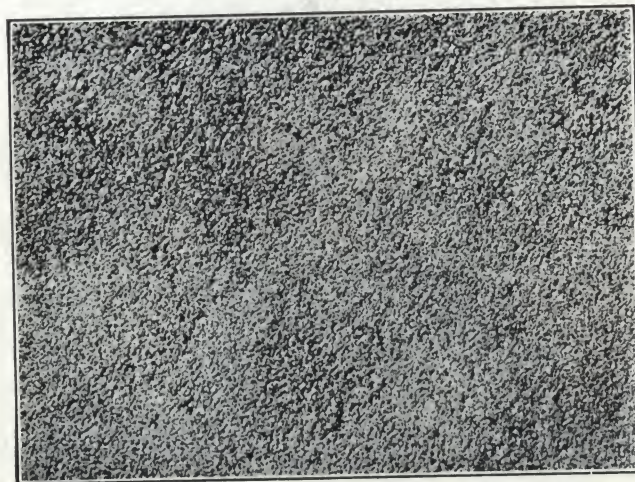
Akoustolith Plaster

AKOUSTOLITH PLASTER is a light weight masonry material used as a finish coat $\frac{1}{2}$ in. thick possessing a sound absorption of from .31 to .59 between the frequencies of 297 to 2890 vibrations per second—these values being many times greater than ordinary plaster.

Uses—AKOUSTOLITH PLASTER is used for the purpose of insuring correct acoustics in auditoriums and churches, also in hospitals, banks and offices, etc., where excessive reverberation would occur.

Color—AKOUSTOLITH PLASTER is a light gray color, almost white. If other colors are desired the usual mortar stains of any shade that the architect may select can be added by the plasterer. For tinting AKOUSTOLITH PLASTER after installation special instructions will be sent on request.

How Purchased—AKOUSTOLITH PLASTER is sold f.o.b. factory, packed in bags and ready for use with the addition of water only, and can be applied by any intelligent plasterer following the specifications and instructions furnished by the manufacturer.



Photograph Showing Interesting Texture Obtainable with Akoustolith Plaster

Stone & Webster Investment Offices, Boston, Mass.



Vaulted Ceiling of Guastavino Timbrel Tile Construction, with a Soffit Course and Moulded Ribs of Akoustolith Sound Absorbing Artificial Stone

Leslie Lindsey Memorial Chapel, Boston, Mass.

ALLEN & COLLENS, Architects

MACOUSTIC ENGINEERING COMPANY, INC.

Acoustical Engineers and Manufacturers of Macoustic Material

Union Trust Building, CLEVELAND, OHIO

REPRESENTATIVES

ATLANTA, GA., KEELING-CASSIDY BRICK Co., 234 Peachtree Street
 BIRMINGHAM, ALA., C. M. McCrum Co., 513 E. 21st Street
 BOSTON, MASS., PENNSYLVANIA TILE & CONSTRUCTION Co., 260 Tremont Street
 BUFFALO, N. Y., GLOBE PLASTER Co., 210 Franklin Street
 CHAMPAIGN, ILL., M. L. HECKER Co.
 CHARLOTTE, N. C., SOUTHERN BRICK & TILE Co., 129 Brevard Court
 CHATTANOOGA, TENN., JOHN A. CURRIN, Volunteer Building
 CHICAGO, ILL., HERBERT T. RICH, 457 122 So. Michigan Avenue
 CINCINNATI, OHIO, STONE & METAL EQUIPMENT Co., 9 E. 8th Street
 COLUMBUS, OHIO, HOWARD BUILDING SERVICE Co., 279 E. Broad Street
 DALLAS, TEX., W. L. MACATEE & SONS, 2907 San Jacinto Street
 DAYTON, OHIO, DAYTON BUILDERS' SUPPLY Co.
 DETROIT, MICH., ROBERT H. GORDON, 2511 First National Bank Building
 GARY, IND., PARRY-READE BRICK Co., 557 Madison Street
 HOUSTON, TEX., W. L. MACATEE & SONS
 INDIANAPOLIS, IND., INTERSTATE CLAY PRODUCTS Co., 604-6 J. F. Wild Building
 KANSAS CITY, MO., C. A. BROCKETT CEMENT Co., 2035 E. 19th Street

LINCOLN, NEB., NEBRASKA MATERIAL Co., 1126 P Street
 LOS ANGELES, CAL., C. W. COMEGYS, 830 No. Sycamore Street
 MARQUETTE, MICH., N. G. DEHAAS, Harlow Block
 MEMPHIS, TENN., JOHN DENIES' SONS Co., 373 Adam Avenue
 MILWAUKEE, WIS., CONRAD SCHMITT Co., 1707 Wisconsin Avenue
 NEW ORLEANS, LA., JAHNCKE SERVICE, INC., 814 Howard Avenue
 NEW YORK, N. Y., MACOUSTIC ENGINEERING COMPANY, INC., 122 East 41st Street
 NIAGARA FALLS, N. Y., EMPIRE BUILDERS' SUPPLY Co., Gluck Building
 OMAHA, NEB., SUNDERLAND COAL & SUPPLY Co., Sunderland Building
 PHILADELPHIA, PA., THOMAS F. GIBSON Co., 20 So. 15th Street
 PITTSBURGH, PA., W. G. RICHARDS, Bessemer Building
 ROCHESTER, N. Y., AMERICAN CLAY & CEMENT CORP., 1175 E. Main Street
 ST. LOUIS, MO., T. T. TYLER, 515 Chemical Building
 ST. PAUL, MINN., R. E. STANTON Co., 2694 University Avenue
 SEATTLE, WASH., D. E. FREYER & Co., 1105 Second Avenue
 SHREVEPORT, LA., H. C. BELLOW, 214 Edwards Street
 SYRACUSE, N. Y., SYRACUSE WALL PLASTER Co., 319 No. Clinton Street
 UTICA, N. Y., AMERICAN HARD WALL PLASTER Co.
 WASHINGTON, D. C., UNITED CLAY PRODUCTS Co., Investment Building

Macoustic Material

Macoustic is mixed and applied in exactly the same manner as ordinary plaster, without special skill, by regular plastering contractor. Labor application cost is the same as for ordinary plaster. Macoustic has been used without basic change since 1921.

Method

Macoustic engineering recommendations, based upon definite established principles of sound direction and control, are proven correct by practical and successful application in all types, shapes, and sizes of interiors, under varying conditions, from coast to coast. Macoustic has eliminated guesswork.

Service

Macoustic treatment is adaptable to your own designs. The services of our Engineering Department are available without charge to architects, engineers, and others for analysis of plans and section drawings. Proper design and proportions plus Macoustic treatment produce maximum results.

Distinctive Macoustic Features

Practicability—Mixed and applied in exactly the same manner as ordinary plaster without special solutions or formulas or special skill.
Economy of Application—Applied for the same labor cost as ordinary plaster. Coverage, 100 yd. per ton.
Permanence—Becomes an integral, permanent part of the interior.
Decorative Appearance—Unlimited range of surface texture finishes in combination with harmonious color.
Fire Resistance—Macoustic is fire resistant and verminproof—not an added hazard.
Acoustical Effectiveness—Evidenced in actual practice by universally successful achievement.
Low Cost—The reasonable cost of Macoustic treatment places it within the reach of the smallest jobs, permitting a specification for Macoustic where otherwise this important consideration of good hearing would necessarily be eliminated.

Uses

For producing a correct acoustical condition in auditoriums of all sizes, churches and temples, theatres, music rooms and school classrooms, studios and recital rooms, lodge rooms, banquet rooms and courtrooms, corridors, banking rooms, workrooms, lobbies and concourses, library reading rooms, gymnasiums, natatoriums and recreation rooms.

MACOUSTIC

TRADE-MARK REGISTERED
 Patent Pending

Specifications

Use the following:

Macoustic Plaster manufactured by MACOUSTIC ENGINEERING COMPANY, INC., Bulkley Building, Cleveland, Ohio, to be applied on all surfaces specified and recommended by the Manufacturer's Engineering Department, and in accordance with their standard specifications.

Macoustic to be mixed with clean water and applied in the same manner as ordinary plaster, over a gypsum scratch or brown coat, and laid on to a depth of $\frac{1}{2}$ in. Produce specified surface texture finish.

Additional Data

Write for additional detailed literature or information, or send us plans for prompt analysis, followed by our acoustical engineering report with cost data covering each of your interiors.

Correct acoustics should and can be an accomplished fact before your final working drawings are completed.

Typical Macoustic Installations

Saint Ambrose Church, Chicago, Ill.
 Auditorium of Seneca Vocational School, Buffalo, N. Y.
 McFarlin Memorial Auditorium, Dallas, Tex.
 Holy Rosary Church, New Orleans, La.
 St. Basil Church, Chicago, Ill.
 Niagara Falls High School, Niagara Falls, N. Y.
 Synagogue Jewish Center, Cleveland, Ohio
 Groton School, Groton, Mass.
 Catholic Cathedral, Saint Louis, Mo.
 St. James Church, Los Angeles, Cal.
 St. Ambrose Church, Detroit, Mich.
 First Baptist Church, Asheville, N. C.
 City Hall, Winston-Salem, N. C.
 Nebraska State University Activities Building, Lincoln, Neb.
 Superior Wisconsin Cathedral,
 Detroit College of Medicine and Surgery, Detroit, Mich.
 Lutheran Church, Winston-Salem, N. C.
 East Ninth Street Theater, Cleveland, Ohio
 Music Building, Lake Erie College, Painesville, Ohio
 Irving Junior High School, Lincoln, Neb.
 Phillips Academy, Andover, Mass.
 Temple Emanuel, Providence, R. I.
 Bloomfield Country Club, Detroit, Mich.
 Wellesley College, Wellesley, Mass.
 Temple Israel, Miami, Fla.
 Scottish Rite Cathedral, Montgomery, Ala.
 First National Bank, Dearborn, Mich.
 Eagles Club Building, Milwaukee, Wis.
 Cheyenne Theater, Cheyenne, Wyo.
 St. Johns Lutheran Church, Minneapolis, Minn.
 Meyer-Kiser Building, Indianapolis, Ind.
 Natrona High School, Casper, Wyo.



Chickering Hall, Los Angeles, Cal.

A splendid example of perfect acoustics in the small intimate type of auditorium or recital hall.



Cleveland Auditorium

Seating capacity, 15,000. The largest and most successful acoustically designed and treated interior in the world. Note ceiling development.



Natrona High School, Casper, Wyo.

Illustrating permanent and decorative characteristics of Macoustic treatment, combined with maximum, uniform acoustical quality.

UNITED STATES GYPSUM COMPANY

Sabinite Acoustical Plaster

Licensed Under Sabine Patent No. 1,458,631, June 12, 1923

300 West Adams Street

CHICAGO, ILL.

For Sales Offices, see page B1359

Product

SABINITE ACOUSTICAL PLASTER.

For Structolite Cement, see pages A44-45; for Floor Voids, see page A114; for Reinforced Roof Tile and Monolithic Floors and Roofs, see pages A166-170; for Dry Fill Insulation, see page A200; for Partition and Furring Tile, Beam and Column Covering, see pages A382-383; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Sabinite Acoustical Plaster

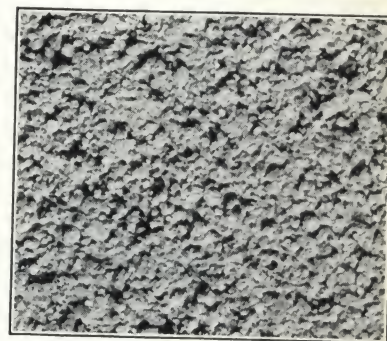
Description—Sabinite Acoustical Plaster is the development of years of scientific effort toward the control of sound. It is the result of the research work of Dr. Paul E. Sabine, a recognized authority on acoustics, at the Riverbank Laboratories, Geneva, Illinois, which is known as the most complete acoustical laboratory in America.

Sabinite Acoustical Plaster is a gypsum material combining wonderful properties of sound absorption with the other qualities of a practical wall and ceiling plaster; it provides an economical, scientific solution of the problems of acoustics. It is mixed in the same manner and applied with the same tools as ordinary gypsum plaster.

Advantages—Sabinite Acoustical Plaster affords relief from the reverberation of sound from the usual hard, non-absorbent plastered walls found in modern

buildings, and overcomes the confusion caused by the intensity of a constant source of sound.

Sabinite absorbs from 15% to 40% of the sound that strikes it, depending upon the pitch, compared with 2% absorption by the ordinary plastered wall. Tests show that in a room plastered with Sabinite, sound is absorbed 6 to 18 times as quickly as in a room plastered with ordinary plaster. That is, if sound is produced in both rooms at the same rate, the average intensity in the room plastered with Sabinite is from one-sixth to one-eighteenth as great as the other. The effect of sound absorption is as if a heavy carpet were applied to walls and ceilings.



Section of Sabinite Wall Showing Porosity of Material

The reason for these remarkable results is that Sabinite is exceedingly porous, being filled with a multitude of connecting air spaces. Sound enters these small spaces, and through friction, is converted into heat—in other words, the sound is absorbed in the plaster.

Sabinite is as easily and quickly applied as any other gypsum plaster. It is gray-white in color and its finish is that of a sand float, providing a restful, attractive tone to walls and ceilings.

Where Sabinite May Be Used—Sabinite Acoustical Plaster is valuable in reducing excessive reverberation and resultant confusion of sound in theaters, churches, auditoriums and halls. It also decreases the intensity of sound from a constant source in any room—a condition found in any average office.

Sabinite transforms the walls of corridors in hospitals, hotels, apartments and office buildings—usually very noisy from the highly intensive sound-reflecting materials with which they are plastered—into “zones of quiet” at once restful and comfortable.

Note: See Special Bulletin and Direction Sheet for complete information and instructions for mixing and application and for the application of paint.

Covering Capacity—One ton of Sabinite, applied 1/2 in. thick will cover 60 sq. yd.

Package—Sabinite Acoustical Plaster is packed in 80-lb. paper bags.



Lincoln Hall, Levy Mayer Building, Northwestern University School of Law, Chicago, Ill.

JAMES GAMBLE ROGERS, New York, N. Y., CHILDS AND SMITH, Chicago, Ill.
Associate Architects
Walls and ceiling of Sabinite

STEVENS SOUND-PROOFING CO.

Sound-proofing Engineers

Room 1190, 407 South Dearborn Street, CHICAGO, ILL.

REPRESENTATIVES

ATLANTA, GA., H. N. PURDY, R. 318, 101 Marietta Building
BIRMINGHAM, ALA., CAD JONES & J. O. BURKS, 1001 Martin Building
BOSTON, MASS., F. E. BERRY JR. & Co., 837 Little Building
BUFFALO, N. Y., NIAGARA ASBESTOS CORP., 11 Terrace
CHICAGO, ILL., G. F. BECKER Co., 407 So. Dearborn Street
CINCINNATI, OHIO, CINCINNATI BUILDERS SUPPLY Co., 534 Main Street
COLUMBUS, OHIO, B. M. FREEMAN Co., Columbian Bank Note Building
DALLAS, TEX., R. V. AYCOCK Co., 1213 Hord Street
DENVER, COLO., R. V. AYCOCK Co., 2233 Arapahoe Street
DETROIT, MICH., WILLIAM FOSTER SHAW, Majestic Building
DULUTH, MINN., WALKER-JAMAR COMPANY, 365 So. First Avenue, E.
DES MOINES, IOWA, TOWER MATERIALS Co., Hubbell Building
HOUSTON, TEX., R. V. AYCOCK Co., 1308 Conti Street
INDIANAPOLIS, IND., CHAS. E. WEHR, Hume-Mansur Building

KANSAS CITY, MO., R. V. AYCOCK Co., 1526 Grand Avenue
LOS ANGELES, CAL., WILLIAM L. HAVEN, 2704 South Hill Street
LOUISVILLE, KY., BUILDING EQUIPMENT Co., Citizens Building
MINNEAPOLIS, MINN., H. O. JOHNSON, Builders Exchange
MONTREAL, QUE., WALTER FREDERICK (Reg'd), Keefer Building
NEW YORK, N. Y., FERRO BUILDING PRODUCTS Co., Graybar Building
PHILADELPHIA, PA., ALBERT ZELFELDER, 1324 Walnut Street
PITTSBURGH, PA., PITTSBURGH BUILDING SPECIALTIES Co., Jones-Law Building
ST. LOUIS, MO., R. V. AYCOCK Co., 3900 Chouteau Avenue
SEATTLE, WASH., ASBESTOS COVERING & SUPPLY Co., 1037 Sixth Avenue, So.
TULSA, OKLA., R. V. AYCOCK Co., 119 West First Street
WASHINGTON, D. C., W. LESTER BAKER, Peoples Life Insurance Building

Engineering Service

We offer, in addition to a sound-proofing system of wide scope, an engineering service to the architect and engineer. We are prepared to present suggestions and make recommendations on any sound-proofing problem that may arise in connection with any class of construction, and the architect and engineer are invited to call upon us at any time in order to avail themselves of this service. It is good policy to go into such matters at the time preliminary plans are being drawn, so that recommendations can be made before final details of construction are arranged.

This service is offered without charge and the recommendations being based on years of experience in this field, to which our entire time has been devoted, eliminates the necessity of working out experimentally such problems on a purely theoretical basis.

Eleven years of successful installations in all parts of the United States form the basis on which all recommendations and specifications are offered.

Advantages of Stevens System

Sound is an expansion and contraction of air, and travels in all directions in waves from the source of the sound. Where sound is disturbing within a room due to reverberation or echo, it is a simple matter to place absorbing materials in such a way that the sound will be partially absorbed and a large percentage of the echo eliminated.

Sound being a phenomena of the air, the problem becomes more complex when sound is transmitted from one closed room to another, as it is evident there is no passage of air.

It has been fairly well established that the transmission of sound from one room to another is caused by the movement or vibration of the structural parts of the building, which are set in motion by the sound and reproduces that sound wherever it comes in contact with air. Thus, a sound may carry indefinitely through a building, depending on the intensity of the sound and the resistance offered by the materials used in the building.

It is, therefore, evident that where absorbing materials are placed under floors or behind partitions or ceilings, that no matter how efficient they may be, that they can not function if the building is all tied together, as the sound will be transmitted by the steel, concrete or other materials.

The Stevens System provides a practical method of breaking the solid connection between the finished surfaces of a room and the substructures so that the surfaces exposed to the sound may vibrate or move without disturbing the substructure and by using proper absorbing materials in connection with the installation to absorb

the sounds produced by the diaphragmatic action of the finished surface.

Special Uses

In addition to using the system under floors, in partitions, in ceilings and under machinery to prevent passage of sound or vibration, it is also used under ballroom and gymnasium floors to provide resiliency and eliminate fatigue and shock of impact.

Some Installations

Adelphi Theater, Clark & Estes Avenue, Chicago, Ill., J. E. O. Pridmore, architect. Stevens System installed in 1917 in connection with six bowling alleys. Alleys placed on second floor over lobby of theatre and stores, and adjoining theatre auditorium.

Aeolian Hall, 54th Street and Fifth Avenue, New York, N. Y., Warren & Wetmore, architects. Three organ recital rooms. Stevens System used on floors, partitions and ceilings of organ chambers and recital rooms.

Roxy Theatre, Seventh and 50th Street, New York, N. Y., Walter Ahlslagier, architect. Ventilating fan and motor weighing 6 tons placed directly above the auditorium on Stevens anti-vibration platform.

Elks Club, Milwaukee, Wis., R. A. Messmer & Bro., architects. Ten bowling alleys placed on fourth floor directly above restaurant and directly under main lodge hall.

Stevens Hotel, Seventh Street and Michigan Avenue, Chicago, Ill., Holabird & Roche, architects. All ballroom and banquet room floors treated with Stevens System.

Edsel Ford Residence, Grosse Pointe, Mich., Albert Kahn, architect. All floors above first floor soundproofed under the Stevens System.

Fifth Avenue Theater, Seattle, Wash., R. C. Reamer, architect. Theater was built in connection with an office building, and each lease contained a clause stating that if sounds of theater organs are disturbing the lease may be broken. The two organ chambers were treated on ceilings, floors and partitions with entire satisfaction.

Grosse Pointe Country Club, Grosse Pointe, Mich., Smith, Hinchman and Gryls, architects. All floors treated with Stevens System.

Specifications

Furnish and install Stevens System of Sound-proofing as designed and manufactured by the STEVENS SOUND-PROOFING Co., Room 1190, 407 South Dearborn St., Chicago, Ill.

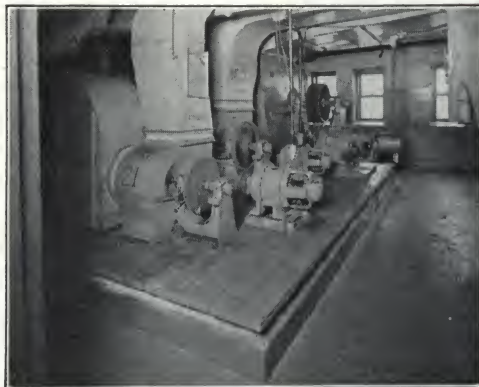
This system to be installed under the specifications and direction of the manufacturer.

Further Information

If further information is desired, a representative will call at your request. Write for new catalogue.

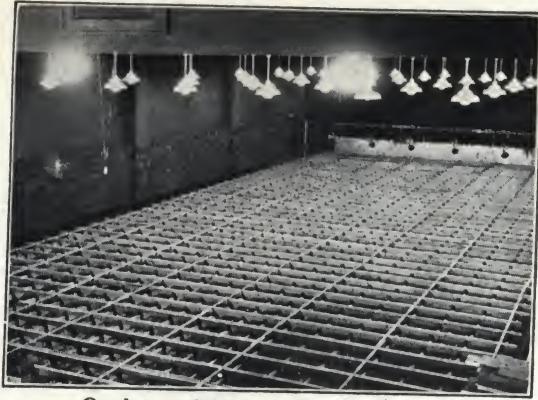


Aeolian Hall, New York, N. Y.
WARREN & WETMORE, Architects
Organ rooms treated throughout with Stevens System



Southwestern Bell Telephone Building, St. Louis, Mo.

MAURAN, RUSSELL & CROWELL, Architects
HERBERT H. MORRISON, Consulting Engineer
Stevens Anti-vibration platforms under fan and motor units



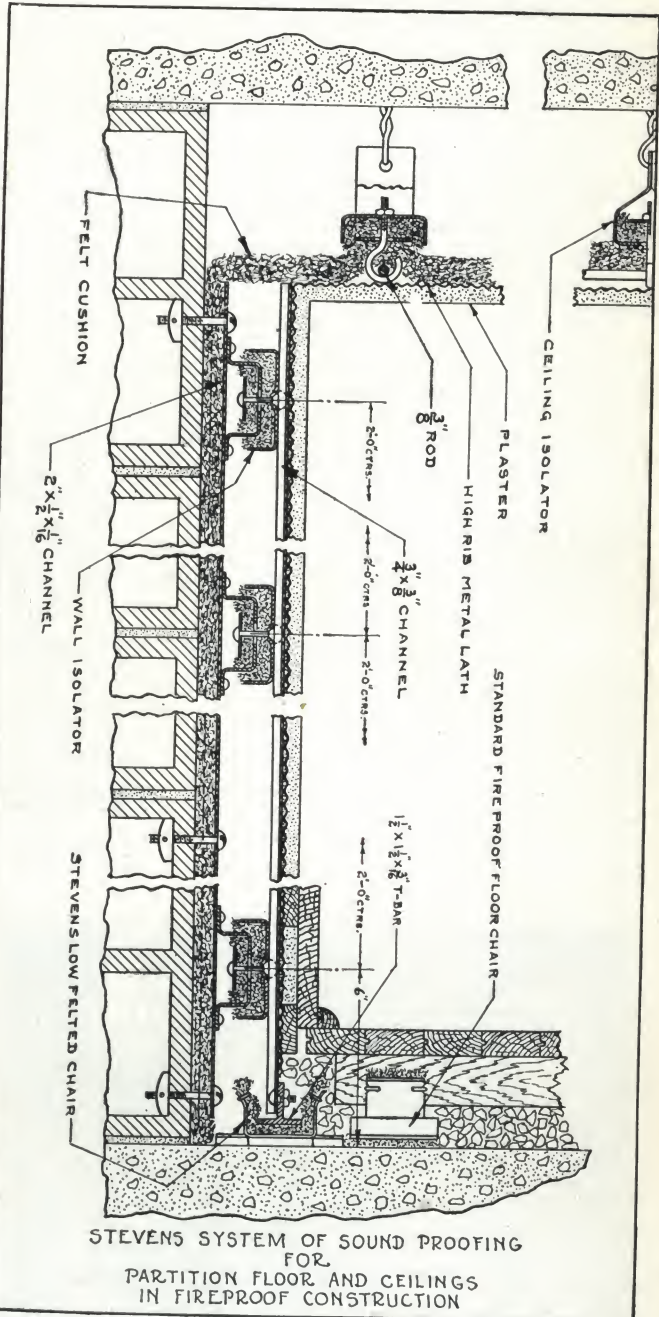
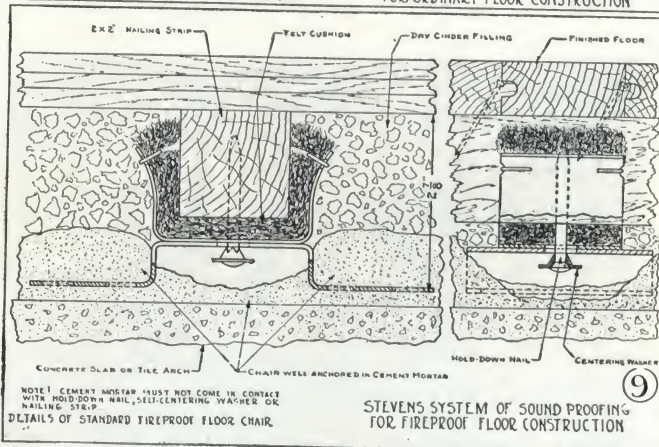
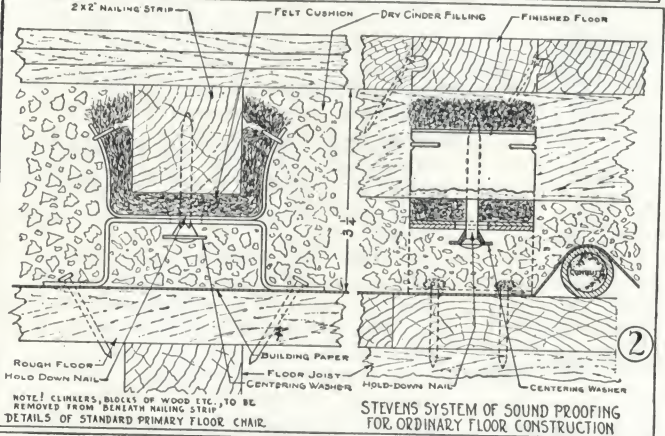
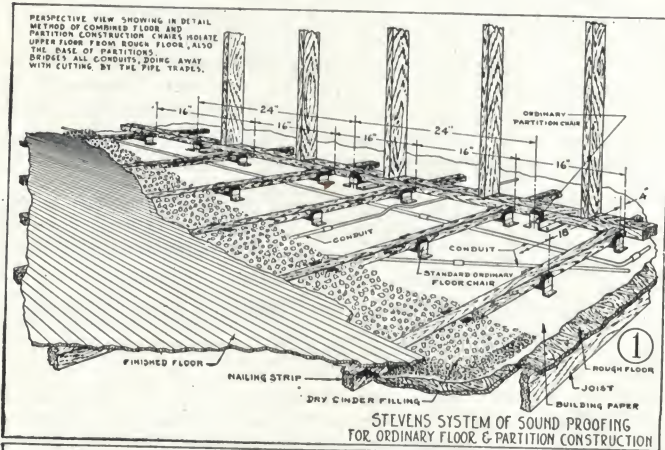
Orpheum Theatre, Pontiac, Mich.

Showing Stevens System of Sound-proofing under 10 bowling alleys above theatre used for drama



Drake Field House, Des Moines, Iowa

BURDETTE HIGGINS, Architect
PROUDFOOT, RAWSON & SOUERS, Associate Architect
Stevens System under gymnasium floor



Detailed Drawings, Stevens System of Floor Deadening

Detailed Drawings, Stevens System of Floor Deadening

Ordinary Construction: (1) Isolates upper floor from rough floor. Does away with all cutting by pipe trades. Eliminates all cutting of the floor plate; bridges all conduits. (2) Hold-down chairs for use where floors have a tendency to buckle, in center of rooms, etc.

Fireproof Construction: (1) Eliminates buckling of finished floors. Saves all cinder concrete fill. Conduits easily changed. Saves time. No waiting for the cinder concrete to dry. Hold-down chairs to prevent buckling floors.

MAURICE BLUMENTHAL & ASSOCIATES

Contracting Foundation Engineers

55 West 42nd Street

NEW YORK, N. Y.

Products and Services

We have the experience and organization necessary for the successful execution of difficult foundation work, specializing in:

STEEL TUBES TO ROCK, for foundations of new structures.

STEEL PILE UNDERPINNING, for underpinning existing structures to rock with steel tubes left in the ground.

Also Special Patented Concrete Piles to suit any soil conditions, concrete piers, etc.

Steel Tubes to Rock

Where foundations for new structures are to be driven in the open to rock we have developed our *steel tubes to rock* system.

This system possesses many advantages over the usual open cut methods. The chief of these are: greater speed in completing the job, saving in cost and working space required, greater flexibility.

Our wide experience in this class of construction is at your disposal both in furnishing preliminary suggestions and estimates and in the actual supervision and construction of the work.

Steel Pipe Underpinning

Some Advantages—Wherever it is necessary to underpin existing structures, such as heavy buildings, bridge piers, retaining walls, etc., due to settlement or the proximity of new construction, our steel pipe underpinning system will be found greatly superior to existing methods. This is especially true where rock is very deep, making it too costly and too dangerous to go down in open pits. Then again the speed with which the pipe can be driven as compared to the old method of excavating piers by hand, represents a great saving in time.

As compared to the use of compressed air caissons this method is much more flexible and far less expensive as it requires no compressor plant, air locks, etc.

Brief Description—In the Blumenthal method of steel pipe underpinning, the piles, consisting of sectional steel pipe filled with concrete, are sunk in the following manner.

A small pit is first dug and sheathed close to the wall of the structure to be underpinned. This pit is carried down until its bottom is several feet below the wall footing, then offset to get under the wall and continued far enough down to furnish a chamber having sufficient headroom to sink the sections of pipe.

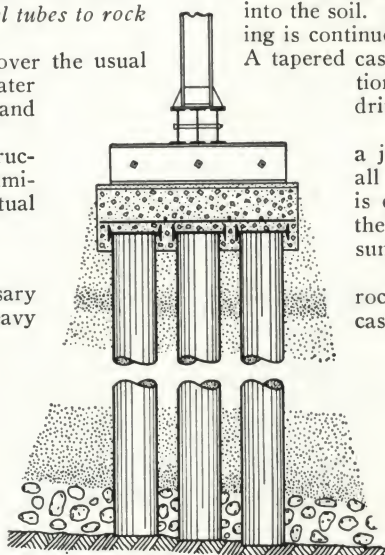
The first length of pipe is then placed immediately below the point to be underpinned, a hydraulic jack is inserted between pipe and wall footing and the tubing is forced down into the soil. By inserting various sized wedging blocks jacking is continued until the first length of pipe is driven flush. A tapered cast steel collar is then fitted into the driven section, a second length of pipe set in place and driving continued.

After the first length of pipe has been driven a jet hose is inserted and during the jacking of all subsequent sections, the sand within the tubing is constantly stirred up and removed along with the water through the suction hose, as the pipe is sunk into place.

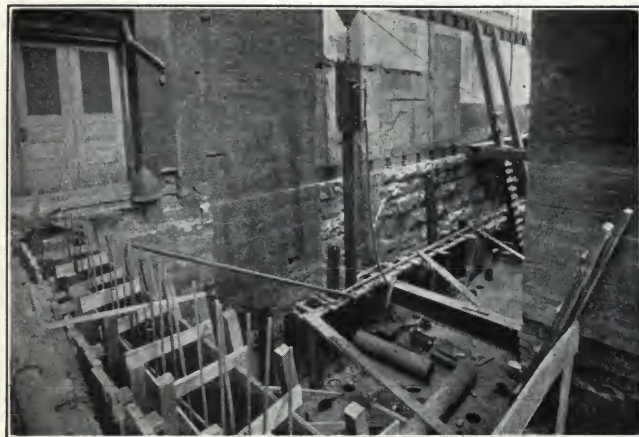
These operations continue until hard pan or rock is reached. The jack is then removed, the casing filled with concrete and after testing for straightness, load, etc., the finished pile is properly wedged up under the wall footing or grillage and the pit concreted and carefully grouted.

Where this method is used, the various piles to be driven can be placed in such a way as to provide distributed support to the structure during the entire process of underpinning.

In case where sufficient headroom is available, the hydraulic jack may be replaced with a drop hammer for driving.



Type of Difficult Foundation Work Executed by This Organization



Driving Steel Cylinders in the Open for Foundation of 30-story Empire Building, Pittsburgh, Pa.



Example of Steel Tube Underpinning Colonial Theater, New York, N. Y.

SIMPLEX CONCRETE PILE ASSOCIATION, INC.

27 William Street
NEW YORK, N. Y.

MEMBER COMPANIES

BOSTON, MASS., NEW ENGLAND FOUNDATION Co., 38 Chauncy Street	NEW YORK, N. Y., NEW ENGLAND FOUNDATION Co., 27 William Street
BUFFALO, N. Y., NEW ENGLAND FOUNDATION Co., 1335 Main Street	PHILADELPHIA, PA., SIMPLEX FOUNDATION Co., Wissinoming
CINCINNATI, OHIO, NOLTE CONSTRUCTION Co., Gerke Building	PITTSBURGH, PA., SIMPLEX PILE AND CAISSON Co., Keystone Building

Products and Services

SIMPLEX CONCRETE PILES: Cast-in-place, Pre-cast and Composite.

ENGINEERS and CONTRACTORS for CONCRETE CONSTRUCTION; ENGINEERS and CONTRACTORS for FOUNDATIONS for Chimneys, Tanks, Buildings, etc.; CAISSONS for CONCRETE CONSTRUCTION.

Also Steel Incased Concrete Piles.

We will submit recommendations, designs and estimates on receipt of necessary data, or will visit the site of prospective work at any time for purposes of investigation and consultation, and without obligation.

Specific Types of Piles for Specific Conditions

No one type of concrete pile has as yet been designed that will economically and successfully meet all conditions of soils and loadings. We have developed several methods of installing concrete piles enabling us to meet successfully every condition.

Simplex piles are of proven worth. They have been used extensively in the United States and Europe since 1903 for supporting buildings and other structures.

Advantages of Simplex Concrete Piles

Simplicity; easily and quickly installed	Durability equal to that of natural rock; renewals never required
Constant sectional area of 201 sq. in.; equal bulk of concrete for each foot of length	Greatest frictional surface
Certainty of results	Unsurpassed carrying power
Load transferred to firm bearing strata without reference to or dependence on poor soil above, although taking full advantage of it in addition to the end bearing value	Economy in time and cost over other types of foundations

Standard Simplex Cast-in-place Concrete Piles

Standard Simplex concrete piles are cast-in-place by driving to proper penetration a cylindrical steel driving form fitted at its lower end with a detachable cast iron base. The driving form is then filled with concrete to the necessary height and withdrawn, leaving the cast iron base in the ground with a column of concrete on top of it completely filling the hole to its compacted walls.

The concrete is placed before the removal of form.

In no case of Simplex pile construction has it been found that the back pressure of the earth was as great as the weight of the column of concrete in the pile.

Specifications—

General—Piles shall be made of concrete, cast-in-place, and shall be of the Standard Simplex type. Materials and workmanship shall in all respects comply with the requirements of the best engineering practice for such work. The contractor for piling shall furnish and install complete all piling shown on the drawings and called for in the specifications, and shall at all times co-operate with the other contractors doing work on the same project.

Driving Form—The driving form shall be of steel. It shall be cylindrical, and it shall be of sufficient thickness to withstand driving. Its outside diameter shall be the same as the diameter of the piles as shown on plans.

Base—Base shall be of Standard Simplex design and shall be made of cast iron. The joint between the driving form and the base shall, when necessary, be sealed to insure its being watertight.

Capacity—The piles are designed to carry a load of ... tons each.

Driving—Piles shall be driven by either a drop hammer, or a steam hammer, whichever in the contractor's opinion, is best suited to conditions. The depth to which the piles shall be driven shall be determined by the Engineering News Formula. Any pile driven to a penetration which gives the required capacity under the Engineering News Formula shall be considered to be a satisfactory pile, unless there is evidence to the contrary, or unless it has been agreed that some other means of determining the depth to which piles shall be driven is to be used.

Spacing—Piles shall be spaced a minimum of three feet (3 ft.) on centers, unless soil conditions permit of closer spacing.

Concrete—The concrete shall be mixed thoroughly and to proper consistency in the proportions as specified under general specifications for the work to be done, and shall be placed in such manner as not to disturb the proper distribution of the mixture.

Reinforcement—Reinforcement, if required, shall be placed within the tube after it has been driven to necessary penetration prior to the concrete being placed. Care shall be taken that no displacement of the reinforcement occurs.

Simplex Pre-cast Concrete Piles

Are used for foundations for docks, wharves, sea walls and other water work, and for foundations where the ground is unusually unsatisfactory. A form is driven to proper depth as in the standard system. A small amount of wet concrete is poured into the form. A pre-cast reinforced concrete pile is lowered through the form; the projecting ends of the reinforcement extend into the wet concrete. The form is then withdrawn, leaving the pre-cast pile in position. Thin grout poured into the form as it is withdrawn materially increases skin friction in some cases. This method admits of positive results as to penetration without striking a blow on the pre-cast pile and entirely avoids the questionable consequences of jetting.

Standard size is 13 in. octagonal section and 40 ft. in length, but can be installed in larger diameters and to greater depths.

Simplex Composite Piles

Economically meet soil conditions requiring great depth of penetration, where the permanent water line is considerably below the surface. A wood pile of required length and diameter is driven to proper depth, upon which is constructed a standard Simplex concrete pile. This method lends itself to the modifications of the standard system and readily admits the use of a pre-cast concrete pile on top of the wood pile.

MacARTHUR CONCRETE PILE CORPORATION

15 Beekman Street, NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 134 North La Salle Street
PITTSBURGH, PA., Union Trust Building
SAN FRANCISCO, CAL., 22 Battery Street

PHILADELPHIA, PA., 20 South 15th Street
NEW ORLEANS, LA., 325 North Cortez Street
BOSTON, MASS., 108 Massachusetts Avenue

CANADIAN MacARTHUR CONCRETE PILE CO., LTD., NEW BIRKS BUILDING, MONTREAL

Products

MacARTHUR CAST-IN-PLACE PILES, including:

Straight Shaft and Pedestal Piles of uncased compressed concrete—up to 40 ft. in length.

Composite Piles of Concrete and Timber with cased or uncased concrete section—100 ft. in length.

Composite Piles with uncased upper section of compressed concrete and lower pipe section of any length.

Cased Concrete Piles with Pedestal—up to 40 ft. in length.

Pipe Piles with Cast Steel Point—filled with concrete to any length.

Concrete Slabs for Gas Holders.

"A Special Pile for Every Condition—Not One Pile for All Conditions."

Over 16 Years of Service to Architects and Engineers

For over sixteen years this Company has been successfully solving foundation problems which have confronted architects and engineers in charge of the erection of large buildings. During this time we have had to overcome many difficulties connected with unexpected subsoil conditions. Our experience has led us to appreciate the fact that very few building sites have the same formation throughout, variations occurring in most unexpected ways. As a result, we have developed a series of piles suited to the different soil conditions, but the method of forming them is such that they can be placed with our standard equipment. In this way, there is no delay incidental to bringing in equipment for special piles as the equipment is already on the site, and the material we use is available locally.

Modern Steel Pile Driving Equipment at Central Locations

Our equipment includes the most improved type of steel drivers and pile forming apparatus built to withstand the severest working conditions without breakdowns and consequent delays.



MacArthur Piles Excavated for Inspection
Made under supervision of Supt. of Building Dept., Borough of Brooklyn, N. Y.



MacArthur Modern Steel Pile Driving Equipment on a Job

Frequently unexpected conditions have arisen necessitating the completion of the job at an earlier date than had been anticipated. In these circumstances, we have aided the architect or engineer, and owner, by working double shift or by placing additional pile drivers on the site. This is always possible, as our equipment is held at strategically located points so as to be available for new work or emergencies which may arise in the performance of work already started.

Compressed Concrete Increases Bearing Power

The concrete in MacArthur Piles is mixed with just enough water to hydrate it and this is compacted into the soil under a pressure of 70 to 80 lb. per sq. in.

This compressed concrete is much denser than the surrounding soil and can not be distorted or forced out of place through the driving of adjacent piles, as might be the case with a wet uncompacted concrete even if protected by a thin metallic casing.

Hundreds of piles formed on 2-ft. 6-in. centers in the toughest and most rubbery of clays have been found to be absolutely perfect when excavated.

30 to 40 Tons Safely Carried on MacArthur Piles

Under the supervision and severe examinations of some of the foremost architects and engineers, it has been proven that 30 to 40 tons (depending on the nature of the soil) may be safely placed on MacArthur Piles.

A special feature of MacArthur Pedestal and Composite Piles, is the fact that they will withstand a considerable uplift. They have successfully withstood pulling strains up to 45 tons, when properly reinforced.

This feature proves very valuable when the piles are used as anchors to resist the effect of wind pressure, hydrostatic head or cantilever action on the pile footing.



Nine MacArthur Pile Drivers Quickly Finished This Foundation
A large public utility plant, where every day saved counted heavily

Specifications for the "MacArthur Method" of Placing Concrete Piles

No matter if the bearing stratum is as deep as 100 ft., the MacArthur Method will give you a pile with a safe load of 30 tons.

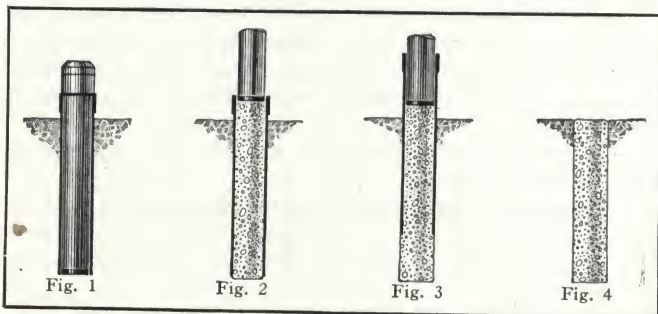
By specifying any type of "MacArthur" Pile by name the placing of the most suitable pile for the soil is assured, but should the use of a trade name not be desirable, the following alternate specifications (a) (b) (c) or (d) may be substituted.

Specification (a)

The concrete piles shall be cylindrical and formed of concrete having not more than a 1-in. slump, which has been compacted under a pressure of at least 70 lb. to the square inch. The pile form in which the concrete is placed shall previously have been driven to carry the required load, as indicated by the Engineering News Formula.

Specification (b)

Specification for Straight Shaft Piles—Piles shall consist of a cylindrical shaft of compressed concrete formed as follows: By driving a steel casing of [14] [15] [16] inches in diameter and close fitting core into the ground by means of a steamhammer until it indicates the required carrying capacity under the Engineering News Formula. The core shall then be withdrawn and the casing filled with concrete having a 1-in. slump. As the casing is withdrawn the full weight of the core and hammer shall rest on the concrete to compact it and force it into the soil.



Compressed Concrete Straight Shaft Type

Fig. 1. Core and casing driven into ground.
Fig. 2. Core removed and casing filled with concrete a sufficient amount above grade to take care of compression. The 7-ton weight of the core and hammer is then placed on the concrete.
Fig. 3. The casing is steadily withdrawn from the ground—the 7-ton weight of the core and steamhammer remaining constantly on the concrete and forcing it into the space occupied by the casing and any voids in the ground.
Fig. 4. The finished cylindrical shaft—a solid homogeneous mass of compressed concrete.

Specification (c)

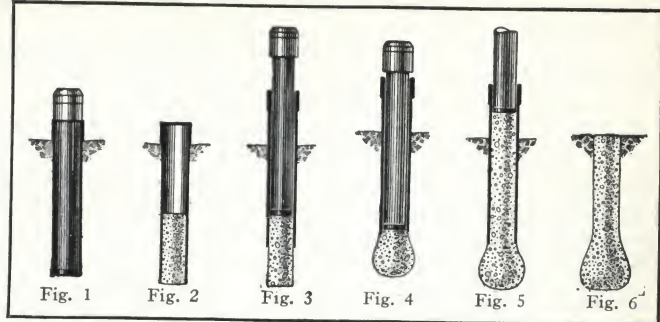
Specification for Pedestal Piles—Pedestal piles shall consist of a cylindrical shaft of compressed concrete with an enlarged base formed as follows: By driving a steel casing of [14] [16] [18] inches in diameter and close fitting core into the ground by means of a steamhammer to desired depth.

The core shall then be withdrawn and a suitable charge of concrete placed in casing. The casing shall then be pulled up 18 in. to 3 ft. (depending on soil conditions).

The core shall then be replaced in casing and charge of concrete hammered out until about 6 in. remain in casing.

Note: If the ground is very soft it may be necessary to use a second charge. In no instance shall concrete be compressed so that less than 6 in. of concrete is in the casing.

The core shall then be withdrawn and the casing filled with concrete (having a 1-in. slump) to a height above required elevation of top of finished pile. Core shall then be replaced and the casing withdrawn. Full weight of core and hammer shall rest on the concrete while casing is being withdrawn.



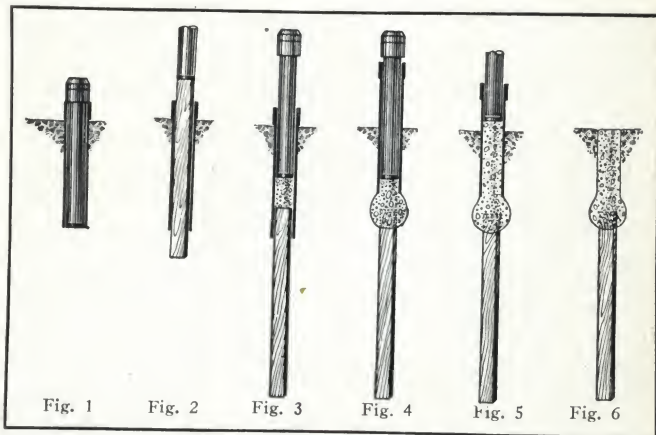
Compressed Concrete Pedestal Type

Fig. 1. Core and casing driven into ground.
Fig. 2. Core removed, charge of concrete dropped to bottom of casing.
Fig. 3. Casing pulled up 18 in. to 3 ft. with 7-ton pressure of core and steamhammer remaining on concrete.
Fig. 4. Charge of concrete rammed out.
Fig. 5. Core is removed, casing filled with concrete. Core replaced and casing steadily withdrawn while concrete is under 7-ton pressure.
6. Finished shaft with enlarged base

Specification (d)

Specification for Composite Piles—Composite piles shall consist of a lower section of standard weight pipe closed at the lower end with a metal point and filled with concrete, or of a square timber, the upper section being of compressed concrete. The two sections shall be connected by a pedestal of hammered concrete. The completed pile shall have a safe working load of not less than 30 tons, and be formed as follows:

By driving the core and casing below water level. The lower section of pipe or timber shall be driven through the casing, giving perfect alignment until the necessary bearing is indicated under the Engineering News Formula. A charge of concrete shall then be hammered out to form a pedestal joint around the top of the lower section with a standard compressed concrete shaft to complete the pile.



Composite Type (Concrete and Wood Pile)

Fig. 1. Core and casing driven into ground.
Fig. 2. Core withdrawn and square timber placed in casing.
Fig. 3. Timber guided by casing, driven down to give necessary bearing. Butt of timber below ground water level. Core withdrawn.
Fig. 4. Casing raised necessary distance, pedestal joint formed batch of concrete deposited in casing on top of timber and core replaced around top of timber insuring perfect juncture between timber and concrete.
Fig. 5. Core withdrawn, sufficient concrete deposited to provide for voids and space occupied by casing. Casing then steadily withdrawn with 7-ton pressure remaining constantly on the concrete.
Fig. 6. Finished shaft well knitted and bonded to soil

A Few of the Prominent Concerns Who Have Used the "MacArthur Method"

Bartlett-Hayward Co., Baltimore, Md.
Wilputte Coke Oven Corp., New York, N. Y.
William Higginson, New York, N. Y.
John Ebersson, Chicago, Ill.
D. X. Murphy & Bro., Louisville, Ky.
B. H. Davis, New York, N. Y.
A. Burton Cohen, New York, N. Y.
William B. Ittner, St. Louis, Mo.
James Riely Gordon, New York, N. Y.
Paul A. Davis, 3rd & Dunlap, Philadelphia, Pa.
Russell G. Cory, New York, N. Y.
Ford, Bacon & Davis, New York, N. Y.
Fletcher-Thompson, Inc., Bridgeport, Conn.

Westcott & Mapes, New Haven, Conn.
Jenks & Ballou, Providence, R. I.
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio
Irwin T. Catherine, Philadelphia, Pa.
Bernard H. Prack, Pittsburgh, Pa.
Frank D. Chase, Chicago, Ill.
Peuckert & Wunder, Philadelphia, Pa.
Charles F. Sanders (County Engineer), Reading, Pa.
J. W. Knight & Co., St. Louis, Mo.
W. F. Brooks, Hartford, Conn.
Brooklyn Union Gas Co., Brooklyn, N. Y.
Stevens & Wood, New York, N. Y.
General Engineering & Management Corp., New York, N. Y.

RAYMOND CONCRETE PILE COMPANY

Concrete Piles and Special Concrete Work

140 Cedar Street
NEW YORK, N. Y.

111 West Monroe Street
CHICAGO, ILL.

BRANCH OFFICES

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BALTIMORE, MD., 921 Munsey Building
BOSTON, MASS., 957 Park Square Building,
31 St. James Avenue
CLEVELAND, OHIO, 503 Union Building
DETROIT, MICH., 406 Empire Building

HOUSTON, TEX., 1014 Keystone Building
KANSAS CITY, MO., 616 Huntzinger Building
LOS ANGELES, CAL., 1307 Washington
Building
NORFOLK, VA., 1007 Royster Building
PITTSBURGH, PA., 701 Union Bank Building

PHILADELPHIA, PA., 1423 Locust Street
PORTLAND, ORE., 463 Kerby Street
ST. LOUIS, MO., 2153 Railway Exchange
Building
MILWAUKEE, WIS., Majestic Building
ST. PAUL, MINN., Builders Exchange
MONTREAL, CANADA

RAYMOND CONCRETE PILE CO., LTD., 822 New Birks Building,

Products

RAYMOND STANDARD CAST-IN-PLACE CONCRETE PILES.

RAYMOND COMPOSITE (WOOD-CONCRETE) PILES.

RAYMOND PRE-CAST PILES: Bearing and Sheet.
CONCRETE WORK of a Special Nature.

Slogan

*A form for every pile—
A pile for every purpose.*

Concrete Piles vs. Wood Piles

There are certain fundamental advantages that concrete piles have over the use of wood piles. Wood piles must be driven so that the cut-off is below permanent water line, whereas concrete piles may be cut off at any level, irrespective of the permanent water line. Wood piles are often broomed or broken while being driven, thus reducing, if not eliminating their supporting power, whereas the Raymond type of concrete pile is not subject to distortion in driving.

In marine work, wood piles most frequently are creosoted for protection against marine borers, whereas concrete piles are not subject to such destruction. Wood piles very often require considerable shoring, underpinning, sheeting, pumping and deep excavation, whereas this can usually be eliminated partially, if not entirely, by the use of concrete piles. Furthermore, there is an important saving in time by the use of concrete piles, as the footings can be placed immediately after the concrete pile has been driven.

Classification of Concrete Piles

Concrete Piles are of two distinct types:

- (1) Concrete piles, which are made in place, commonly referred to as "cast-in-place" concrete piles.
- (2) Concrete piles which are cast in moulds and then driven like wooden piles and are referred to as "pre-cast" concrete piles.

Cast-in-place piles are divided into two classes:

- (a) Those in which a form is left in the ground to preserve the integrity of the finished pile.
- (b) Those in which the concrete is placed by means of a temporary driving form which is removed before the concrete hardens and leaves the pile confined only by the loose earth. The green concrete is then, obviously, subject to the admixture of foreign materials, excess of water and distortion due to strains set up by soil pressures and the driving of adjacent piles.

Pre-cast concrete piles are those which are cast in a mould and then driven like a wooden pile and are referred to frequently as "pre-cast concrete piles."

The Raymond Method

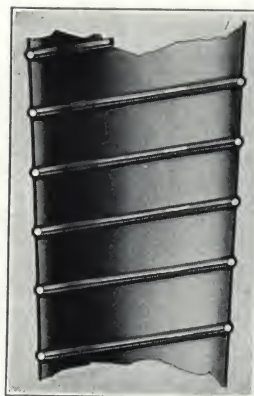
A collapsible steel core, usually 8-in. diam. at the point and increasing in diameter at the rate of 0.4 in. per lin. ft. of length, is incased by a spirally reinforced steel metal shell. The core, thus incased, is driven to a proper penetration in accordance with the *Engineering News* formula. It is then collapsed and withdrawn from the shell, the shell remaining in the ground and maintaining the resistance encountered in the driving. The shell is then inspected and if found perfect from tip to top is filled with concrete, making a perfect concrete pile.

Under certain conditions we use a core with a larger diameter at the point.

Loads and Spacing—Usually Raymond concrete piles are driven to carry a working load of 30 tons each, but in some cases, loads of from 35 to 40 tons are safely carried.

A working load of 30 tons per pile is accepted by all building departments. The usual spacing of Raymond concrete piles is 2 ft. 6-in. centers for piles less than 30 ft. in length, and for piles in excess of 30 ft. in length, a spacing of 3-ft. centers is more desirable. In view of the very wide variation in soil conditions and other difficulties surrounding a job, it is suggested that the nearest Raymond office be conferred with, so that the site can be investigated and recommendations made.

Sizes and Weight of Material—The standard Raymond concrete pile is installed by the use of a pile core 8-in. diam. at the point and increasing in diameter 0.4 in. per lin. ft. of length. For instance, a pile 20 ft. in length would be 16-in. diam. at the top, while one 37 ft. long would have a top diameter of 22.8 in.



Section of Spiral
Shell



Looking Down Into a Driven
Shell—30-ft. Long

The present limit in length of a standard Raymond concrete pile is 37 ft. 6 in. Where conditions are such as to require piles of greater length, we call attention particularly to the Raymond composite pile, a description of which will be found on the next page.

Working Loads—In calculating the resistance to penetration, the *Engineering News* formula, based on using a steam hammer, has been found most satisfactory. This formula follows:

$$L = \frac{2WH}{S + 0.1} \begin{cases} L = \text{Load in pounds} \\ W = \text{Weight of falling parts in pounds} \\ H = \text{Drop in feet of falling parts} \\ S = \text{Final penetration per blow in inches} \end{cases}$$

A No. 1 steam hammer has a weight of 5000 lb. falling 36 inches.

A No. 2 steam hammer has a weight of 3000 lb. falling 30 inches.

Thus the carrying capacity of the Raymond concrete pile is not a matter of guesswork or speculation, but is susceptible of computation and demonstration.

Advantages of Taper—The Raymond concrete pile possesses an extreme taper and offers a maximum resistance for a given length. This has been proved by a comprehensive record of resistance encountered in driving plus an extensive series of loading tests, during which the real carrying power of the pile has been checked with the driving resistance.

Prices—The Raymond concrete pile is "made-in place" and not sold by the foot, f. o. b. cars, consequently it is impossible to quote prices without knowing the conditions under which the work is to be done. For even approximate prices, it is necessary to have some knowledge of the number of piles, probable length, the approximate spacing, soil conditions, accessibility of the site, etc.

Points of Superiority of Raymond Concrete Piles—

(1) Absolute permanency: immunity from decay or from the attacks of wood borers and destroyers.

(2) Economy, because of greater carrying capacity—meaning a less number of piles for a given load. The greater carrying capacity rests upon several points—to wit:

(a) Greater size, therefore greater displacement and frictional area.

(b) Greater taper, therefore greater frictional value per square foot.

(c) Perfect shape, therefore perfect contact with the ground at every point.

(d) Possibility of inspection after driving, hence the ability to load to full capacity, instead of making a large allowance for inefficiency as in the case of wood piles subject to injury by overdriving, telescoping, departing from the vertical, and like defects, none of which are discernible at the moment when correction is possible.

(e) Decreased length of pile as a natural consequence of greater size and taper.

(3) Smaller and lighter footings, because of decreased number of piles.

(4) Decrease in total load to be carried, because of decreased weight of footings.

(5) Practical elimination of shoring, underpinning, sheeting, pumping and deep excavation and the reduction of masonry.

(6) Due to decreased number of piles and consequent reduction in width of wall footings, the center line of columns can be brought nearer to the building line.

(7) Important saving in time caused by:

(a) The smaller number of piles required.

(b) The reduction in the amount of excavation, shoring, sheeting and pumping.

(c) The reduction in quantities of footing or masonry.

(d) Manufacture of the pile in place, from materials readily procurable in all localities, and limit of manufacture to the actual number and exact length of piles required. There is no delay for cutting and trimming trees, hauling to shipping point, transporting for great distances by rail or water and delivery to the job, perhaps only to find that the piles are too long or too short.

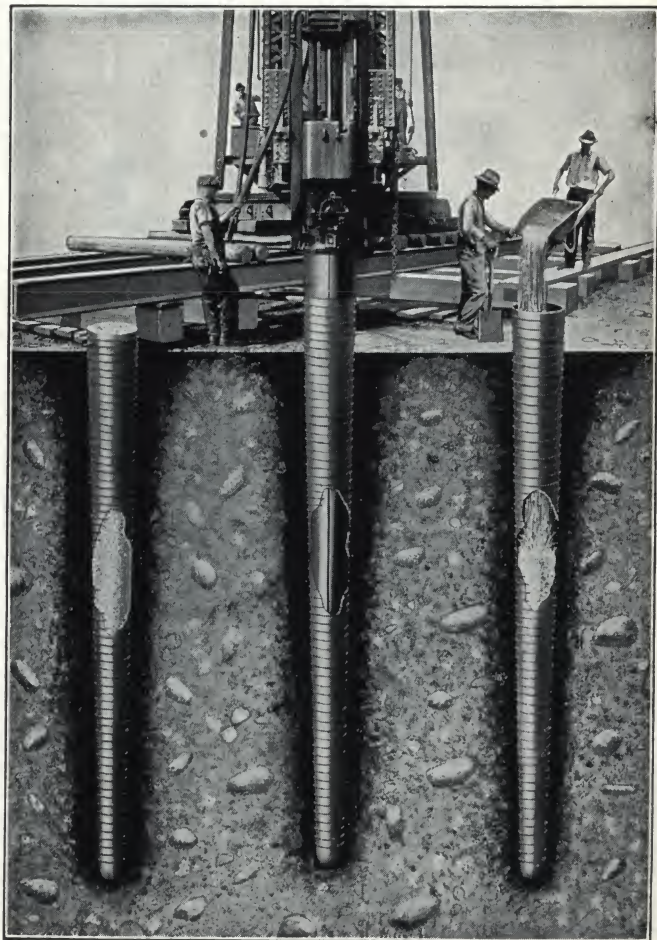
Specification—If "Raymond concrete piles" are called for, this is of course sufficient. On the other hand, if it is for any reason inadvisable to name them specifically the following specifications will cover:

"Concrete piles shall be of a type specifically approved by the architect or engineer, and shall be placed in the following manner:

"A collapsible steel mandrel or pile core 8 in. in diameter at the small end and 20 in. in diameter 30 ft. from that point shall be incased in a spirally reinforced steel shell and driven to a proper penetration. The pile core shall then be collapsed and withdrawn from the shell. Before placing the concrete, each shell shall be inspected and, being found perfect, shall thereupon be filled with concrete placed in accordance with the best practice."

or

"Moulded-in-place piles shall be of a type suitable for the conditions and subject to the approval of the architect or engineer. They shall be formed in casings left in place, which shall be of sufficient strength to prevent distortion or bulging after mandrel has been withdrawn and while the cavity is being filled with concrete or during the driving of adjacent casings."



Essential Steps in the Making of a Raymond Concrete Pile

More About the Raymond "Cast-in-place" Pile

The Raymond pile is the only concrete pile employing the spirally reinforced driven casing as a permanent form to remain in the ground. This feature is essential for perfect dependable results. The province of the form or shell is manifold:

- (1) To serve as a form for the piles.
- (2) To prevent the admixture of foreign substances.
- (3) To retain the original moisture in the mixture until the concrete is thoroughly hardened.
- (4) To prevent distortion by external pressure, due to the driving of adjacent piles or accumulated pressures from displacement by the pile itself.
- (5) To perfectly retain the displaced earth forming the walls of the cavity, so that there may be no relaxation of the ground and therefore no loss of resistance when the displacing force (the core) is removed.
- (6) To act as reinforcement of the pile until the concrete shall have attained its maximum strength.

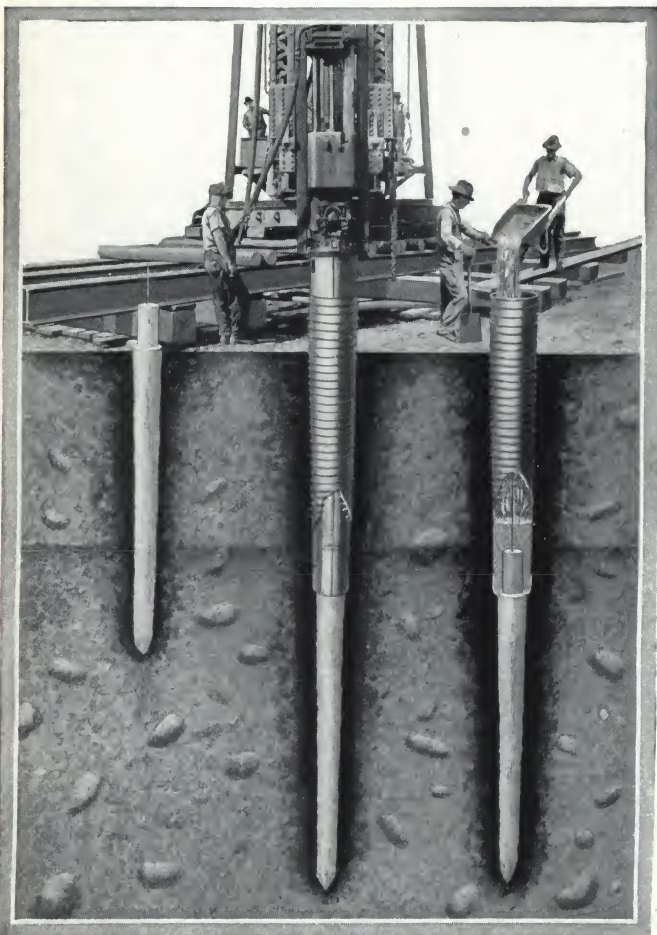
Raymond Composite Piles

For use where depths greater than 37 ft. 6 in. are encountered, we have developed a composite pile made up by superimposing a Raymond concrete section on a previously driven wooden pile.

The wood pile is ultimately driven so that its top is below the permanent water level and from that point to the bottom of the footing is a standard Raymond Concrete pile, as fully illustrated below.

Pre-cast Piles

Pre-cast piles have a large and useful field, particularly in marine structures, such as docks, bulkheads, etc.



Raymond Composite Pile

The RAYMOND CONCRETE PILE COMPANY is prepared, through its experience, to give good advice upon the use of "pre-cast piles," and also to design and construct work in which a pre-cast pile can be used economically and advantageously.

Special Concrete Construction

In addition to the placing of standard Raymond concrete piles for foundation of structures on land, we construct and design permanent docks, piers, bulkheads, trestles, storage bins, retaining walls, bridges, heavy foundation, shipways, drydocks, etc.

Each problem requires special study for solution and our experienced organization is yours to command.

Services and Facilities

Our staff of experts is at your service, to assist in the designing and installation of concrete piles for all purposes and to meet all conditions.

Engineering—Our engineering department is available to architects and engineers at all times for investigation work and consultation, and we will gladly submit recommendations, designs and estimates covering any problem within the scope of our business.

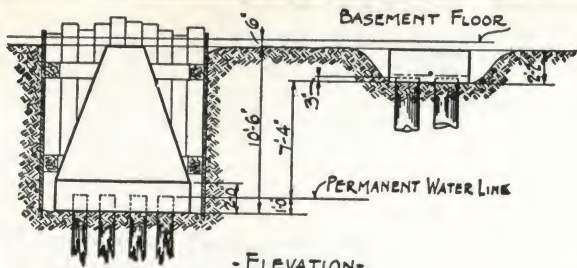
Equipment—Every Raymond driver is built of structural steel, scientifically designed for the most rapid and economical construction, and the major portion of our equipment is built in our own machineshops.

References

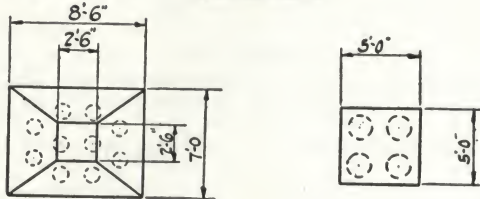
Since 1901 when the first Raymond concrete pile was placed, we have placed up to December, 1926, more than 24,000,000 ft. of Raymond concrete piles throughout the United States, covered by over 2000 separate and individual contracts. We will be only too glad to have you refer to any of the many engineers, architects, owners, and general contractors with whom we have been associated.

A partial list follows:

McKenzie, Voorhees & Gmelin, New York, N. Y.
 Helmle & Corbett, New York, N. Y.
 Ballinger Co., New York, N. Y.
 James Gamble Rogers, New York, N. Y.
 Ernest Flagg, New York, N. Y.
 William Higginson, New York, N. Y.
 C. B. J. Snyder, New York, N. Y.
 Maynicke & Franke, New York, N. Y.
 Warren & Wetmore, New York, N. Y.
 Cross & Cross, New York, N. Y.
 Palmer, Hornbostel & Jones, New York, N. Y.
 Trowbridge & Livingston, New York, N. Y.
 Lockwood, Greene & Co., Chicago, Ill.
 Jarvis Hunt, Chicago, Ill.
 George C. Nimmons & Co., Chicago, Ill.
 Mundie & Jensen, Chicago, Ill.
 Pond & Pond, Chicago, Ill.
 Perkins, Fellows & Hamilton, Chicago, Ill.
 C. W. & George L. Rapp, Chicago, Ill.
 Mauran, Russell & Crowell, St. Louis, Mo.
 Albert B. Graves, St. Louis, Mo.
 Eames & Young, St. Louis, Mo.
 Clyde N. Friz, Baltimore, Md.
 Owens & Sisco, Baltimore, Md.
 Albert W. Kelsey & Paul P. Cret, Philadelphia, Pa.
 Harris & Richards, Philadelphia, Pa.
 Smith, Hinchman & Grylls, Detroit, Mich.
 Albert Kahn, Detroit, Mich.
 Richards, McCarty & Bulford, Columbus, Ohio
 D. A. Bohlen & Son, Indianapolis, Ind.
 Proudfoot, Bird & Rawson, Des Moines, Iowa
 Gaggin & Gaggin, Syracuse, N. Y.
 Supervising Architect, U. S. Treasury, Washington, D. C.
 D. X. Murphy & Bros., Louisville, Ky.
 Smith, Rea & Lovett, Kansas City, Mo.
 T. R. Kimball, Omaha, Neb.
 Esenwein & Johnson, Buffalo, N. Y.
 Walker & Weeks, Cleveland, Ohio
 Alden & Harlow, Pittsburgh, Pa.



-ELEVATION-



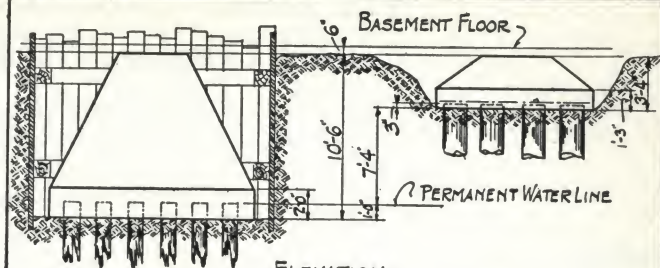
-PLAN-

- FOR COLUMN LOAD OF 116 TONS -

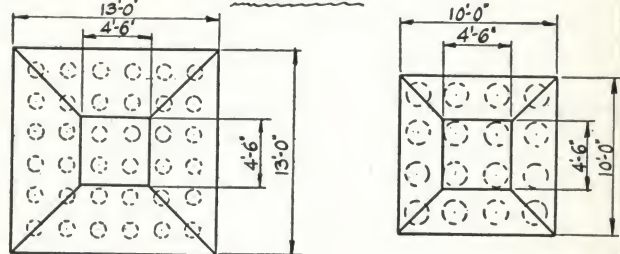
WOOD PILE LOAD - 15 TONS -

CONCRETE PILE LOAD - 30 TONS -

QUANTITIES -	WOOD	CONCRETE
NO OF PILES	10.	4.
CONCRETE	15. Cu. Yds.	2.01 Cu. Yds.
STEEL	0	121. Lbs.
FORMS	237. Sq. Ft.	44. Sq. Ft.
EXCAVATION	36. Cu. Yds.	3.94 Cu. Yds.
SHEETING	39 LIN. FT. 12 FT. DEEP	0



-ELEVATION-



-PLAN-

- FOR COLUMN LOAD OF 461 TONS -

WOOD PILE LOAD - 15 TONS -

CONCRETE PILE LOAD - 30 TONS -

QUANTITIES -	WOOD	CONCRETE
NO OF PILES	36.	16
CONCRETE	38.5 Cu. Yds.	8.9 Cu. Yds.
STEEL	0.	1230. Lbs.
FORMS	419. Sq. Ft.	150. Sq. Ft.
EXCAVATION	87.5 Cu. Yds.	22. Cu. Yds.
SHEETING	60 LIN. FT. 12 FT. DEEP	0.

~ WOOD PILES VS CONCRETE PILES ~



1



2



3



4



5



6



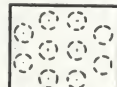
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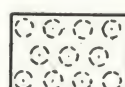
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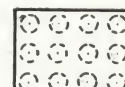
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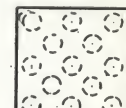
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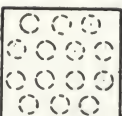
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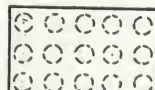
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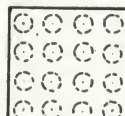
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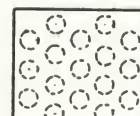
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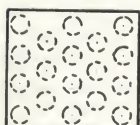
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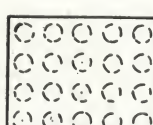
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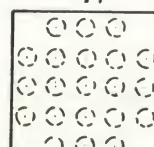
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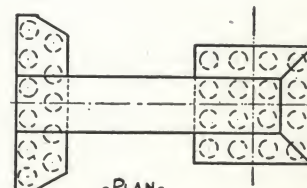
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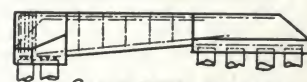
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-PLAN-



-CANTILEVER - ELEVATION-

~ TYPICAL PILE FOOTINGS ~

WESTERN FOUNDATION COMPANY

Engineers and Contractors

30 North La Salle Street
CHICAGO, ILL.

Products

FOUNDATIONS of all types.
PILES.
CAISSONS.

Foundations of All Types

Where the soil conditions are such as to require special foundations the WESTERN FOUNDATION COMPANY finds its field of activity. We are prepared to discuss with architects and engineers any standard type of foundations, i.e., concrete piles, composite piles, caissons, steel pipe piles, wood piles and steel and wood sheeting.

Our Service

Being prepared to execute any type of foundation work, we are enabled to install not one particular type of foundation on a given job but the most economical type for the soil conditions. It sometimes happens that on a single job several types of foundations are desirable. In one recent job, there were piers, open caissons, blown-out steel pipes, compressed concrete piles, composite piles and wood piles, all of these being carried to rock, which in one part of the building was above the water line and in another part below the water line.

Being prepared to execute various types of foundations, we are also in a position to discuss with architects and engineers the cost of various types. Our engineers have had many years of experience in foundation work. We are very glad to have them call upon architects and discuss with them their foundation problems when they are studying a job and making preliminary cost estimates, so that the most economical type of foundation can be determined and the plans prepared accordingly.

Our Concrete Piles

Experience has shown that satisfactory results with concrete piles cannot be obtained by using the same type of pile for all soil conditions. In some cases the compressed type of pile is the most satisfactory. In other cases the soil is such that it is desirable to protect the concrete with a metal casing. In some other soils it is desirable to make a pile with an enlarged base so that the load may be carried through a soft stratum on to a firm stratum. Again the load conditions may be such that a pile of small diameter will be entirely satisfactory, or the load may be so great that it is necessary to have a pile of large diameter in order to keep the stresses in the concrete within safe limits.

All of these varying conditions can be and have been taken care of by us in an economical and satisfactory manner.

Who Is The Western Foundation Company and What Do They Do?

The WESTERN FOUNDATION COMPANY is a new company, having been incorporated in 1924. It is made up of men who have had many years of experience in foundation and structural work—consequently the plant and equipment is thoroughly modern and has many new

features. Our first job was started in October, 1924. We have had work for the following to whom we would refer any one that may be interested:

Architects

Alfred S. Alschuler, 28 East Jackson Boulevard, Chicago, Ill.
John Archibald Armstrong, 127 No. Dearborn Street, Chicago, Ill.
Bennett, Parsons & Frost, 80 E. Jackson Boulevard, Chicago, Ill.
Condron & Post, 53 W. Jackson Boulevard, Chicago, Ill.—2 jobs
Folz & Brand, 510 No. Dearborn Street, Chicago, Ill.
Graham, Anderson, Probst & White, 80 E. Jackson Boulevard, Chicago, Ill.—2 jobs
Harry Hake, 2400 Gilbert Avenue, Cincinnati, Ohio
Holabird & Roche, 104 So. Michigan Avenue, Chicago, Ill.
Albert Kahn, Marquette Building, Detroit, Mich.
Kirchoff & Rose, 210 Sycamore Street, Milwaukee, Wis.
M. J. Morehouse, 343 So. Dearborn Street, Chicago, Ill.
Smith, Hinchman & Grylls, Marquette Building, Detroit, Mich.
Thielbar & Fugard, 219 E. Superior Street, Chicago, Ill.

Contractors

Austin Co., W. 60th and So. 48th Street, Chicago, Ill.
Avery Brundage, 110 So. Dearborn Street, Chicago, Ill.—3 jobs
William Baehr Organization, 232 So. Clark Street, Chicago, Ill.
Carmichael Construction Co., Akron, Ohio
Contracting & Materials Co., 42 E. Pearson Street, Chicago, Ill.
Ferro Concrete Construction Co., Third and Elm Streets, Cincinnati, Ohio
John Griffiths, Builders Building, Chicago, Ill.—2 jobs
Hegeman-Harris Co., Tribune Building, Chicago, Ill.
J. H. Johnson, 612 No. Michigan Avenue, Chicago, Ill.
Kelly-Atkinson Construction Co., 189 W. Madison Street, Chicago, Ill.—2 jobs
M. A. Long Co., 332 So. La Salle Street, Chicago, Ill.
MacDonald Engineering Co., 53 W. Jackson Boulevard, Chicago, Ill.—4 jobs
Mutual Construction Co., 2532 Warren Avenue, Chicago, Ill.
South Parks Board, Linn White, Chief Engineer, 57th and Cottage Grove Avenue, Chicago, Ill.—11 jobs
Turner Construction Co., 6 No. Michigan Avenue, Chicago, Ill.
R. C. Wieboldt Co., 1534 Van Buren Street, Chicago, Ill.—3 jobs

Owners

Alpha Portland Cement Co., Easton, Pa.
Battle Creek Gas Co., Battle Creek, Mich.—2 jobs
Battle Creek Sanitarium, Battle Creek, Mich.
Sanitary District of Chicago, 910 So. Michigan Avenue, Chicago, Ill.
Eckhart Milling Co., 1320 Carroll Avenue, Chicago, Ill.
Evansville Portland Cement Co., Catasauqua, Pa.
Ford Motor Co., Detroit, Mich.—2 jobs
W. H. Holliday Co., Indianapolis, Ind.—2 jobs
International Portland Cement Co., New York, N. Y.
May Company Department Store, Akron, Ohio
Michigan Bell Telephone Co., Flint, Mich.
National Biscuit Co., 110 No. Morgan Avenue, Chicago, Ill.
North Shore Coke & Chemical Co., Waukegan, Ill.
Pittsburgh Plate Glass Co., Oregon and Barclay Streets, Milwaukee, Wis.
Union Stock Yards Co., Cincinnati, Ohio

We would call particular attention to the fact that, although we have been operating less than three years, we have had many repeat orders. Notice the number of jobs we have had with the same owners, architects and contractors.

In many cases, after we have had one job, we have been given the second and succeeding jobs without competition. This can mean but one thing—satisfaction.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

33 West Grand Avenue
CHICAGO, ILL.

ATLANTA, GA.
BIRMINGHAM, ALA.
BOSTON, MASS.
CHICAGO, ILL.
COLUMBUS, OHIO
DALLAS, TEX.

DENVER, COLO.
DES MOINES, IOWA
DETROIT, MICH.
HELENA, MONT.
INDIANAPOLIS, IND.
JACKSONVILLE, FLA.
VANCOUVER, B. C.

DISTRICT OFFICES

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LINCOLN, NEB.
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PITTSBURGH, PA.

PORTLAND, ORE.
RICHMOND, VA.
ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN FRANCISCO, CAL.
SEATTLE, WASH.
WASHINGTON, D. C.

Purpose

The Portland Cement Association is a national organization to improve and extend the uses of concrete.

This phrase states in formal language the purpose of the PORTLAND CEMENT ASSOCIATION. It is a service organization, supported by the manufacturers of portland cement, for the benefit of users and prospective users of concrete.

In November, 1927, the Association will complete twenty-five years of existence. Since 1915, its service has been available on a truly national scale.

Concrete is a basic material in nearly every form

of construction. Research has developed the laws which control the strength of concrete, as well as other important characteristics. Inventive craftsmanship has developed applications of concrete for artistic decoration which were unknown a few years ago. An attempt has been made to convey brief and somewhat general information about these fundamental laws and new applications in the four pages following.

It is impossible in this limited space to present all of the information that may be desired. Inquiries for more complete data are invited, and may be addressed to the nearest district office in the list given on this page.



STANDARD SPECIFICATIONS FOR PORTLAND CEMENT

A.S.T.M. Serial Designation: C 9-26

Definition

(1) Portland cement is the product obtained by finely pulverizing clinker produced by calcining to incipient fusion an intimate and properly proportioned mixture of argillaceous and calcareous materials, with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

I. Chemical Properties

- (2) The following limits shall not be exceeded:
- | | |
|---|------|
| Loss on ignition, per cent..... | 4.00 |
| Insoluble residue, per cent..... | 0.85 |
| Sulphuric anhydride (SO ₃), per cent..... | 2.00 |
| Magnesia (MgO), per cent..... | 5.00 |

II. Physical Properties

(3) The residue on a standard No. 200 sieve shall not exceed 22 per cent by weight.

(4) A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking, or disintegration in the steam test for soundness.

(5) The cement shall not develop initial set in less than 45 minutes when the Vicat needle is used or 60 minutes when the Gillmore needle is used. Final set shall be attained within 10 hours.

(6) The average tensile strength in pounds per square inch of not less than three standard mortar briquets (see Section 47) composed of one part of cement and three parts of standard sand, by weight, shall be equal to or higher than the following:

Age at test, days	Storage of briquets	Tensile strength, lb. per sq. in.
7	1 day in moist air, 6 days in water	225
28	1 day in moist air, 27 days in water	325

(7) The average tensile strength of standard mortar at 28 days shall be higher than the strength at 7 days.

III. Packing, Marking and Storage

(8) The cement shall be delivered in packages as specified with the brand and name of the manufacturer plainly marked thereon, unless shipped in bulk. When shipped in bulk, this information shall be contained in the shipping advices accom-

panying the shipment. A bag shall contain 94 lb. net. A barrel shall contain 376 lb. net. All packages shall be in good condition at the time of inspection.

(9) The cement shall be stored in such a manner as to permit easy access for proper inspection and identification of each shipment, and in a suitable weather-tight building which will protect the cement from dampness.

IV. Inspection

(10) Every facility shall be provided the purchaser for careful sampling and inspection at either the mill or at the site of the work, as may be specified by the purchaser. At least 12 days from the time of sampling shall be allowed for the completion of the 7-day test, and at least 33 days shall be allowed for the completion of the 28-day test. The cement shall be tested in accordance with the methods hereinafter prescribed. The 28-day test need not be made if waived by the purchaser.

V. Rejection

(11) The cement may be rejected if it fails to meet any of the requirements of these specifications.

(12) Cement remaining in storage prior to shipment for a period greater than 6 months after test shall be retested and shall be rejected if it fails to meet any of the requirements of these specifications.

(13) Cement shall not be rejected on account of failure to meet the fineness requirements if upon retest after drying at 100° C. for one hour it meets this requirement.

(14) Cement failing to meet the test for soundness in steam may be accepted if it passes a retest using a new sample at any time within 28 days thereafter. The provisional acceptance of the cement at the mill shall not deprive the purchaser of the right of rejection on a retest of soundness and time of setting at the time of delivery of cement to the purchaser.

(15) Packages varying more than 5 per cent from the specified weight may be rejected; and if the average weight of packages in any shipment, as shown by weighing 50 packages taken at random, is less than that specified, the entire shipment may be rejected.

Note: The American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa., will furnish complete information on the standard tests and test methods for determining physical and chemical properties of Portland cement. Our booklet "Standard Specifications and Tests for Portland Cement" also gives this information and may be obtained by addressing our nearest district office.

PORTLAND CEMENT CONCRETE

Proportioning Concrete

Extensive research in the past 10 to 15 years has resulted in a new method of proportioning concrete mixtures by which it is possible to design mixes that will have definite strengths and other qualities. It has been found that for given materials and methods of manipulation, the strength, watertightness and ability to withstand weathering depend upon the amount of mixing water used. The less mixing water used the stronger will be the concrete and the more watertight and weather resistant. The mixtures must be workable, completely filling the forms and surrounding the reinforcement without excessive spading. With fixed quantities of cement and water the amount and proportions of aggregates may be adjusted to give the workability necessary for the particular job without affecting the strength so long as the mixture is plastic. This discovery has led to the water-cement ratio specification for concrete, given below in abbreviated form:

Specifications for Concrete

Water-Cement Ratio—Concrete shall be proportioned to give the necessary workability without exceeding the quantities of mixing water given in the following table:

Class of Concrete	Desired compressive strength at 28 days, lb. per sq. in.	Maximum quantity of mixing water, U. S. gal. per sack cement
A ¹	3000	6
B ²	2500	6¾
C ³	2000	7½
D ⁴	1500	8¾

¹Suitable for roadways, piles, pressure pipe, tanks, thin structural members and walls, dams, piers, etc., exposed to severe action of water and frost.

²Suitable for sewers, bridges, walls, dams, piers, etc., subject to moderate action of water and frost.

³Suitable for ordinary reinforced concrete buildings. Bridges and retaining walls of heavy section in moderate exposure.

⁴Suitable for mass concrete, basement walls, etc., protected from water or severe weather conditions.

These water-cement ratios are the maximum permissible. The mixes shall be proportioned for somewhat lower ratios so that with the normal fluctuations from batch-to-batch these ratios will not be exceeded. Moisture held by the aggregate must be included in computing the water-cement ratios. Water absorbed by the aggregate in a period of 30 minutes may be deducted in computing the water-cement ratio.

Change of Water-Cement Ratio—The water-cement ratios specified shall not be changed except by the Engineer. In the event that the Engineer finds it necessary to change the water-cement ratios from those specified, adjustment covering amount of cement and aggregates affected will be made as an extra or a credit under the provisions of the contract.

Measuring Moisture in the Aggregate—Moisture in the aggregate shall be measured by a method satisfactory to the

Engineer, which will give results within 1 lb. for each 100 lb. of aggregate.

Concrete Consistency—The proportions of aggregate to cement for concrete of the water-cement ratios specified shall be such as to produce concrete that can be puddled readily into the corners and angles of the form and around the reinforcement without excessive spading and without segregation or undue accumulation of water or laitance on the surface. In no case shall concrete be placed which shows a slump outside of the following limits:

Part of structure	Slump, inches	
	Minimum	Maximum
Caissons.....	1	4
Heavy walls, slabs, beams.....	3	7
Thin walls and columns.....	4	8
Pavements.....	1	3

Proportions of Aggregate—The proportion of fine and coarse aggregate shall be such that the ratio of the coarse to the fine shall not be less than—*nor more than—*nor shall the amount of coarse material be such as to produce harshness in placing or honeycombing in the structure. When forms are removed, the surface and corners of the members shall be smooth and sound throughout.

Note: *The following limits in the proportion of coarse to fine aggregate are suggested:

Maximum size of coarse aggregate, inches	Ratio of coarse to fine aggregate on basis of dry and rodded volumes	
	Minimum	Maximum
$\frac{3}{8}$	0.4	0.8
$\frac{1}{2}$	0.6	1.5
1 and over	1.0	2.0

Control of Proportions—The methods of measuring materials shall be such that the proportion of water to cement can be closely controlled during the progress of the work and easily checked at any time by the Engineer or his representative. To avoid unnecessary or haphazard changes in consistency, the aggregates shall be obtained from a source which will insure uniform quality and grading during any single day's operation, and they shall be delivered to the work and handled in such a manner that variations in moisture content will not interfere with the steady production of concrete of a reasonable degree of uniformity.

High Early Strength Concrete

The element of time is often important in concrete work. Certain operations such as repairing cuts in pavement slabs, made necessary by water or sewer construction, require high early strengths in the concrete. Portland cement meeting standard specifications will produce concrete of the desired strength by variation in the quantity and proportions of the materials, including the water, and by adjusting the methods of placing and curing to the needs of the work under consideration.

The table shows the increase in strength that results from reducing quantity of mixing water and corresponding increase in quantity of cement to maintain same consistency. With some cements the use of 2 lb. of flake calcium chloride with each sack will add further to early strength. This should not be depended upon unless proven by test that the given cement will react in this manner.

Increasing the mixing time to 2 minutes will add about 100 lb. per sq. in. to the strength of all mixes at 3 days and 5 minutes mixing will add 200 lb. per sq. in. The factors which will increase strength at early ages are:

- (1) Decrease amount of mixing water,
- (2) Increase mixing time up to 5 minutes,

Concrete Floor Finish

The installation of concrete floor finishes should be entrusted only to the competent floor contractor where uniformly hard, dense and durable surfaces are desired. The variables that make up a job must be constantly controlled to get satisfactory results. Aggregates must be chosen with regard to gradation, cleanness and

Tests of Concrete—Frequent tests may be made by the Engineer throughout the work to determine the quality of concrete. These tests will be made at the expense of the owner, and will, in general, be made on 6 by 12-in. concrete cylinders loaded in compression at 7 and 28 days, in accordance with the Standard Method of Making and Storing Specimens of Concrete in the Field (Serial Designation: C31-21) of the American Society for Testing Materials.

Co-operation of Contractor—The contractor shall co-operate in every way to the end that concrete of the desired quality be obtained. He shall provide, at cost, such housing as may be required for testing equipment and storage of test specimens; such cost to include only labor and materials actually used.

Mixing Concrete—The concrete shall be thoroughly mixed in a batch mixer of approved type. The mixer shall be equipped with suitable charging hopper. A water-storage and water-measuring device shall be provided. The mixing of each batch shall continue for at least one minute after all the materials are in the mixer during which time the mixer shall rotate at a peripheral speed of approximately 200 ft. per minute.

Depositing Concrete—Concrete shall be handled from the mixer to place as rapidly as practicable and in a manner that will prevent segregation of the ingredients. It shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling. Concrete as it is deposited shall be puddled with suitable tools until forms are completely filled and reinforcement and embedded fixtures thoroughly incorporated in the mass.

Concrete shall be deposited continuously and as rapidly as practicable until the unit of operation, approved by the Engineer, is completed.

Concrete when deposited shall have a temperature of not less than 40° F. and not more than 120° F. In freezing weather suitable means shall be provided for maintaining the concrete at a temperature of at least 50° F. for 72 hours or more after placing, or until the concrete has thoroughly hardened. The methods of heating the materials and protecting the concrete shall be approved by the Engineer. Salt, chemicals, or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing.

Protection of Concrete—Exposed surfaces of concrete shall be protected from drying for a period of at least 7 days after being deposited.

TABLE OF BASIC MIXTURES

Based on 70° F. minimum temperature of concrete when placed and during curing and a minimum time of mixing of 1 minute

Refer. No.	Typical mixes (illustrating range for aggregates used in this test)		Water-cement ratio, (gal. per sack)	Slump in.	Compressive strength (cured wet until test)			
	Mix	Cement, (bbl. per cu. yd.)			1 da.	3 da.	7 da.	28 da.
1	1:2:3½	1.40	7½	6-7	100	500	1100	2000
2	1:2:3½	1.40	6½	2-4	230	830	1530	2600
3	1:2:3½	1.40	6	½	300	1000	1800	3000
4	1:1½:3	1.65	6	6-7	300	1000	1800	3000
5	1:1½:3	1.65	5½	2-4	370	1230	2070	3400
6	1:1½:3	1.65	5	½	470	1500	2400	3900
7	1:1:2	2.25	5	6-7	470	1500	2400	3900
8	1:1:2	2.25	4½	2-4	600	1800	2800	4300
9	1:1:2	2.25	4	½	830	2130	3170	4900

Note: In calculating water-cement ratio, free water or moisture carried by aggregates must be included; water absorbed by dry aggregates may be deducted. Slumps, mixes and cement quantities given above are for illustration only and are accurate only for the particular aggregates used in these tests.

hardness. Mixing water must be reduced to a minimum to produce the strongest concrete. Curing with plenty of water is absolutely necessary. Faulty and excessive troweling must be eliminated. These are the fundamental principles of good floor finish. If they are ignored, soft, porous, short-lived floors will usually

result. Sloppy, soupy concrete, fine grained aggregates, improper troweling and total omission of proper curing account for practically all floor troubles.

Specification for 1-inch Bonded (Two Course) Concrete Floor Finish for an Office Building

Slab Level—The structural slab surfaces shall be reasonably true and struck off at a level approximately 1 in. below the finished floor level.

Brooming—As soon as the concrete base permits, all laitance, scum, dirt and loose aggregate shall be removed from the surface by means of a steel broom. Smearing of concrete indicates that it is still too soft. Brooming shall leave the surface clean and rough to insure thorough bond of finish.

Chipping—When it is impossible to cut off laitance and roughen the slab prior to the final set of the cement, the surface shall be cleaned and prepared for bond by mechanical chipping.

Grouting—The slab shall be thoroughly wet, but free from pools of water. A thin coat of neat cement grout shall

be thoroughly broomed into the surface of the slab just prior to the application of the wearing course.

Mix—The mix shall be 1 part of portland cement, 1 part of coarse, clean, torpedo sand, and 1½ parts of hard, clean pea gravel or crushed stone (¾ to ½ in.).

Consistency—The concrete shall be of the driest consistency possible to work with a sawing motion of the strike-off board.

Finishing—After striking off the wearing course to the established grade, it shall be compacted with a wood float. From time to time, the surface shall be tested with a straight-edge to prevent high and low spots. The concrete shall be floated so as to yield a surface free from depressions or irregularities of any kind. This floating shall be followed by steel troweling to bring the finish to a smooth surface free from marks and blemishes. In no case shall dry cement or a mixture of dry cement and sand be sprinkled on the surface of the wearing course to absorb moisture or to hasten the hardening.

Curing—Within 24 to 36 hours after the final troweling, the finished surface shall be covered with a layer of sand or sawdust which shall be kept wet by sprinkling with water for at least 10 days.

SPECIFICATIONS FOR CONCRETE BUILDING BLOCK AND CONCRETE BUILDING TILE

I. General

(1) The purpose of these specifications is to define the requirements for concrete building block and concrete building tile to be used in construction.

(2) The word "concrete" shall be understood to mean Portland cement concrete.

II. Classification

(3) According to the strength in compression 28 days after being manufactured or when shipped, concrete block and concrete tile shall be classified as heavy load bearing, load bearing, and non-load bearing on the basis of the following requirements:

Name of classification	Compressive strength, lb. per sq. in. of gross cross-sectional area as laid in the wall	
	Aver. of 3 or more units	Min. for individual unit
Heavy load bearing block or tile...	1200	1000
Medium load bearing block or tile...	700	600
Non-load bearing block or tile.....	250	200

(4) The gross cross-sectional area of a one-piece concrete block or tile shall be considered as the product of the length times the width of the unit as laid in the wall. No allowance shall be made for air spaces in hollow units. The gross cross-sectional area of each unit of a two-piece block or tile shall

be considered the product of the length of the unit times one-half the thickness of the wall for which the two-piece block or tile is intended.

III. Requirements

(5) The compressive strength of the concrete in units of all classifications except "non-load bearing block" shall be at least 1000 lb. per sq. in., when calculated on the minimum cross-sectional area in bearing.

(6) Concrete building block and tile to be exposed to soil or weather in the finished work (without stucco, plaster or other suitable protective covering) shall meet the requirements of the absorption test.

(7) All concrete building block and tile not covered by Paragraph 6 need not meet an absorption requirement.

(8) Concrete block and tile shall not absorb more than 10 per cent of the dry weight of the unit when tested as hereinafter specified, except when it is made of concrete weighing less than 140 lb. per cu. ft. For block or tile made with concrete weighing less than 140 lb. per cu. ft. the absorption in per cent by weight shall not be more than 10 multiplied by 140 and divided by the unit weight in pounds per cubic foot of the concrete under consideration.

(9) Specimens for tests shall be representative of the commercial product of the plant.

(10) Not less than three and preferably five specimens shall be required for each test.

(11) The specimens used in the absorption test may be used for the strength test.

CONDENSED SPECIFICATIONS FOR PORTLAND CEMENT STUCCO

General

Preparation of Backing Surface—The backing surface of whatever type, shall provide clean, rough surfaces and good mechanical bond for the stucco, and shall be thoroughly cleaned before the application of stucco; all hangers, fasteners, trim or other fixed supports, or projections of any kind, shall be in place before stucco is applied. Masonry walls shall be properly wetted before the application of the scratch coat. Flashing shall be applied at all points where it would prevent water from getting behind the stucco.

Materials

Cement—Portland cement shall conform to the requirements of the latest standard specifications of the American Society for Testing Materials.

Fine Aggregate—Fine aggregate shall consist of clean sand, or screenings from crushed stone or pebbles, graded from fine to coarse, passing when dry a No. 8 screen, free from dust or other deleterious materials.

Water—Water shall be clean, free from oil, acid, strong alkali or vegetable matter.

Coloring Materials—Only permanent mineral oxides that are fully guaranteed by the manufacturer to be unaffected by

lime, cement or weather, and in amounts not to exceed 10 per cent of the weight of the cement shall be used as coloring matter.

Hydrated Lime—Hydrated lime shall meet the requirements of the standard specifications of the American Society for Testing Materials and shall be used in quantity not to exceed one-fifth the volume of cement.

Construction

Proportions—The proportions for all coats shall be 1 bag of cement to 3 cu. ft. of sand to which may be added hydrated lime in an amount not exceeding one-fifth the volume of cement. In these proportions 1 cu. ft. (1 bag) of cement weighs 94 lb. net and 1 cu. ft. of hydrated lime weighs 40 lb.

Mixing—The ingredients of the stucco shall be thoroughly mixed, preferably in a machine mixer of the rotating drum type, for at least five minutes after all materials are in the drum. The quantity of water shall be determined by trial and thereafter measured in proper proportion.

Masonry Walls—Concrete, concrete block, brick, hollow tile and similar walls shall be rigid and constructed upon solid footings, all units being set in portland cement mortar. The surface on which stucco is to be applied shall be clean, free from all dust, dirt or loose particles, preferably rough and of coarse texture. Wood lintels over wall openings shall not be used. Monolithic concrete walls shall be roughened by hacking, wire brushing or other effective means. Concrete block, tile or brick units shall have the joints cut back even with the surface.

Framing—Spacing of studs shall not exceed 16 in. Stud-
ding shall run from foundation to rafters without intervening
horizontal members, tied together below second floor joists with
1x4-in. boards let into the inner faces of the studs. In open
construction without sheathing, the spacing of studs shall not
exceed 12 in. The corners of all walls shall be braced diagonally
to secure the necessary rigidity of the structure. Bridging
of studding with 2x4-in. braces shall occur at least once in each
story height.

Sheathing—Sheathing boards shall not be less than 6 in.
nor more than 8 in. wide, dressed to a uniform thickness, laid
horizontally and fastened securely to each stud. Over the
sheathing shall be laid, horizontally, beginning at the bottom,
any standard asphalt saturated roofing felt weighing 15 lb. per
square, the bottom layer lapping the baseboard and each strip
lapping the strip below and all flashing at least 2 in.

Application of Reinforcement—Reinforcement shall be
placed horizontally, fastened with approved furring devices not
more than 8 in. apart over the surface. Vertical laps shall occur
at supports, horizontal joints being lapped and tightly laced with
18 gauge annealed wire. The sheets shall be returned around
corners at least 4 in. in sheathed construction and 16 in. in
open construction. Corner beads shall not be used.

Furring—All reinforcement shall be furred out from the
studs, sheathing or base $\frac{3}{8}$ in. by any device which will not
reduce the effective section of the scratch coat.

Half-timbering—Embedded trim or half-timbering shall
be securely nailed directly upon sheathing or studs, and shall
have the inside corners of vertical members grooved into which
the mortar of the first coat shall be forced forming a water-
tight joint. All joints on horizontal members shall be flashed.

Application of Stucco Coats on Frame Construction—
The application shall be carried on continuously in one general
direction without allowing the stucco to dry at the edges. If

it is impossible to work the full width of the wall at one time
the joining shall be at some natural division of the surface,
such as a window or door. The scratch coat shall be shoved
thoroughly through the metal reinforcement forming a solid
mass against the sheathing paper, thus completely encasing the
metal. This coat shall be $\frac{1}{2}$ in. thick fully covering the face of the
reinforcement and shall have its surface heavily cross scratched
to provide a strong mechanical key or bond. Allow this coat
to become thoroughly dry. It shall be wet down but not satur-
ated before applying the second coat. The second or browning
coat shall be at least $\frac{1}{2}$ in. thick over the face of the first coat
and shall be rodged straight and true in every direction, or left
untrue giving a wavy effect, as the desired finish would suggest.
If the finish is to be a float type finish, the second coat shall be
brought to a good even surface with wood floats. This coat
shall be wet down for at least three days and allowed to become
thoroughly dry before the finishing coat is applied. The finish
coat shall be applied not less than one week after the applica-
tion of the second coat and shall vary in thickness from $\frac{1}{8}$ to
 $\frac{1}{4}$ in., depending upon the texture of the finish coat.

Scratch Coat on Masonry Walls—Mortar shall be trow-
eled on to a thickness of approximately $\frac{1}{2}$ in., heavily cross
scratched and allowed to become thoroughly dry before the
browning coat is applied.

(From this point on use specification covering "Application
of Stucco Coats on Frame Construction.")

Freezing—Stucco shall not be applied when the tempera-
ture is below 32° F., unless protected with canvas and heat
sufficient to prevent freezing for a period of at least 48 hours
after application.

Curing—Each coat shall be protected from drying rapidly
from effects of intense sunlight or wind until it has sufficiently
hardened to permit sprinkling. Each coat shall be kept moist
by sprinkling for at least three days following its application.

Color Decoration on Concrete

Concrete surfaces are eminently suited for express-
ing directly, motifs in any color combinations known to
the artist. Oil stains give a wide range of color without
affecting the characteristic texture of the concrete.
Craftsmen have found that the roughness and board
markings serve to enhance the decorative effect. Such
concrete surfaces possess a tone and atmosphere both
unique and pleasing.

Color decoration applied directly to the concrete
surface is extensively used on ceilings and is a natural
development for the beam and girder type of construc-
tion. Many examples have shown that once applied the
design may be protected by suitable coatings over a
long period of years, lending a desirable permanency so
difficult to attain with other media.

Many wall surfaces of concrete have also been
treated in this manner. Color decoration on monolithic
walls combined with modeling in low relief, offers possi-
bilities in wall embellishment expressive of the material.

This type of decoration is well within the usual economic
limits since it eliminates certain operations that add to
the cost of other forms of ornamentation.

Specifications for Painting Concrete

Cleaning—All loose particles and dirt shall be removed.
Grease or oil shall be wiped off with a rag saturated with gaso-
line or benzine. Surfaces previously coated shall be either sand-
blasted, or wire brushed.

Neutralization of Surface—The cleaned surface shall be
brushed with a water solution containing 4 lb. of zinc sulphate
to the gallon. At least 48 hours shall be allowed for the zinc
sulphate to react and dry.

Staining—Staining shall be done by using any good linseed
oil paint thinned to the proper consistency with turpentine.
Stains only differ from paints by containing enough volatile
solvent to make up about one-half by volume of the vehicle.

Painting—For one-coat work the paint shall be applied
without thinning. For two-coat work the first coat shall be
thinned with the proper solvent (turpentine or naphtha, 1 pt.
to the gallon). The second coat shall be applied without thin-
ning. At least 48 hours drying time shall be allowed between
coats.

Concrete Cast Stone

Concrete cast stone is being widely employed as
both an exterior and interior facing material in the finest
types of buildings where a beautiful finish is desired
which will endure. Economy, beauty, complete range
of color and texture and assured uniformity of quality
are among the advantages which account for the increas-

ing popularity of this product. Its flexibility as a medium
for architectural expression gives it unlimited scope for
originality in design.

Many of the most noted stadia, office buildings,
hotels, municipal buildings, theaters, churches, schools,
banks, etc. are built of cast stone.

Representative Installations

Soldiers' Field Stadium, Chicago, Ill.
Westchester County Courthouse, White Plains, N. Y.
Church of the Blessed Sacrament, New York, N. Y.
Portland Cement Association Building, Chicago, Ill.
Merchants National Bank, Plattsburgh, N. Y.
Tobey Furniture Building, Chicago, Ill.
Moose Temple, Harrisburg, Pa.

Keith Theater, Syracuse, N. Y.
Valhalla Memorial, Burbank, Cal.
Los Angeles Evening Herald Building, Los Angeles, Cal.
Masonic Temple, Binghamton, N. Y.
York Rite Temple, Wichita, Kan.
First Baptist Church, Savannah, Ga.
Northwestern Military Academy, Lake Geneva, Ill.

THE ATLAS PORTLAND CEMENT COMPANY

25 Broadway
NEW YORK, N. Y.

CHICAGO, ILL.
PHILADELPHIA, PA.

OMAHA, NEB.

BIRMINGHAM, ALA.
BOSTON, MASS.

ST. LOUIS, MO.
DES MOINES, IOWA
ALBANY, N. Y.

LOS ANGELES, CALIF.
JACKSONVILLE, FLA.
KANSAS CITY, MO.

Products

ATLAS PORTLAND CEMENT.
ATLAS-WHITE PORTLAND CEMENT.
ATLAS LUMNITE CEMENT.

Quality

Atlas Portland Cement—Over a period of more than thirty years, Atlas Portland Cement has merited the distinction of being "the Standard by which all other makes are measured."

It is guaranteed to pass the Standard Specifications for portland cement which have been adopted by:

The United States Government
The American Engineering Standards Committee
The American Society for Testing Materials
The American Society of Civil Engineers
The American Institute of Architects
The American Railway Engineering Association

"Atlas-White Portland Cement"—Atlas-White Portland Cement (white) has been manufactured for 15 years and is identical in strength and durability with Atlas Portland Cement (gray).

Atlas-White Portland Cement is guaranteed to pass the Standard Specifications for portland cement as noted above.

Atlas Lumnite Cement

Gives full strength 28-day concrete within 24 hours.

A slow setting, quick hardening hydraulic alumina cement for concrete and mortar.

Permits pouring concrete one day, putting it in use with safety the next day.

For any concrete work where speed is desirable or necessary.

Packages

Atlas Portland Cement is packed in duck or paper bags of 94 lbs. net weight, 4 bags to the barrel. For export, it is shipped in especially constructed and lined barrels of 400 lbs. gross or 376 lbs. net weight.

Atlas-White Portland Cement is packed in paper and duck bags, and for export, in barrels. Same weights as above.

Publications

"Stucco—Interior Plastering—Grafitto"

"Atlas-White Portland Cement for Remodeling with Stucco"

"Atlas-White Portland Cement for Swimming Pools"

"Atlas-White Portland Cement for Mortar"

"Atlas-White Portland Cement for Terrazzo"

"Atlas-White Portland Cement for Ornamental Cast Work"

"Atlas-White Portland Cement for Railroad, Highway and Municipal Uses"

"Houses of Stucco"



TRADE-MARKS

Technical and Research Department

A technical and research department is at the disposal of architects for assistance in any problems pertaining to concrete or stucco. This service is, of course, offered without obligation to them and it is hoped that architects will freely avail themselves of this department.

Uses of Atlas-White Portland Cement

- (1) Wherever a pure color or white is desired.
- (2) For non-staining mortar.

Specific Uses—

Stucco—Makes possible a wide range of color effects. As Atlas-White is neutral in color toward pigments, it gives clear and unclouded shades. Also produces excellent results when used in connection with exposed aggregates, or when mixed with naturally colored sands.

Brick Joints—Makes possible a pure white or correctly colored joint. Can be colored by mixing directly with a colored sand or by pigments.

Cast Stone, Trim and Garden Furniture—Gives white or colored effects as desired.

Terrazzo—White cement when used for this purpose doubles the number of color combinations. It will not discolor.

Swimming Pools—Used with white sand and applied as a plaster or throughout the concrete gives an inexpensive, durable and attractive finish. Particularly adapted to outdoor pools.

Interior Plastering—Interior plastering of white cement mortar makes possible interesting color and textural effects. As it is unaffected by moisture, it is also used for dairies, cold storage rooms and lavatories.

For Its Non-staining Qualities—

Pointing, Setting and Backing Fine Stone—Widely used for setting Indiana limestone and marble. Gives the strongest possible mortar and is absolutely non-staining.

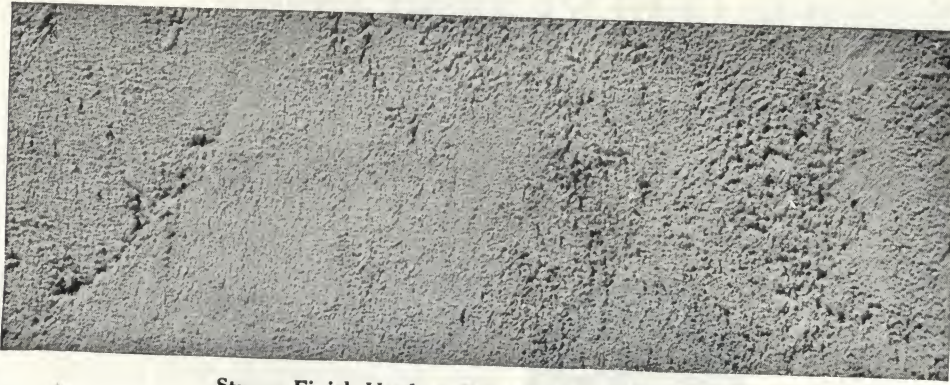
Setting Tile—Will not stain the tile and is unaffected by moisture.

Stucco Finishes

The illustrations show only four of the endless variety of stucco finishes which are possible with the use of a portland cement stucco using Atlas-White.

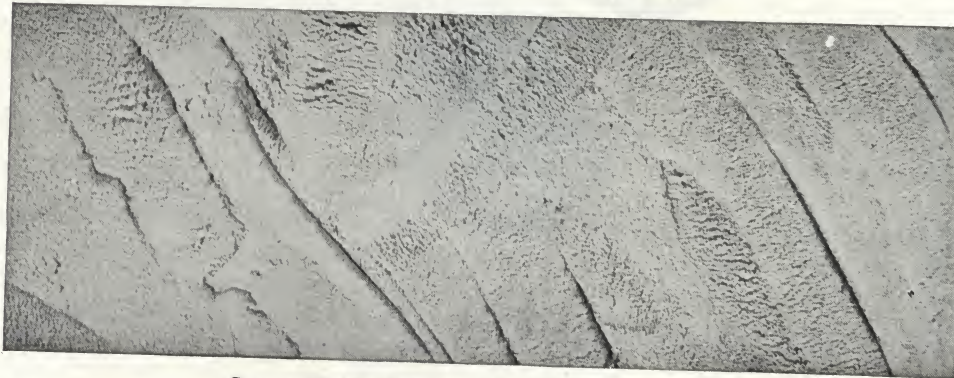
The endless number of textures possible are produced by various methods of manipulation of the plastic material. While it is difficult to describe in detail the exact method by which they are obtained, an examination by the architect of the photographs in "Stucco—Interior Plastering—Grafitto," the book referred to above, will make the manner of finishing evident.

Stucco finishes in portland cement are unlimited as to texture and color. To secure permanently successful results in color and durability, Atlas-White Portland Cement is the ideal material.



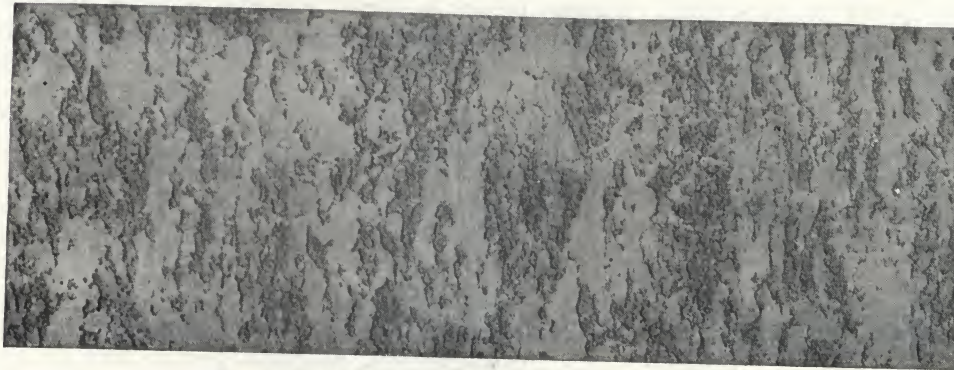
Stucco Finish Used on House at Forest Hills, L. I.

The house, portion of which is shown, was designed by W. L. Bottomley, New York City. The finish is from an actual wall and shows a rather dry mix applied with irregular pressure and motion of the trowel



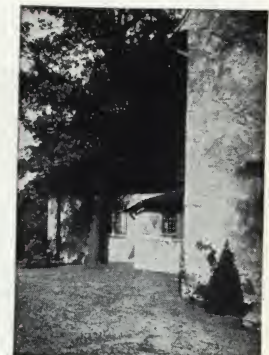
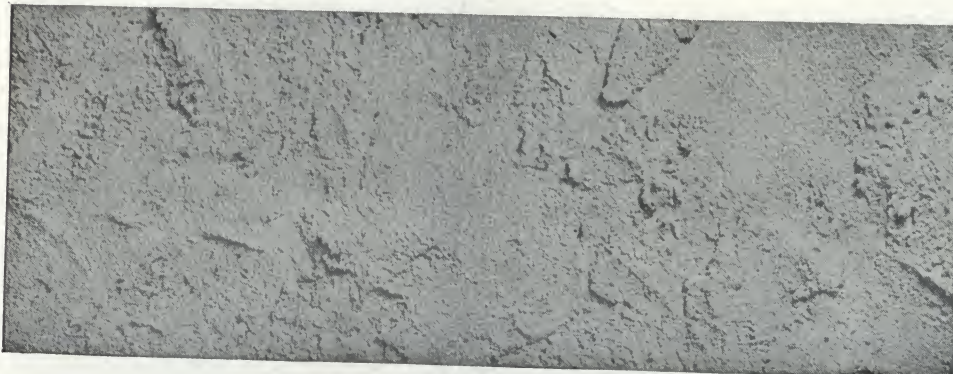
Stucco Finish Used on House at Pelham, N. Y.

This house, for which Bloodgood Tuttle of New York was the architect, is particularly pleasing in its use of stucco. The panel shows a finish placed with a sweep of the trowel, using more pressure on one end than the other



Stucco Finish Used on House at Jamestown, N. Y.

A. J. Bodker of New York was the architect for this residence. The finish was obtained by throwing on a spatter dash and smoothing the high parts with a steel trowel



Stucco Finish Used on House at Riverdale, N. Y.

The adaptability of stucco to harmonize with architectural design is evident in this house for which Julius Gregory was the architect. The panel shows a finish obtained with a rather dry mix applied with an irregular motion of the trowel

ESTABLISHED 1832

LAWRENCE CEMENT COMPANY302 Broadway
NEW YORK, N. Y.

DISTRICT OFFICES

PHILADELPHIA, PA., 4 South 15th Street

BOSTON, MASS., 31 Milk Street

Product

DRAGON PORTLAND CEMENT.
 DRAGON SUPER CEMENT.
 MAINROCK LIME.

Production

Dragon Portland Cement has been produced in the heart of the Lehigh Valley at Siegfried, Pa., continuously since 1889. This mill has a capacity of eleven million bags per year. Large reserve stocks are maintained at the mill. Exceptional shipping facilities permit despatching 200 carloads per day.

A new mill at Thomaston, Maine, New England's own and only cement mill, to be in operation early in 1928, will produce an additional annual supply of four million bags of Dragon Cement.

Quality

The LAWRENCE CEMENT COMPANY has been engaged in manufacturing or selling cement continuously for nearly a century, having established business in 1832.

Dragon Portland Cement has been on the market for thirty-eight years. During this period the demand has steadily increased.

The quality of Dragon Cement has been carefully guarded at all times, the test requirements at the mill being considerably above the standard specifications and tests for Portland Cement adopted by the American Society for Testing Materials.

The seven-day sand tensile strength tests of Dragon Cement for the last ten years have exceeded 300 lbs. per sq. in., although the A.S.T.M. standard, until recently, required only 200 lbs. per sq. in.

Many architects, engineers, contractors and builders



TRADE-MARK
(Registered)

regularly specify Dragon Portland Cement on their work in the East because this cement attains high early strength, is remarkably uniform and exceptionally finely ground.

Dragon Super Cement

Dragon Super Cement with nothing but the usual aggregates and usual mixing methods produces concrete that is absolutely waterproof, oilproof and highly resistant to the attack of frost, seawater, acids, alkalis and other destructive agents.

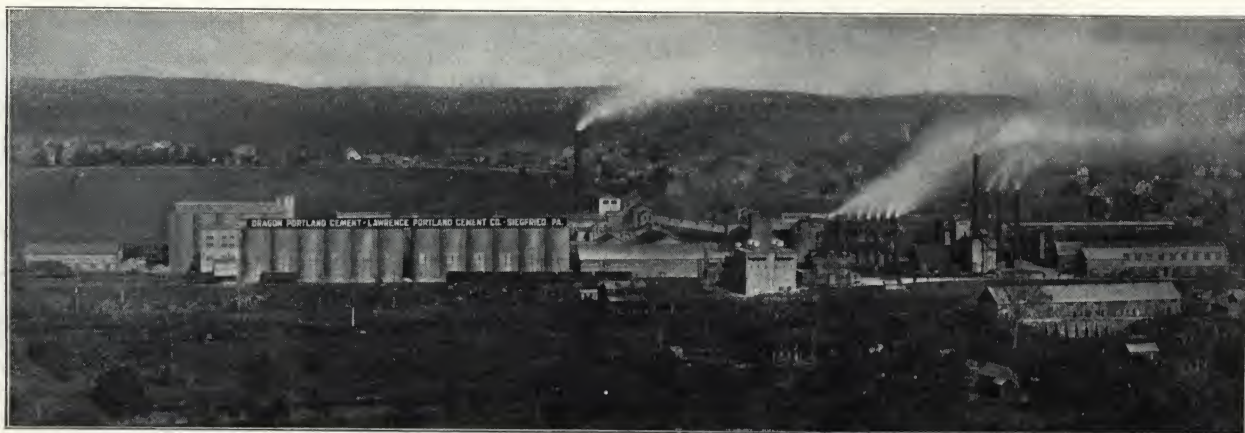
Super cement has been highly endorsed by prominent architects, engineers and contractors who have used it on such work as foundations, dams, subways, tunnels, tanks, reservoirs, swimming pools, piles, pipe, stucco, etc.

Service

The LAWRENCE CEMENT COMPANY is always glad to assist architects, engineers and contractors in the solution of any problems that may arise in connection with the use of cement. Inspection of the Company's mills is cordially invited and will be arranged at any time to suit the convenience of the visitor.

Noteworthy Users of Dragon Portland

Grand Central Terminal, New York, N. Y.
 Warren & Wetmore, Architects.
 New York Stock Exchange, New York, N. Y.
 George B. Post, Architect.
 United States Custom House, New York, N. Y.
 Cass Gilbert, Architect.
 School No. 23, Jersey City, N. J.
 John F. Rowland, Architect.



Dragon Portland Cement Mill at Siegfried, Pa.

THE SANDUSKY CEMENT COMPANY

Manufacturers of Medusa Portland Cements

CLEVELAND, OHIO

BRANCH OFFICES

CINCINNATI, OHIO, Builders Industries Building
DIXON, ILL., 34 Dixon National Bank Building

NEW YORK, N. Y., 350 Madison Avenue
TOLEDO, OHIO, 1004 Second National Bank Building

FACTORIES

BAY BRIDGE, OHIO

SILICA, OHIO

DIXON, ILL.

YORK, PA.

Products

MEDUSA PORTLAND CEMENTS.

For Medusa Waterproofing see page A78; for Medusa Cement Paints, see page B1689.

Output

Annual production, 3,000,000 bbls.

Quality

Medusa Portland Cements are guaranteed to pass all standard and U. S. Government specifications. Every carload is tested before being shipped. A record of laboratory tests furnished on request.

Literature

New Medusa literature, in standard size 8½x11 in., describing many of the uses for Medusa White Cement will be gladly sent at your request.

The Use and Some of the Many Applications of Medusa White Portland Cement—Waterproofed or Plain

Irrespective of type or kind of structure, Medusa White Portland Cement will fit in perfectly at several points in the construction. Any concrete work when the element of appearance is as vital and important as the permanence of the material itself, should be done in either Waterproofed or Plain Medusa White Portland Cement.

One handles and mixes Medusa White Portland Cement exactly the same as ordinary gray cement. Special attention must be given to the sand and aggregates used in the producing of different tints or shades. Various mineral oxides can be used with Medusa White Portland Cement to produce color effects.

Due to the whiteness of Medusa White Cement, it is especially desirable where light shades of color are required.



There is no waterproofed white cement except Medusa Waterproofed White Cement. We are the exclusive manufacturers of this product.

The illustrations show some of the practical, unique and enduring effects that can be secured in exterior work, and the specifications show definitely how any given effects may be produced.

Partial List of Leading Applications for Medusa White Portland Cement—

Cast stone (plain or ornamental)	Lawn furniture
Cut cast stone (plain or ornamental)	Lamp standards
Cement brick	Monuments
Cement floor tile	Mortar
Cement mantels	Ornamental cement work
Concrete block facing	Shower baths
Concrete blocks	Stucco
Concrete burial vaults	Swimming pools
Concrete fence posts	Table tops and counters
Concrete roofing tile	Terrazzo tile
Concrete stove silos	Traffic markers
Hollow concrete tile	

Description of Medusa Portland Cements

Medusa Portland Cements attain high strength rapidly; they are absolutely uniform, unsurpassed in fineness and strength.

Medusa White Portland Cement—Is perfectly white and non-staining; a product of unlimited artistic possibilities. It differs from ordinary gray cement in color and fineness only. Where ordinary portland cement is a varying shade of gray, Medusa White Cement is a uniformly clean white. This is true in the finished work as well as in the sack. It passes all the requirements of the American Society for Testing Materials. Fur-

nished either plain or waterproofed.

Medusa Gray Portland Cement—

Is uniform in color and passes all the requirements of the American Society for Testing Materials. Furnished either plain or waterproofed.

Medusa Waterproofed Cements are our regular gray and white brands, waterproofed with our celebrated Medusa Waterproofing (see our pages in Waterproofing Section), and ready for use.



A Remarkable Illustration of the Possibilities in Architectural Embellishment of Precast Work Using Medusa White Cement, on the Estate of John Bindley, Coconut Grove, Fla.

KIEHNEL & ELLIOTT of Pittsburgh and Miami, Architects
All ornamentation shown was done under the able execution of JOHN B. ORR of Miami

Vital Points to be Observed Carefully in Concrete Work

Use the proper proportions for the work intended.

Cement—The most important materials used in concrete work are cement and water.

The cement used in mass concrete or the facing of concrete work should be either Medusa White Portland Cement or Medusa Waterproofed White Portland Cement.

The gray portland cement should be either Medusa Gray Portland Cement or Medusa Waterproofed Gray Portland Cement. (In locations where it is impossible to obtain Medusa Waterproofed Gray Cement any standard gray portland cement passing the requirements of the U. S. Government may be used with the addition of the proper amount of Medusa Waterproofing.) See our pages in *Waterproofing Section*.

Storage of Cement—All cement should be stored in a weathertight, dry building to prevent caking.

Water—Water for concrete or cement work must be clean, free from oil, acid, strong alkali or vegetable matter and should be good enough to drink. Do not use an excess of water in mixing, as it will ruin the work by causing sand and stone pockets and wash away the cement, reducing the strength of concrete and causing cement work to dust and disintegrate.

Best results are obtained by making the mixture of a plastic or jellylike consistency, so as to flow readily into the forms with slight spading.

If applying cement plaster to a base which is in the least porous—such as tile, brick, old concrete walls, floors, etc.—the base must be thoroughly soaked with water before applying. Otherwise water will be drawn out of the fresh cement plaster before it has a chance to set properly and the results will be a failure.

Fine Aggregates—Sand that looks and feels good in the palm of the hand should not be accepted without further tests for quality, grading and voids.

Quality—There are numerous sands that are not wholly decomposed and will crush under pressure of the fingers. Under microscopic examination such sands will show a small crystal surrounded by a soft honeycombed wall; when used in concrete, it would break down the cementation value of the cement and result in weak, mealy concrete. Fine silica sands are often found to be matted together and should be broken up before using.

Grading—All sands should be frequently tested by thoroughly drying and running through at least three screens— $\frac{1}{8}$ in., 24 and 40.

Sand should be clean, free from clay, loam or vegetable matter. It should be graded so that all will pass a $\frac{1}{8}$ -in. mesh, one-third remaining on a No. 24 screen, one-third on a No. 40, and one-third on a No. 60. (It is rare to find a sand with such an exact grading—the above figures are given as a standard. The closer they are approached the better the final results.) The following actual sieve tests are examples of ideal sands for use in any concrete work:

3% through $\frac{1}{8}$ -in. mesh,	held on $\frac{1}{8}$ -in. mesh
20% through $\frac{1}{8}$ -in. mesh,	held on $\frac{1}{8}$ -in. mesh
35%—12% through $\frac{1}{8}$ -in. mesh,	held on No. 24 mesh
17% through No. 24	mesh, held on No. 30 mesh
35%—18% through No. 30	mesh, held on No. 40 mesh
22% through No. 40	mesh, held on No. 60 mesh
5% through No. 60	mesh, held on No. 80 mesh
2% through No. 80	mesh, held on No. 100 mesh
30%—1% through No. 100	mesh

Damp sands are misleading; the coarse will attract the minute particles, appearing apparently perfect, when in reality they are excessive in fines and dangerous.

Coarse Aggregates—Equal care is necessary in the use of the larger aggregates. Bank run should never be used before ascertaining the percentage of coarse and fine material and proportioning accordingly.

Gravel and pebbles will produce more dense concrete; trap rock and silica sand the greatest strength.

Trap rock, gravel and silica sand produce strength and density. Crushed granite or hard trap rock requires more sand.

For soft trap rock, presenting rounded corners, use less sand. It is dangerous to use the crusher run of any aggregate before screening. Dust in excess of 15% through a 60-mesh screen should never be used.

Colorimetric Test—A simple, practical test to determine

the presence of rotten vegetable or organic matter in sand, pebbles or broken stone, is made as follows:

Take a 12-oz. bottle. Fill to $4\frac{1}{2}$ -oz. mark with material to be tested. Then pour in a 3% solution of caustic soda until the volume of sand and solution after shaking amounts to 7 oz. Thoroughly shake the bottle and contents and allow to stand for 24 hours. If, at the end of this time, the liquid above the material is colorless, or only a light yellow, it is sufficiently free of organic matter to be used, provided its other qualities are suitable.

If the liquid is darker than a light yellow, approaching a brownish yellow, the material may be used for unimportant concrete work. It should not be used in first class concrete work. If the liquid is a dark brown the material should be washed or rejected.

Cause of Cracking, Hair Cracks, or Map Checks

The appearance of hair cracks or crazing in concrete or cement work results from greater shrinkage in the rich, wet surface than in the body of the work and can be prevented by keeping the work covered, moist and protected from the sun and wind, for a period from one to four weeks, according to weather and character of the work.

Hair cracks or crazing generally may be traced to any or all of the following conditions:

- (1) Mixture too rich in cement.
- (2) Too much water used in mixing.
- (3) Too rapid drying out.
- (4) Too fine sand or aggregate.

Mixture Too Rich in Cement—Neat cement when set and hardened in air contracts much more than when mixed with sand or other inert aggregate, this contraction increasing with age up to a certain period. When allowed to harden and set under water, contraction is very much less than in air, but is still present to a slight extent. With a fair proportion of sand, finely crushed stone or other suitable aggregate, the contraction is reduced to practically zero and there is no tendency for cracks to form, provided surface is protected and kept moist. As a rule, the ratio of cement to inert material should not be greater than 1 to 2.

Too Much Water Used in Mixing—When the right quantity of water is used in mixing concrete, a soft plastic mass is formed with just sufficient water to bind the cement, sand, etc., together and to remain in the mass itself with no tendency to escape or flow away.

Water also serves as a vehicle to carry the cement and finer particles of sand into the spaces between the larger pieces of gravel, stone, etc., and to distribute the component parts uniformly throughout the mass.

An excess of water will run off or rise to the surface of the concrete, carrying with it much of the cement in suspension and rob the interior of its cementing material. As the surface water evaporates, the fine cement is deposited as a layer of practically neat cement which, as stated above, has a greater tendency to contract than the poorer mixture beneath. This is the most fruitful cause of hair cracks.

Too Rapid Drying Out—Where ample precautions are taken to protect fresh concrete or cement work from drying out, by means of thick layers of wet sand, or wet cloths hung over vertical faces, and this protection is kept up for a week or more, very few if any hair cracks occur.

Neat cement or very rich mixtures which will craze when hardened in the air will show no such effect if kept under water. Therefore there is less chance for contraction when the concrete or cement is not allowed to dry out; and the prevention of contraction prevents also the tendency to crack or check on the surface.

Too Fine Sand or Aggregate—Insufficient coarse material in concrete, stucco, etc., to hold the cement and fine sand, will increase the danger of the sand and cement being washed to the surface. The same result will be obtained as where an excess of water is used.

Few contractors and users of cement realize the importance of a properly graded mixture and the practical necessity of having sufficient coarse particles, whether pebbles or fragments of crushed rock, present for the greatest strength and best results.

One of the most successful manufacturers of cast stone in Ohio attributes his freedom from hair crack trouble to care in selecting and grading his aggregates.

With attention to the above four points, we are confident that any careful user of cement can reduce hair crack and crazing trouble to a minimum, or prevent it altogether.

Specifications for Waterproofed Portland Cement Stucco

Materials—Cement—The cement for the first coat (base or scratch coat) shall be standard gray portland cement conforming to the Specifications of the American Society for Testing Materials, with the addition of Medusa Waterproofing Powder or Paste, to the amount of 2% by weight of the cement used (2 lbs. to the sack of cement).

The cement for the second or brown coat, and the third or finish coat, shall be Medusa Waterproofed White Portland Cement.

Fine Aggregate—Fine aggregate shall consist of sand, screenings from crushed stone, or crushed pebbles, evenly graded from fine to coarse, passing when dry a No. 8 screen. Fine aggregates should preferably be of silicious materials, clean, coarse and free from loam, vegetable or other deleterious matter.

Hydrated Lime—Hydrated lime shall meet the requirements of the standard specifications for hydrated lime of the American Society for Testing Materials, being used to add plasticity to the mixture.

Coloring Matter—Only permanent, mineral oxides and limeproof colors shall be used. Finish coat containing colors shall be applied as dry as possible to prevent separation of the colors. (The use of Medusa Waterproofed Cement will prevent the gradual washing out of a color surface).

Water—Water shall be clean, free from oil, acid, strong alkali or vegetable matter.

Preparation of Mortar—Mixing—The ingredients of the mortar shall be mixed until thoroughly distributed and the mass is uniform in color and homogeneous. The quantity of water necessary for the desired consistency should be determined by trial, and thereafter measured in proper proportion. The water shall be added slowly to the dry mix so as to allow the aggregates to absorb as much as possible in the course of mixing.

Machine Mixing—The mortar shall preferably be mixed in a suitable mortar-mixing machine of the rotating drum type. The period of machine mixing shall be not less than 5 minutes after all the ingredients are introduced into the mixer.

Hand Mixing—The mixing shall be done in a watertight mortar box, and the ingredients shall be mixed dry until the mass is uniform in color and homogeneous. The proper amount of water shall then be added and the mixing continued until the consistency is uniform.

Measuring Proportions—Methods of measurement of the proportions of water shall be used which will secure separate uniform measurements at all times. All proportions stated shall be by volume. A bag of cement (94 lbs. net) may be assumed to contain 1 cu. ft.; 40 lbs. may be assumed as the weight of 1

cu. ft. of hydrated lime. Hydrated lime shall be measured dry, and shall *not* be measured nor added to the mortar in the form of putty.

Retempering—Mortar which has begun to stiffen or take its initial set shall not be used.

Consistency—Only sufficient water shall be used to produce a good workable consistency. The less water in the mix, the better the quality of the mortar, within working limits.

Mortar Coats—Mortar—All coats shall contain not less than 3 cu. ft. of fine aggregate to 1 sack of portland cement.

Application—The plastering shall be applied with a steel trowel and carried on continually in one general direction without allowing the plaster to dry at the edge. If it is impossible to work the full width of the wall at one time, the joining shall be at some natural division of the surface, such as a window or door. The first coat shall thoroughly cover the base on which it is applied and shall be troweled enough to insure the best obtainable bond. Before the coat has set it shall be heavily cross-scratched with a saw-toothed metal paddle or other suitable device to provide a strong mechanical key.

The first coat shall be thoroughly wet down before the second coat is applied. The second coat shall be applied, whenever possible, on the day following the application of the scratch coat, and shall be brought to a true and even surface by screeding at intervals not exceeding 5' 0", and by constant use of a straight-edge. When the second coat has stiffened sufficiently, it shall be floated with a wood float and lightly and evenly cross-scratched to form a good mechanical bond for the finish coat. The day following the application of the second coat, and for not less than 3 days thereafter, the stucco must be thoroughly sprayed at frequent intervals and kept from drying out. The finish coat shall be applied not less than a week after the application of the second coat. Methods of application will hereinafter be described under "Finish."

Drying Out—The finish coat must not be permitted to dry out rapidly and adequate precaution must be taken to make this certain by sprinkling frequently after the mortar is set hard enough to permit it, or by hanging wet burlap or similar material over the surface, during hot weather.

Freezing—Stucco should not be applied when the temperature is below 32° Fahr., nor under any conditions such that ice or frost may form on the surface of the wall.

Stains—Dirt may be readily washed off Medusa Waterproofed White Portland Cement stucco by using a brush and Sapolio, or other cleaning compound.

Mortar Colors—Should not be used to color portland cement stucco, use only mineral oxides.



Residence of J. L. Carmen, Gravelly Lake, Near Tacoma, Wash.

KIRTLAND CUTLER, Spokane, Architect
Stucco applied by FRED STABBERT, Tacoma
Medusa White Cement Stucco on hollow tile



Halliday Residence, Santa Monica, Cal.

MR. PIERPONT, Architect
Exterior finish of California Stucco Products Company Cement Stucco in which Medusa White Cement was used

Use of Medusa White Waterproofed Portland Cement for Non-staining Mortar

Setting and backing up marble and stone work, and laying face brickwork requires a mortar that will not discolor the face of the marble, stone or face brick.

Medusa Stainless White Cement contains only a

trace of iron. Due to this purity of composition it will not streak or stain the finest of building materials. It is used extensively from coast to coast, on the finest of buildings for this purpose.

Specifications

Mortar for Marble or Stone Work

For setting, backing and pointing marble and stone work.

Non-staining Waterproofed Cement—Cement shall be Medusa Waterproofed White (Non-staining) Portland Cement, manufactured by THE SANDUSKY CEMENT COMPANY, Cleveland; or other approved white (non-staining) portland cement conforming with the requirements of the American Society for Testing Materials, and guaranteed by the manufacturer to contain 20% or more of water-repellents, ground in with the cement during process of manufacture at the mill.

Waterproofing mixed with a non-staining cement by hand or machine, at the job or elsewhere, will not be permitted to be used.

Sand—Sand shall be clean river, lake or bank sand, light in color and evenly graded from fine to coarse, all passing through a $\frac{1}{8}$ "-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Crushed Marble for Pointing—Crushed white marble for pointing mortar shall be equal to Conlin Marble Company's, Tuckahoe, N. Y., size 20 to 30.

Measuring—Assuming that 1 bag of portland cement measures 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring of sand or other material with a shovel will not be permitted.*

Water—Water in all cases shall be added slowly and only sufficient water used to reach a stiff, workable consistency.

Setting Mortar—Mortar for the setting and backing of marble and stone work shall consist of:

- 1 part Medusa Waterproofed White Portland Cement.
- $\frac{1}{2}$ part hydrated lime, by volume.
- 3 parts sand.

Pointing Mortar—Mortar for pointing of marble shall consist of:

- 1 part Medusa Waterproofed White Portland Cement.
- $\frac{1}{2}$ part hydrated lime, by volume.
- $2\frac{1}{2}$ parts white crushed marble.

Setting of Marble or Stone—All marble or stone work shall be sufficiently embedded and backplastered in the mortar to form one continuous coating. Special attention must be given to all belt courses, copings and other exposed surfaces.

Mortar for Laying Face Brick

Note: The object of using Medusa Waterproofed Cement is to overcome discoloration, dampness and efflorescence.

Non-staining Waterproofed Cement—Cement shall be Medusa Waterproofed White (Non-staining) Portland Cement, manufactured by THE SANDUSKY CEMENT COMPANY, Cleveland; or other approved white (non-staining) portland cement conforming with the requirements of the American Society for Testing Materials, and guaranteed by the manufacturers to contain 20% or more of water-repellents, ground in with the cement during process of manufacture at the mill.

Waterproofing mixed with a non-staining cement by hand or machine at the job or elsewhere, will not be permitted to be used.

Sand—Sand shall be clean river, lake or bank sand, light in color and evenly graded from fine to coarse, all passing through a $\frac{1}{8}$ "-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Water—Water in all cases shall be added slowly and only sufficient water used to reach a stiff, workable consistency.

Measuring—Assuming that 1 bag of portland cement contains 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring*

ing of sand or other material with a shovel or other implement that has no positive dimensions will not be allowed.

Setting Mortar—Mortar for laying face brick shall consist of:

- 1 part Medusa Waterproofed White Portland Cement.
- $\frac{1}{2}$ part hydrated lime, by volume.
- 3 parts sand.

Joints—Should a joint exceeding $\frac{5}{8}$ " be desired, the necessary amount of coarse grit may be added to the above mortar.

Mixing—When mortar is hand mixed, dampen the sand to a damp earth consistency, add Medusa Waterproofed Cement and hydrated lime, and mix as usual. When sand, Medusa Waterproofed Cement and lime are uniformly mixed add only enough water to secure proper consistency.

When a batch mortar mixing machine is used, dampen the sand and put into the mixer with the Medusa Waterproofed Cement and hydrated lime; allow mixer to run until cement, sand and lime are uniformly mixed. Then add only enough water to secure proper consistency.

Mortar for Laying Exterior Common Brick Walls

Notes: The object of using Medusa Waterproofing Powder or Paste is to prevent efflorescence, dampness and discoloration of the face brick or the exterior face of the brick wall.

See our pages in Waterproofing Section describing Medusa Waterproofing, Powder and Paste.

Cement—All cement shall be an approved brand of portland cement conforming with the requirements of the American Society for Testing Materials.

Sand—All sand shall be clean bank sand, light in color and evenly graded from fine to coarse, all passing through a $\frac{1}{8}$ "-mesh sieve, with voids not in excess of 35% by water after thoroughly drying.

Waterproofing Powder (or Paste)—All waterproofing shall be Medusa Waterproofing Powder (or Paste) mixed according to the directions of the manufacturers or their representatives.

Water—Water in all cases must be added slowly and only sufficient water used to reach a stiff, workable consistency.

Note: If Medusa Waterproofing Paste is to be used the above Water clause should be omitted.

Measuring—Assuming that 1 bag of cement contains 1 cu. ft., other aggregates are to be measured accordingly by the use of a bottomless box that holds 1 cu. ft. *The measuring of sand or other material with a shovel or other implement that has no positive dimensions will not be allowed.*

Setting Mortar—Mortar for laying exterior brick walls shall consist of:

- 1 part approved portland cement.
- $\frac{1}{2}$ part hydrated lime, by volume.
- 3 parts sand.

(A) Medusa Waterproofing Powder shall be used in quantity equal to 2% by weight of the cement (8 lbs. to the barrel) thoroughly mixed with the dry cement, then in turn with the sand. All according to the directions of the manufacturers or their representatives.

Note: If Medusa Waterproofing Paste is used instead of powder, the following clause (B) should be used in place of clause (A).

(B) Medusa Waterproofing Paste shall be used as follows: 1 gal. (8 lbs.) of Medusa Paste shall be added to 20 gals. of water. This is sufficient to gauge 1 barrel of cement. All according to the directions of the manufacturers or their representatives.

Note: If Medusa Waterproofing Paste is to be used the above Water clause should be omitted.

Architectural Stone Made with Medusa Stainless

No better grade of cement can be employed as the principal ingredient in manufacturing artificial architectural stone, such as cut cast stone and cast stone both plain, moulded and ornamental, than Medusa Stainless White Portland Cement (Plain or Waterproofed) especially due to its whiteness, which is permanent; its stain-

White Portland Cement (Plain or Waterproofed)

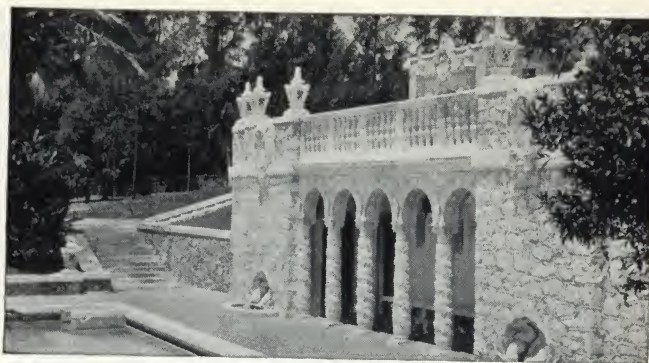
less qualities; and when Medusa Waterproofed White Portland Cement is used, the manufactured product becomes impervious to water and moisture.

Special attention must be given to the aggregates used to produce different results. This information we will gladly furnish at your request.



Salina Memorial Hall, Salina, Kan.

CHARLES SHAVER, Salina, Architect
PETERSON CONSTRUCTION CO., General Contractors
Cast architectural trim stone made by the Concrete Products Company, Salina. This product, faced with Medusa White Cement, is known as Granitite



Beautiful Cast Stone Work on the John Bindley Estate, Coconut Grove, Fla.

KIEHNEL & ELLIOTT, Pittsburgh, Pa., and Miami, Fla., Architects
JOHN B. ORR of Miami designed and executed the cast architectural trim stone



FOUNTAIN IN THE COURTYARD OF THE "ALCAZAR," CLEVELAND, OHIO

Cast stone work by FISCHER AND JIROUCH, Cleveland, Ohio
Imitation caen stone



Fountain and Garden Furniture Faced with Medusa White Portland Cement

UNITED STATES GYPSUM COMPANY

Structolite Cement

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see page B1359

Products

STRUCTOLITE CEMENT.

For Acoustical Plaster, see page A19; for Floor Voids, see page A114; for Reinforced Roof Tile and Monolithic Floors and Roofs, see pages A166-170; for Dry Fill Insulation, see page A200; for Partition and Furring Tile, Beam and Column Covering, see pages A382-383; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Structolite Cement for Fireproof Walls and Slab Construction, Sleeper Fill and Fireproofing Structural Steel

Structolite Concrete is a mixture of "Structolite" with a coarse aggregate of steam coal cinders, blast furnace slag, crushed limestone, or gravel and sand. Using the standard proportions recommended, when cured, Structolite Concrete has an ultimate compressive strength as shown in the table in column two with a weight of about half that of portland cement concrete.

Recent developments in light steel floor joists permit their use in combination with Structolite Concrete on expanded lath or Sheetrock. The economy of Structolite Cement for this

STRUCTOLITE

Reg. U. S. Pat. Off.

The Quick-Set Insulating Cement

For exterior walls, interior partitions, floors and roofs, sleeper fill and fireproofing structural steel

purpose is a strong argument for its use. Its light weight saves steel; its quick set speeds construction. At working temperatures it will set before it freezes, thus reducing the cost of winter work.

Because of its high sound insulation, fireproofness and general adaptability, Structolite is ideal for light occupancy buildings, such as apartments, office buildings, garages, hotels, hospitals, school buildings and residences.

Compression Test—The structural value of this material has been determined by compression tests made at Columbia University, New York City; The Building Department, Philadelphia, Pa.; Washington University, St. Louis, Mo., and at our own mills, using various mixtures of different aggregates.

A comparison of the loads and results of all tests show a safety factor under ordinary residence construction of not less than 10, and under average conditions from 15 to 25.

This exceptional combination of high compressive strength and light weight makes it most desirable for use in exterior bearing walls, floor and interior partitions of homes, service stations, garages and similar buildings where the loads encountered are light.

Structolite Concrete is adaptable for curtain walls of factories where loads are carried principally by structural steel.

WASHINGTON UNIVERSITY TESTING LABORATORY COMPRESSION TESTS

1 part Structolite, 1 part sand, 2 parts aggregate
For Fills: 1 part Structolite, 2 parts sand, 3 parts aggregate

Lab. No.	Mark	Size of tested section		Maximum load producing rupture lb.	Maximum strength in lb. sq. in.	Coarse aggregate	Age at test, days
		Diam., in.	Area, sq. in.				
12775	C4	6.05	28.7	38600	1345	cinder	15*
12776	C5	6.05	28.7	38150	1330		
00001	C6	6.04+	28.7	31200	1085	cinder	14*
00002	C7	6.04+	28.7	30400	1060		
00003	C8	6.05	28.7	29450	1025		
12837	S4	6.05	28.7	40200	1400	limestone	16**
12838	S5	6.05	28.7	45200	1575		
12839	S6	6.00	28.3	41900	1480		
12840	G4	6.05	28.7	45000	1570	gravel	16**
12841	G5	6.03	28.6	42500	1485		
12842	G6	6.05	28.7	43650	1520		

*7 days in cool room and 7 to 8 days at 85° F. until no further loss of weight.

**4 days in room (temp. 65° F.) and 12 days in hot room (temp. 85° F. to 95° F.) until no further loss of weight.

Specifications for Structolite Concrete Floors and Roofs

Scope of Work—All floor and roof slabs over metal joists shall be the UNITED STATES GYPSUM COMPANY'S Reinforced Structolite construction. All slabs shall be of the thickness shown on the plans, and shall be laid level and true, and left in the proper condition required for the type of floor finish to be used.

Proportions—All Structolite Concrete used structurally in this work shall be of the following proportions, which shall be volumetric:

For the equivalent to a 1:2:4 portland cement concrete:
1½ parts of Structolite 1 part of sand
3 parts of coarse aggregate

Structolite Cement—The Structolite Cement used shall be as manufactured by the UNITED STATES GYPSUM COMPANY and shall be delivered to the job in the original packages.

Storage—The Structolite Cement shall be stored in a dry place and shall be well protected from the elements.

Sand—The sand shall be clean, sharp and well graded. It shall be free from loam or other organic material.

Coarse Aggregate—Coarse aggregate shall be cinders, crushed stone, gravel or slag. Cinders shall be a good grade of powerhouse cinders, containing no large unbroken lumps, and



A Structolite Floor and Roof Installation



Pouring a Structolite Floor
Can be worked over in one hour

shall be free from unburned coal. Cinders shall be screened over a $\frac{1}{4}$ -in. screen and all fines removed.

Crushed stone, gravel and slag, shall be crushed to such a size as will pass through a $\frac{3}{4}$ -in. ring and be retained on a $\frac{1}{4}$ -in. sieve. Gravel shall be clean and well graded. Gravel and slag shall be free from clay or other soft material. Slag shall be air-cooled, clean and properly graded.

Water—The water used for mixing shall be clean and free from organic substances.

Mixing and Placing—The mixing of Structolite Concrete shall be done in the ordinary concrete mixer, preferably of the tilting drum type. Care must be exercised in dumping all of each batch and keeping the mixer clean generally, so that particles of set Structolite do not remain to accelerate the next batch. The speed of the drum shall not exceed 20 r.p.m. The predetermined amount of water shall be introduced into the drum first, and the drum allowed to revolve until the paddles and sides are cleaned from any material left from the previous mix. The feeding hopper should be charged, so that the coarse aggregate is delivered into the drum first to help scour it out. For the same reason, if no hopper is used, the coarse aggregate should be placed in the drum first, after the water, and the Structolite last. Just enough water shall be used to insure a thorough mixing of the mass into a workable consistency. (The amount of water required will vary with the dampness of the aggregate.) As soon as the mass has become thoroughly mixed, it shall be removed immediately and placed in the slab. With a drum speed of 20 r.p.m., the entire mixing time shall not exceed two minutes after the Structolite and aggregate have been introduced into the drum. Dump at once; do not allow the drum to idle with all or part of the mix therein and further agitate the mass once the mixing is complete.

Slab Reinforcement—Slab reinforcement shall be an electrically welded, galvanized steel mat, having No. 10 gauge wires, 6 in. on centers in each direction, or its equivalent, placed directly on top of the metal lath.

Wood Floors—Where wood floors are indicated on the plans, they shall be laid as specified under "Carpentry".

Carpet, Linoleum, and Rubber or Cork Tile—Where these coverings are indicated on the plans they shall be applied as per manufacturer's directions. Such wearing courses require a troweled base. Whenever Structolite Slabs are to be troweled, screed the slab smooth and level, and apply a topping not less than $\frac{1}{4}$ in. thick consisting of Structolite Cement and clean, sharp sand mixed in the volumetric proportion of 1 part of Structolite to 1 part of sand. In all cases, apply the topping after the slab has set and dried out for at least 12 hours and preferably after the plastering has been done and just before the building is trimmed. Before applying the topping, clean and sweep the floor thoroughly, removing all loose particles and wet it down. Spread out a layer of Structolite and sand mixed as stated above $\frac{1}{8}$ in. in thickness and allow to remain until it has set. Then apply the balance of the topping mixed very dry at about the consistency of brick mortar, and strike off level with the screed strips. Float and trowel as required to a smooth, level surface using a procedure similar to that employed in surfacing walls. Do not trowel through the set.

Composition Finish—Where composition finish is indicated on the plans, it should be applied as per manufacturer's directions.

Tile or Marble Floor Finish—Where tile or marble finish is indicated on the plans, they shall be laid according to the specifications of the tile manufacturer.

Terrazzo Finish—Where terrazzo finish is indicated on the plans, it shall be laid according to the most recent specifications of the Portland Cement Association. The combined thickness of the finish and bed shall not be less than $1\frac{1}{2}$ in. thick on top of the Structolite concrete slab.

Cement Finish—Where Cement Finish is indicated on the plans, it shall be applied as a free standing slab, according to the latest specifications of the Portland Cement Association. In applying the cement finish, the top of the slab shall be brought to a smooth surface by spreading and screeding thereon a layer of sand. (Use just enough sand to even up the high spots in the rough slab.) Then cover the slab surface with a layer of Slater's Roofing Felt weighing approximately 32 lb. to a roll of 500 sq. ft.

The topping shall not be less than $1\frac{1}{2}$ in. thick, preferably of a 1 to 3 mix with pea gravel aggregate. It shall be reinforced with a light mesh. The slabs shall be cured with a blanket of wet sand or shavings for a period of not less than



A Beautiful "Structolite Home"

two weeks, and shall be divided into squares not exceeding 100 sq. ft. each and preferably less.

Roof Slabs—The Structolite concrete roof slabs shall be troweled smooth and level to receive the roof covering.

Home Building with Structolite

With its remarkable insulation, strength, and deadening values, combined with light weight and nailability, Structolite makes a fireproof residence wall that cannot be equalled with any other material or combination of materials at anywhere near its cost.

Consider this: *Within itself* Structolite is load bearing, insulating, adaptable and cannot be equalled on a value giving basis.

We have recently supplemented our poured "Structolite Home" construction with a precast neat Structolite Tile that is designed to combine the features of the poured house in a unit construction that can be handled without the use of special equipment. Tile construction is less costly than poured and more adaptable for winter work. No special details are required and any mason can handle.

Either poured in place or built of precast standard masonry units cemented together with Structolite mortar offer a monolithic wind tight structure that is rugged and permanent. It cannot burn.

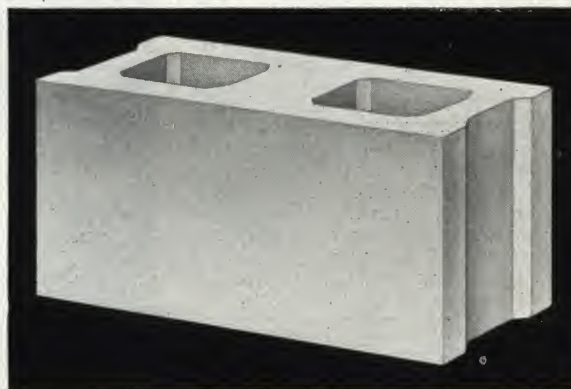
Brief Description of Structolite Tile

Insulation—The conductivity of a finished 8 in. wall is about 0.10 B.t.u. per sq. ft. per hr. per diff. in degree Fahrenheit.

Strength—A compression load of 1000 lb. per sq. in. gross area is obtained before failure.

Weight—8x8x16 in. tile weigh about 25 lb. each. 8x6x16 in. tile weigh about 18 lb. each.

Size—Standard 8x8x16 in. and 8x6x16 in.



Structolite Tile

Load bearing, insulating, lightweight

CELITE PRODUCTS COMPANY

Manufacturers and Distributors of Insulating Materials and a Workability Agent for Concrete

11 Broadway
NEW YORK, N. Y.

53 West Jackson Boulevard
CHICAGO, ILL.

1320 South Hope Street
LOS ANGELES, CAL.

140 Spear Street
SAN FRANCISCO, CAL.

OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

CELITE PRODUCTS LIMITED, New Birks Building, Montreal, Que.
CELITE PRODUCTS CORP., 147 Windsor House, Victoria Street, Westminster, London, England

Products

CELITE, a Workability Agent for Concrete.
SIL-O-CEL HIGH TEMPERATURE INSULATING MATERIALS.
Also Filter-Cel and Super-Cel Aids to Filtration.

Celite

Celite is a dry powder composed of extremely fine particles of amorphous silica. Added to a concrete mixture with the other dry materials it stabilizes the mass, holding the portland cement, water, sand and coarse aggregate in the same relation to each other throughout handling and placing as when they left the mixing drum.

Improved Workability—The first benefit of Celite in a concrete mixture is improved workability. It obviates the use of excessive mixing water and makes it possible to successfully place concrete of drier consistencies in mass structures or in intricate forms, without danger of honeycombing or segregation.

What Improved Workability Means—(1) It results in quicker and cleaner discharge.

(2) The concrete can be placed with less labor and manipulation.

(3) The concrete will flow into place in the forms around intricate reinforcing, completely filling all corners and recesses.

(4) Relatively dry concrete can be satisfactorily handled by chutes without the need for excess water.

(5) In cases where central mixing is employed no segregation will be encountered in transit from the mixer to the job, and difficulties in dumping from trucks will be eliminated.

Uniformity and Strength—Segregation is the principal cause of non-uniformity in a concrete structure. It can be absolutely overcome through the correct use of Celite, so that the minimum strength (which is in fact the effective crushing strength of the concrete) is greatly increased.

A higher average strength also is made possible since concrete containing Celite can be placed with a lower slump, ordinarily, than would otherwise be used.

Water-tightness—Celite provides integral water-tightness in concrete in which it is used—a result of improved uniformity and decreased void sizes.

Concrete in Sea Water—The value of amorphous silica in combining with the free lime which is released as concrete hardens, is particularly emphasized where concrete structures may be subjected to the action of sea water. Celite, being practically pure amorphous silica, is a very effective material for preventing sea water corrosion.

Admixture Tables—The quantity of Celite which should be used to secure best results varies with the mix. Harsh aggregates may require a slight increase over the amounts specified. In any case, however, the amount of Celite constitutes only a very small proportion of the entire mixture.

AMOUNT OF CELITE RECOMMENDED

Concrete mix	Economic limits per bag of cement	Average recommendations per bag of cement
1: 1½: 3	1½-3 lb. Celite	2 lb. Celite
1: 2½: 3½	2-4 lb. Celite	2½ lb. Celite
1: 2: 4	2-4 lb. Celite	3 lb. Celite
1: 2½: 5	3-6 lb. Celite	4 lb. Celite
1: 3: 6	4-8 lb. Celite	5 lb. Celite

Increased Yield—The cost of Celite in many cases is repaid alone by the increased yield of finished concrete in place. In a 1:2:4 mix, for example, the use of 3 lb. of



Celite per bag of portland cement ordinarily results in an increase in the yield of finished concrete of approximately 5 per cent.

Method of Use—No changes of equipment or in methods of mixing or placing concrete are involved in the use of Celite. This powdered material is simply added with the other dry ingredients at the mixer. The mix is handled in the usual manner. No more water is added to a concrete mix containing Celite than is necessary to give an equal or lesser slump than would be secured with plain concrete.

Standard Specifications—Celite shall be used in all concrete in the proportions set forth below for the different concrete mixtures.

... : ... : ... concrete ... lb. per bag of cement
... : ... : ... concrete ... lb. per bag of cement.

The Celite may be measured by a pre-determined volume in such a manner as will insure the correct proportion by weight, and shall be added at the mixer with the dry materials.

Only sufficient water shall be used to give a workable consistency and in no case shall more water be added than will give a slump of ... in.

Sil-O-Cel Insulating Materials

For the insulation of all types of boilers and auxiliary heating and power plant equipment, Sil-O-Cel is provided in the form of brick, block, powder, plastic and hard finish cements and coarse aggregate (C-3) for making insulating concrete.

Building walls, partitions and roofs are ordinarily insulated and sound deadened with a filling of Sil-O-Cel Coarse Grade Powder.

Sil-O-Cel Standard Insulating Brick—Recommended for insulating service behind the refractory or over steel surfaces where direct temperatures will not exceed 1600° F.

Sil-O-Cel C-22 Insulating Brick—These brick are free from shrinkage at direct temperatures as high as 2000° F.

Sil-O-Cel Super Brick—Semi-refractory, withstand direct temperatures up to 2500° F. without shrinkage or deterioration.

Mortar for Laying Sil-O-Cel Brick—This is included with each shipment. The brick are well packed in cartons of 25 for convenience in storage and handling.

Insulating Powder and Coarse Grade Insulation—Used as an insulating filler in hollow walls and over the tops of heated equipment.

C-3 Aggregate—A coarsely ground calcined material used as an insulating filler in hollow walls or bases where temperatures behind the refractory run as high as 2000° F. Weight in place, 36 lb. per cu. ft. Four parts of C-3 mixed with one part by volume of portland cement make an insulating concrete of great durability, which weighs when dried, only 60 lb. per cu. ft.

Insulating Cements—("Plastic" and "Hard Finish"), made with Sil-O-Cel, are provided for covering irregular surfaces where insulating brick could not be conveniently used.

Insulating Blocks—made of Sil-O-Cel and long fibered asbestos, are supplied in 6 and 12-in. widths, lengths of 18 and 36 in., and thicknesses of 1, 1½, 2, 3 and 4 in.

Celite Engineering Service

Celite Engineering Service is freely available at every office of the Company to co-operate toward the solution of any problems relative to the proportioning and placing of concrete, or the insulation of buildings or heated equipment.



1:2:3½ Concrete Containing 3 lb. of Celite per Bag of Cement
Slump 3 in. Note extreme workability and freedom from segregation

ADENSITE CO., INC.

Manufacturers of Concrete Waterproofing and Hardeners

116 West Thirty-ninth Street
NEW YORK, N. Y.

PHILADELPHIA OFFICE: Land Title Building

LABORATORY: Jackson Avenue and Seventh Street, LONG ISLAND CITY, N. Y.

Products

ADENSITE, a Liquid Integral which is used in the gauging water for Hardening and Waterproofing portland cement concrete and mortar.

PUR-TONE COLORS, mineral color in powder form for portland cement floor finish.

ADAFLINT, a flush-on floor hardener in crystal form.

Adensite

Uses—Waterproofing concrete walls below grade, either in mass concrete or in plaster coat. Hardening and dustproofing cement floor finish.

Waterproofing portland cement stucco.

For brick masonry, Adensite gauged mortar is smooth working, does not drag and prevents "riding."

Authoritative Tests—Upon request, we shall be pleased to furnish the architect with authoritative test data on Adensite, compiled from testing laboratory results and research work carried out at the U. S. Bureau of Standards for the A. S. T. M.

Guarantee—Adensite is unconditionally guaranteed to produce positive and permanent results by the manufacturers, the **ADENSITE CO., INC.**

Surety maintenance bonds furnished on waterproofing jobs.

Service—Our field men visit construction operations while Adensite is in use.

Colored Floors

PurTone colors are specially prepared for use with portland cement in floor finish and are used integrally throughout the entire top finish, assuring permanent and positive results.

(Specifications upon request.)

Applied Hardener

Adaflint, dissolved in water, 2 lb. to the gallon and slushed over an old or new floor, will render a cement finish hard and dustless.

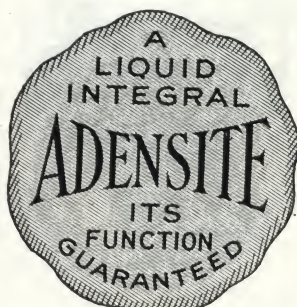
Adaflint is furnished in natural gray, oak and green.

Shipments

Adensite is shipped in 5, 30 and 50-gal. containers.

PurTone Color is shipped in 550-lb. barrels.

Adaflint is shipped in 2-lb. boxes, 25 to a case.



TRADE-MARK



Independence Hall, Philadelphia

Waterproofed with Adensite gauged plaster coat

Adensite Specifications

Waterproofing Mass Concrete—The gauging liquid for concrete shall be prepared by placing from 3 to 4 gal. of Adensite in a 52-gal. barrel and adding water. For every 1-bag batch, use between 3 and 4 gal. of the prepared liquid (amount of liquid varies with fineness of aggregate and temperature).

Joints Between Pourings—Shall be thoroughly grouted with Adensite grout.

Waterproof Plaster Coatings—Shall be $\frac{5}{8}$ in. in thickness, applied in 2 coats and properly coved and bonded to the floor.

Bonding New to Old Concrete—All surfaces before application of new work shall be thoroughly roughed, cleaned and dampened with Adensite grout to insure perfect bond.

Adensite Grout—Add 1 part Adensite to 3 parts water and enough cement to give mixture a creamy consistency.

Protection of Green Work—To protect green work against action of water, the pump shall be kept in operation 24 hours after pouring or trowelling of work.

Floor Hardening—Upon the plain concrete floor slab shall be laid a 1-in. topping of 1 part cement and 2 parts clean sand. This dry mix shall be tempered with a liquid composed of 3 gal. of water to 1 qt. of Adensite for every 1-bag batch. No dryer shall be used.

Gauging Liquid for Floor Finish—Gauging liquid may be prepared by putting 4 gal. of Adensite into a 52-gal. barrel and adding water (no stirring required).

Bond—When slab is over 48 hours old, before topping is stretched, it shall be given a coating of Adensite grout.

When slab is over 7 days old, before topping is stretched, it shall be roughed with a pick or chisel, cleaned and given a coat of Adensite grout.

Brick Masonry—The mortar shall be composed of 1 part portland cement, and 3 parts clean sand, tempered with a liquid composed of 1 part Adensite to 12 parts water.

Some Users of Adensite

Grosvenor Atterbury, New York, N. Y.

Alfred C. Bossom, New York, N. Y.

Harold B. Brady, Elizabeth, N. J.

Buchman & Kahn, New York, N. Y.

Bureau of Yards & Docks, Washington, D. C.

Clinton & Russell, New York, N. Y.

Coffin & Coffin, New York, N. Y.

C. B. Comstock, New York, N. Y.

George W. Conable, New York, N. Y.

Cross & Cross, New York, N. Y.

Day & Klauder, Philadelphia, Pa.

Delano & Aldrich, New York, N. Y.

Dennison & Hiron, New York, N. Y.

I. E. Ditmars, New York, N. Y.

J. H. & W. C. Ely, Newark, N. J.

John F. Jackson, New York, N. Y.

Jardine, Hill & Murdock, New York, N. Y.

Mack & Sahm, Wilkes-Barre, Pa.

John Molitor, City Architect, Philadelphia, Pa.

New York Central Railroad Co., New York, N. Y.

John T. Rowland, Jr., Jersey City, N. J.

F. B. & A. Ware, New York, N. Y.

Warren & Wetmore, New York, N. Y.

THE AMERICAN FLURESIT COMPANY

Manufacturers of Fluresit, a Hardening, Densifying, Waterproofing and Acid-proofing Admixture for Concrete, Mortar and Cement Stucco

27 East Water Street
CINCINNATI, OHIO

FOREIGN FACTORIES

LONDON, ENGLAND
PARIS, FRANCE

HANAU, GERMANY
BARCELONA, SPAIN

CAIRO, EGYPT
VIENNA, AUSTRIA

BUDAPEST, HUNGARY
PRAGUE, CZECHO-SLOVAKIA

Product

FLURESIT, a hardener, accelerator, waterproofer, acidproofer, freezeproofer, densifier and anti-efflorescent for concrete and mortar.

Service Record

Fluresit has been used in Europe since 1912, and is highly recommended by leading architects and engineers all over the world, as proven by testimonials which will be sent on request.

Special Features

Fluresit is a chemical compound, in paste form, which is either dissolved in the gauging water or added directly to the mixer. When used according to the specifications, Fluresit immediately sets up a chemical action which continues throughout the hardening of the concrete or mortar, quickening the time of set and contributing many other desirable qualities.

FLURESIT TENSION AND COMPRESSION TESTS WITH 1-3 PORTLAND CEMENT AND OTTAWA SAND MORTAR

Made by H. C. Nutting Co., Cincinnati, Ohio
Ordinary Laboratory Storage Conditions

Spec. No.	Tension, lb. per sq. in.		Compression, lb. per sq. in.	
	With Fluresit	Without Fluresit	With Fluresit	Without Fluresit
7-Day Test				
1	335	230	2252	1175
2	345	245	1777	1474
3	350	230	1849	1171
Av.	343	235	1959	1273
28-Day Test				
1	500	340	2437	1808
2	485	325	2769	1945
3	490	345	2426	
Av.	492	337	2544	1876

FLURESIT 90-DAY COMPRESSION TESTS WITH 1-3 PORTLAND CEMENT AND OTTAWA SAND MORTAR

Salt Water Storage

Spec. No.	Compression, lb. per sq. in.	
	With Fluresit	Without Fluresit
1	3039	1473
2	2713	1836
Av.	2876	1655

FLURESIT COMPRESSION TESTS WITH 1-2-4 CONCRETE (5-in. Slump)

Ordinary Laboratory Storage Conditions

Spec. No.	Compression, lb. per sq. in.	
	With Fluresit	Without Fluresit
7-Day Test		
1	1523	1211
2	1431	1279
Av.	1477	1245
28-Day Test		
1	2747	2416
2	2912	2308
Av.	2829	2362

FLURESIT 6 MONTHS SALT WATER COMPRESSION TEST

Two cylinders were submerged 30 ft. below the surface in the salt water of Tampa Bay, for a period of 6 months. The cylinders were 6x12 in. and consisted of 1 part cement and 3 parts standard Ottawa sand.

Cylinder No. 11 contained an admixture of Fluresit. Cylinder No. 23 was made with plain water.

Cylinder No.	Compression test	
	Total load, lb.	Unit, lb. per sq. in.
11	67,190	2376
23	51,170	1810

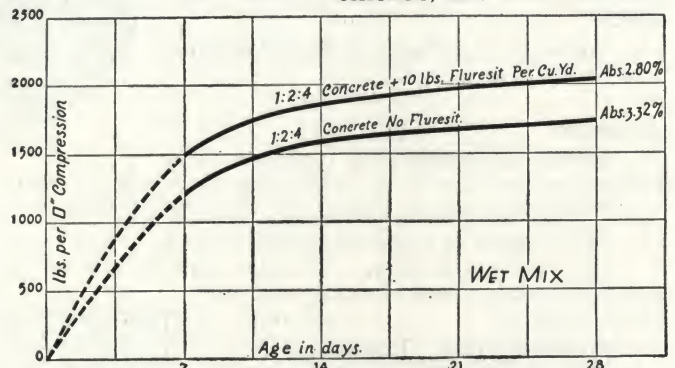
Cylinder No. 11 broke sudden and sharp, thus breaking aggregate. Cylinder No. 23 split and crumbled.



TRADE-MARK

As an Accelerator, Densifier and Hardener—The series of tests described are ample evidence of the value of Fluresit in concrete mixtures. The Fluresit was added to the wet mix in the proportion of 10 lb. Fluresit per cu. yd. Fluresit-concrete starts to set in 2 hours, 20 minutes, setting completely in 12 hours, 30 minutes.

TESTS MADE BY G. F. GEBHARDT AT THE ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO, ILL.



As a Waterproof—Fluresit will withstand water seepage under a pressure of 20 atmospheres (3000 lb. per sq. ft.). It insures dry, healthful basements and improves stucco by not only making it harder, but by also making it rainproof. Fluresit makes concrete permanent even under the action of salt water and in addition deters the formation of barnacle growth.

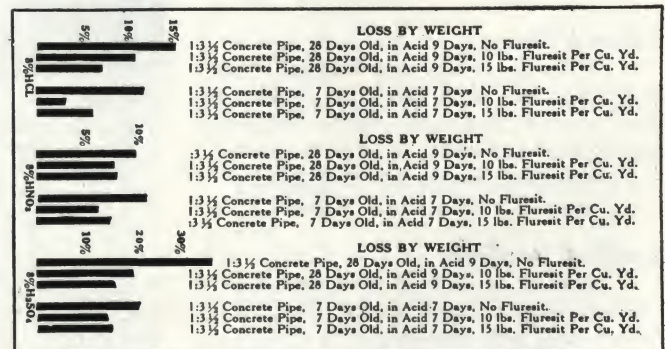
As an Acidproofer—Tests were conducted on concrete sewer pipes, immersed in 8% solutions of hydrochloric, nitric and sulphuric acids. The concrete pipes were made in the plants of the Mid-West Concrete Pipe Co., Chicago, Ill. The mix consisted of 1 part cement to 3½ parts sand and small gravel. The pipes were 12 in. in diameter. Cured in steam. Tested at 7 and 28 days.

Note: While it is not probable that 8% acid solutions will ever be encountered in actual practice, the tests clearly indicate that Fluresit concrete when subjected to mild acid action for a long period of time can be depended upon to have a life 20 to 50% longer than non-Fluresit concrete used under the same conditions.

As a Freezeproofer—Fluresit foundations were poured at zero and at 5° above zero, Fahrenheit, without freezing.

As an Anti-efflorescent—The action of soil acids and alkalis are completely counteracted by Fluresit. Calcium combines chemically with Fluresit to form a permanently insoluble compound, so that it does not cause the unsightly surface crystallization known as salt-peter rash or efflorescence on brick or masonry work.

Heat Resistant—Fluresit-treated concrete will withstand a temperature of 2700° F. without breakdown.



Directions for Use

Use 10 lb. of Fluresit per cu. yd. of concrete for waterproofing and 12 lb. Fluresit per cu. yd. for mortar and acidproofing. Thoroughly mix a given weight of Fluresit with an equal weight of water. This will produce a thick, creamy paste and 1 qt. of this paste will weigh approximately 2 lb., containing 1 lb. Fluresit and 1 lb. water. Add this paste to the concrete ingredients in the mixer on the basis of: 1 qt. for each pound of Fluresit desired in the concrete.

Note: When using Fluresit in concrete, less mixing water is required than when not using Fluresit, due to the fact that Fluresit fattens the mix appreciably.

ESTABLISHED 1895

THE ANTIHYDRINE COMPANY

308 Washington Building
NEW HAVEN, CONN.

Product

Manufacturers of ANTIHYDRINE, a Coating for Dampproofing and Stain-proofing.

Description

Antihydrine is a material made of a high grade of asphalt carefully prepared in combination with several chemicals, which combination gives it the peculiar property of *forming (without heating) a continuous glossy and impervious coating upon porous surfaces, without penetration.*

Antihydrine is the pioneer dampproof paint, having been first made in 1895. *There has been no subsequent change in formula.*

Advantageous Features

(1) Antihydrine eliminates the necessity of using lath and wood furring for interior plastering of outside walls, plastering being applied over the Antihydrine within 24 hours.

(2) Renders walls dampproof.

(3) Prevents staining of plastering on walls and on fireproof work; also, the following:

Applied to Inside of Outside Walls—(4) No furring needed—cost of and space occupied by furring are saved.

(5) Dangerous places to harbor vermin and encourage fires (when wood furring is used) are eliminated.

(6) Outside walls are made absolutely dampproof.

(7) Building is made warmer and more easily heated.

(8) All staining of and efflorescences on plastering are avoided.

Applied to Fireproof Blocks in Ceilings and Partitions—(9) All staining and efflorescence prevented.

(10) Plastering on blocks dries quickly, saving much time.

(11) All plastered surfaces permit diversified decoration without danger of damages from dampness.

(12) Discoloration of plastering from smoky brick is prevented.

Applied to Built-in Surfaces of Iron, Limestone, Marble, Face Brick, etc.—(13) All ironwork built in wall is preserved.

(14) Staining and efflorescence on exterior of limestone, marble and brick are prevented.

(15) Use of *ordinary* cement mortar in the backing is allowed, thus saving time and money otherwise spent in preparation of expensive cement mortar.



ing, however, must be kept absolutely continuous, covering every part. A second coat can be applied, if desirable, within a few hours after the first application.

Covering Capacity

Extensive, by reason of its lack of penetration. 1 gal. covers about 100 sq. ft. of brickwork or fireproofing, 1 coat; or, 60 sq. ft., 2 coats; 1 coat, properly applied, is sufficient for the prevention of dampness and stains.

Shipment

Antihydrine is delivered in casks of 10 and 50 gals.

Cost

The cost of Antihydrine is \$1.25 per gal.

Specification Data

The brush shall be the kind used for oiling brick fronts; contents of barrel to be thoroughly stirred before application; every part to be covered, leaving no small holes, etc.; coating to be thin where it is to be plastered over, with sufficient body to leave a glossy surface; and the Antihydrine to be soft or "tacky" when plastering is applied.

First coat of plastering, as thin as will allow of proper scratching, will dry quickly; second coat is applied immediately thereafter; after drying, third and last coat of plastering is applied when, after a few days, surface will be ready for painting and decorating.

References

A few buildings in which Antihydrine was used:

New York, N. Y.

American Museum of Natural History
Delmonico Building
St. James Building
Manhattan Hotel
Skin and Cancer Hospital
Home for Aged Men and Married Couples
Journey Building
Public School Buildings
New York Hospital
New Hall of Board of Education
Commercial Academy of Marest Bros.
Clara Hirsch Home for Working Girls

Other Cities

Lincoln Memorial, Washington, D. C.
St. John's Home for Boys, Brooklyn, N. Y.
Brazier Building, Boston, Mass., Cass Gilbert, Architect
Masonic Temple, Boston, Mass., Loring & Phipps, Architects
Residence, Beacon St., Boston, Mass., R. Clipston Sturgis, Architect
Hotel Dartmouth, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
St. Joseph's Novitiate, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
Hotel Cambridge, Boston, Mass., W. T. Sears, Architect
Hall of Missions Church, Boston, Mass., T. J. Untersee, Architect

Application

After being well stirred, the Antihydrine contents are poured into a pail and any laborer can apply same *cold* with a brush. Material is fully prepared, ready for use, and is applied as easily as whitewash; the coat-

ANTI-HYDRO WATERPROOFING CO.

TELEPHONE
TERRACE 5440

265-277 Badger Avenue
NEWARK, N. J.

REPRESENTATIVES, SERVICE AND STOCK IN ALL LARGE CITIES

ESTABLISHED 1904

Products and Services

"ANTI-HYDRO PERMANENT," a Liquid Integral Compound for waterproofing, dampproofing, accelerating, without weakening, and for hardening all portland cement mixtures.

ARMORTOP, a liquid applied Hardener and Dust Preventer for cement floor surfaces.

ACCELLO, a water solution of commercially pure calcium chloride for Refrigeration and for Accelerating the Set of Concrete in cold weather, without freezing.

CONSULTING WATERPROOFING ENGINEERS, for consultation and design for all waterproof constructions. Correspondence invited.

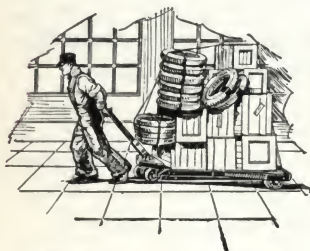
Guarantee

On many important installations we have furnished a written guarantee for a period of five years on the maintenance of waterproof concrete and the dustproofing and hardening of concrete floors. A Surety Bond will be furnished on all waterproofing installations supervised by our Engineering Department.

"Anti-Hydro" Concrete Integral Waterproofer and Hardener

Description—"Anti-Hydro" is a liquid compound, with an affinity for cement. When added, in certain percentage to the water used in gauging portland cement mixtures in the usual way, it has the effect, without retarding setting, of rendering cement in all kinds of masonry impervious to water, moisture, frost, gas, oils, odors, sugar solutions, alkalis and most acids.

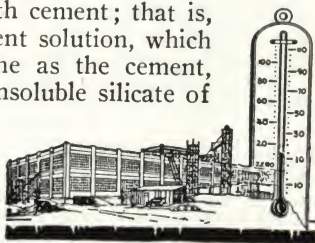
It excites and brings into service all the cohesive or colloidal possibilities of portland cements, which in themselves are most efficient waterproofing mediums. There are no alums, hydrate of lime, greases, oils, stearic acid or decomposable ingredients used; neither are there any iron admixtures—all of which disintegrate concrete in time.



Hardens and Dustproofs Concrete Floors

"Anti-Hydro's" function may be expressed as waterproofing cement with cement; that is, filling the voids with a cement solution, which crystallizes at the same time as the cement, integrally forming a hard, insoluble silicate of greater tensile strength, density and activity. It enriches mortars so that cost of troweling, mixing and supervision is reduced to a minimum. In fact, it more than pays its cost in labor saving. It hardens wearing surfaces to a degree that makes them dustless and adamant. It lowers the freezing point of the gauging water, permitting concreting when the temperature is as low as 15° F.

When mixed with portland cement "Anti-Hydro"



Lowers Freezing Point



Dampproofs Brick Mortar and Prevents Efflorescence

proofing brick mortar and for preventing efflorescence; waterproofing, hardening and bonding concrete roads.

Approval—The superiority of "Anti-Hydro" for waterproofing and concrete hardening is demonstrated by the permanency of work completed since 1904, and by the comparative tests of the United States Bureau of Standards. Their Technologic Paper No. 3 designates "Anti-Hydro" as Compound No. 40, and states "It is the most impermeable of any of the mortars."

Specifications—Waterproofing in Mass—To the 1:2:4 mix, for gauging, add 1½ gal. of "Anti-Hydro" for every cubic yard of concrete. Proper consistency will be obtained if, for each barrel of cement, 1 gal. "Anti-Hydro" and from 10 to 15 gal. of water be used. If forms are below water level, concrete should be poured extremely stiff. Unless walls and floor are poured at one time, key all joints and bond them with "Anti-Hydro" grout. (See bonding directions below.)

Floor Hardener—The 1-in. floor topping of 1:2 mix shall be gauged by addition of "Anti-Hydro" to all water used in tempering dry mixture, in proportion of 1 gal. of "Anti-Hydro" to each barrel (4 bags) of cement. The proper consistency will be obtained if, for each barrel of cement, 1 gal. of "Anti-Hydro" and 10 to 12 gal. of water be used. (See bonding directions below.)

Waterproofing in Coatings—Floor work shall be 1 in. in thickness, and shall serve the double purpose of waterproofing agent and dustless wearing surface.

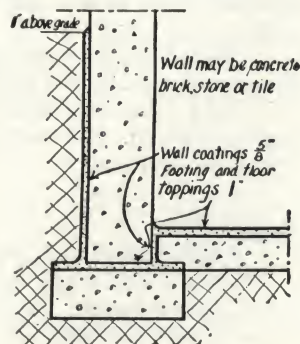
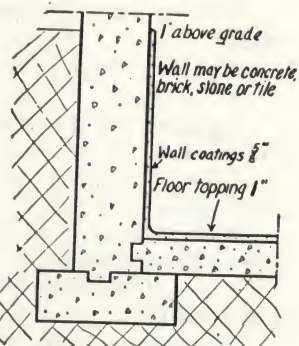
Wall coatings (2-coat) shall be ½ in. in thickness from floor level, where they shall be properly coved and bonded to floor, and carried up to at least 1 ft. above grade.

The 1:2 mortar shall be gauged by addition of "Anti-Hydro" to all water in proportion of 1 gal. "Anti-Hydro" to each barrel (4 bags) cement.

Perfect Bond—To assure perfect bond to underlying masonry, all surfaces, before application of waterproofing, shall be thoroughly roughened, cleaned, dampened and grouted.

forms a plastic mass which sets up very quickly and is used for calking metal passing through concrete, and for stopping leaks under pressure. Mixed with water and cement, it forms a dampproof paint which can be applied to the inside of masonry walls or to the back of limestone to prevent discoloration.

"Anti-Hydro" is used for hardening cement floors, waterproofing concrete in mass and in surface coating, and bonding topping to underlying slab; dampproofing and water-



A slush or grout of neat cement, using 1 part "Anti-Hydro" to 3 parts of water, is first applied. Coatings shall be applied not later than 24 hours after surfaces have been prepared and while slush coat is still wet.

Note: Specifications for waterproofing *Brickwork, Stucco on Solid Masonry and Stucco on Metal Lath and Dampproofing* furnished on request.

Acid Resisting—Write for special specifications.

Road Work—"Anti-Hydro" is especially suited for concrete pavements and roads. It makes concrete as hard in 24 hours as it would ordinarily be in 8 days and actually increases the strength of concrete 22%. Due to its quick hardening qualities, roads are made ready for use in 24 hours after they are laid by mixing 1 gal. of "Anti-Hydro" to 10 gal. of water.

"Anti-Hydro" can be used with any portland cement at a minimum cost.

For maintenance work, "Anti-Hydro" will bond new concrete securely to old.

"ANTI-HYDRO" QUANTITIES

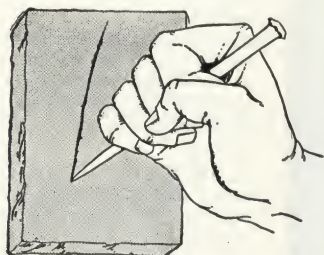
Kind of work	Quantity anti-hydro per bbl. cement	Covering capacity
Waterproofing in mass 1:2:4 concrete	1 gal.	3½ cu. yd. concrete
Waterproofing ¾-in. plaster coat	1 gal.	100 to 125 sq. ft.
Waterproofing 1-in. floor topping	1 gal.	100 to 80 sq. ft.
Waterproofing stucco ¾ in.	1 gal.	100 sq. ft.
Waterproofing brickwork ¾-in. joint	1 gal.	700 brick or 35 cu. ft.
Dampproofing brickwork ¾-in. joint	1 gal.	1000 brick or 50 cu. ft.
Dampproofing in cement wash	1 gal.	400 sq. ft.—2 coats
Hardening cement floor 1-in. topping	1 gal.	100 to 80 sq. ft.

Armortop Concrete Applied Dustproof and Hardener

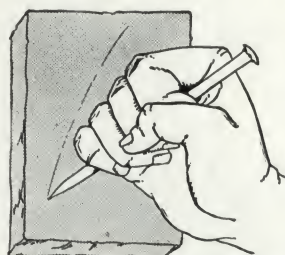
Description—Armortop is a liquid compound which, when applied to any concrete surface, old or new, changes the soft granular topping of the concrete into a granitike mass that resists the most severe wear and abrasion without dusting up. The application of Armortop insures added years of wear and use for any cement floor whether it has just been laid or whether it has been in service for several years. It saves tearing up and relaying old floors which are beginning to rut.

So easily, quickly and surely does Armortop transform soft, crumbling, dusting floors into new, hard, dustproof ones, that the whole job can be performed in the evening after closing hours by any ordinary laborer. Next morning floors are ready for use without loss of time, costly shutdowns and delays to manufacturing.

No skill is required to apply Armortop. Simply mix it with water and brush it with a stiff brush or broom over the surface to be treated.



An Ordinary Concrete Surface Can be Deeply Cut with a Nail or Pointed Instrument as Shown Above



The Same Concrete Surface Treated with Armortop Becomes so Hard That It Can Scarcely Be Scratched with the Same Nail

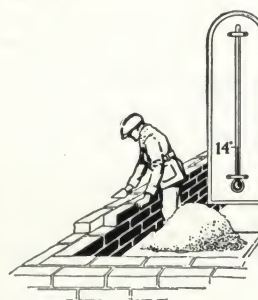
Armortop reacts chemically with cement and combines with it, forming a new compound which binds the loose, disintegrating particles of the concrete mix into a dense hard mass. Because of this reaction, Armortop results are permanent and should not be confused with temporary paint coatings. The covering capacity of Armortop varies with the density of the floor. One gallon will cover from 70 to 150 sq. ft. of floor surface.

A concrete test slab treated with Armortop will be sent to any one desiring to make the comparative test.

Specifications—Upon the clean, dry floor apply a solution of 1 part Armortop and 1 part water in 2 or more coats, depending upon the density of the floor. Allow 4 hours to elapse between coats.

Accello Concrete Accelerator and Anti-Freeze

Description—Accello, a liquid solution, is used to accelerate the set of cement mortars and floor finish in very cold weather, and to make possible the hydration of portland cement mixtures at temperatures as low as 14° F.



in plain concrete, cement plaster, floor toppings, brick mortar, and road work, the use of Accello during the winter months, when the temperature falls as low as 14° F., is indispensable. It insures masonry work against frost and freezing, and permits work to continue during the cold weather.

Accello makes better concrete road work possible, speeds up work and reduces delays to traffic to a minimum.

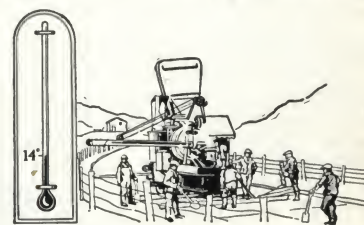
Accello makes bricklaying possible until the temperature drops below the point at which it pays to keep the men at work.

Accello is a standardized solution of calcium chloride, uniform in quality and strength. It is easy to use. Any unskilled workman can add it to the gauging water.

The proportions necessary are shown below:

Proportions of Accello and Water at Outside Air Temperatures—

- 35° F., use 1 part Accello with 20 parts water
- 32° F., use 1 part Accello with 15 parts water
- 28° F., use 1 part Accello with 12 parts water
- 25° F. (or less), use 1 part Accello with 10 parts water
- 14° F. (or less), mechanical heat is necessary



Detailed Information

Write for complete data and specifications for any work within the scope of "Anti-Hydro" products. The services of our Engineers are available at all times.

Dealers Everywhere Carry Stock

A complete stock of "Anti-Hydro" products is carried by dealers throughout the country.

Shipment

"Anti-Hydro" is shipped in standard containers of 5, 10, 20 and 30 gal.

Armortop, in containers of 5, 30 and 50 gal.

Accello, in barrels of 50 gal.

AQUABAR WATERPROOFING PRODUCTS

Waterproofings, Dampproofings, Floor Hardeners, Technical Paints and Steel Coatings—"Consult Us and Keep Dry"

GENERAL OFFICES

428 Perry Building, PHILADELPHIA, PA.

Representatives in all Principal Cities. Nearest Distributer's name furnished on request

Products

AQUABAR INTEGRAL COMPOUND No. 1, WATERPROOFING PASTE.

AQUABAR AQUATITE INTEGRAL LIQUID WATERPROOFING.

AQUABAR CLEAR-COAT No. 2, COLORLESS WATERPROOFING LIQUID.

AQUABAR STATITE PLASTER BOND No. 3 DAMPPROOFING PAINT.

AQUABAR MARINE CEMENT No. 3A.

AQUABAR STONE BACKING No. 3B.

AQUABAR MASTIC INSULITE CEMENT No. 4.

AQUABAR IRON-CLAD CRYSTALS No. 7B (Floor Hardener).

AQUABAR IRON-CLAD LIQUID FLOOR HARDENER.

AQUABAR INTEGRAL LIQUID FLOOR HARDENER.



AQUABAR CRYSTEEL METALLIC FLOOR HARDENER No. 7

AQUABAR QUICK SET CEMENT ACCELERATOR and ANTI-FREEZE COMPOUND.

AQUABAR WOOD FLOOR PRESERVATIVE.

AQUABAR ELASTICOTE No. 6 WATERPROOF PAINT.

AQUABAR CONCO CEMENT FLOOR PAINT.

AQUABAR MARINE WATERPROOF PAINT.

AQUABAR ROOF COATING No. 5.

AQUABAR STERILITE FLAT WAL FINISH.

AQUABAR WAL-WITE ENAMEL (MILL WHITE).

AQUABAR FABRICATORS RED OXIDE, CARBONITE STEEL COATING (Structural Steel Coatings).

AQUABAR TRIPLE SEAL SYSTEM OF WATERPROOFING.

Twenty-six Years of Quality and Service—1901-1927

For the past 26 years we have specialized in the manufacture of waterproofing and dampproofing materials, floor hardeners and protective coatings of all kinds.

As pioneers in solving the most difficult waterproofing problems, Aquabar has proven to be a most economical and efficient waterproofing compound. It is used extensively in the construction of swimming pools, reservoirs, vaults, foundations, tunnels and all other kinds of masonry construction.

Detailed architects' specifications and information on any of our products will be furnished upon request, without any obligation on your part.

No. 1 Integral Compound

Description—A soft semipaste which is easily dissolved in water for waterproofing mass concrete, cement plaster, cement mortar for brick and stone work, stucco, etc. It does not affect the strength of concrete, but increases its effectiveness with age.

Specifications—**Waterproofing Mass Concrete**—A dry mixture of cement, sand and stone—1:2:4 mix, shall be tempered to a medium wet consistency with water, to which 1 part of Aquabar Integral Compound No. 1 has been added to every 50 parts of water, in strict accordance with manufacturer's directions.

Covering Capacity—From $\frac{1}{2}$ to $\frac{3}{8}$ gal. will waterproof 1 cu. yd. of mass concrete 1:2 mix.

Waterproofing Cement Mortar and Stucco—The waterproofed cement mortar, consisting of 1 part cement, 2 parts

sand with water, shall be prepared by tempering to required consistency, to which 1 part Aquabar Integral Compound No. 1 has been added to every 25 parts water, in strict accordance with manufacturer's directions.

Covering Capacity—1 gal. will waterproof approximately, 150 to 175 sq. ft. 1-in. top coat 1:2 mixture cement mortar, or, approximately, 200 to 250 sq. ft. of cement stucco 1 in. thick.

Aquatite Integral Liquid Waterproofing

Description—A liquid compound for waterproofing and accelerating mass concrete and cement mortars.

Specifications—**Waterproofing Mass Concrete**—To the 1:2:4 mixture for gauging add $1\frac{1}{2}$ gal. of Aquatite for every cubic yard of concrete. Proper consistency will be obtained if for each barrel of cement 1 gal. of Aquatite and from 10 to 15 gal. of water be used. If forms are below water level, an extremely stiff mixture should be poured.

Waterproofing Cement Mortars—The 1:2 mortar shall be gauged by addition of Aquatite to all water in the proportion of 1 gal. Aquatite to each barrel (4 bags) of cement.

Covering Capacity—Approximately $1\frac{1}{2}$ gal. will waterproof 1 cu. yd. concrete 1:2:4 mix; 1 gal. will waterproof 100 sq. ft. 1-in. top coat 1:2 mix cement mortar.



Gimbel Brothers Department Store, Philadelphia, Pa.

GRAHAM, ANDERSON, PROBST & WHITE, Architects
THOMPSON-STARRETT COMPANY, Contractors

Foundations waterproofed with Aquabar Integral Waterproofing Compound No. 1

Clear-Coat No. 2

Description—A colorless, transparent liquid for waterproofing and dampproofing outside walls (above grade) of brick, stone, concrete, cement, terra cotta, stucco, etc. Clear-Coat No. 2 does not discolor surfaces to which it is applied. Penetrates readily, filling all pores, rendering the surface impervious to moisture and driving rains.

Covering Capacity—Approximately, 125 sq. ft., 1 coat; 80 sq. ft. per gal., 2 coats, depending upon porosity.

Statite Plaster Bond No. 3

Description—A black compound for application to masonry surfaces of all kinds, so as to form a dampproofing and bond for plaster. It eliminates furring and lathing.

Covering Capacity—Approximately, 75 sq. ft. per gal., 1 coat; 50 sq. ft. per gal., 2 coats.

Marine Cement No. 3A

Description—A black compound of heavy consistency for dampproofing exterior foundation walls below grade, also for application to floor slabs of ground floors. Applied cold.

Covering Capacity—Approximately, 60 sq. ft. per gal., 1 coat; 40 sq. ft., 2 coats.

Stone Backing No. 3B

Description—A black compound for dampproofing unexposed surfaces of cut stone and for rustproofing metal surfaces. It is applied just as it comes from the container.

Covering Capacity—Approximately, 125 sq. ft. per gal., 1 coat; 75 sq. ft., 2 coats.

Mastic Insulite Cement No. 4

Description—A black mastic for waterproofing foundation walls, tunnels, etc., against heavy water pressure; for overcoating, calking and patching old roofs; sealing cracks, open joints, etc. Applied cold (with trowel) $\frac{1}{8}$ to $\frac{1}{4}$ in. thick according to the smoothness of the surface. When set, it has the consistency of hard rubber, never gets brittle and is unaffected by changes in temperature. Very elastic and adhesive; works freely.

Covering Capacity—Approximately, 25 to 30 sq. ft. per gal., 1 trowel coat.

Iron-Clad Crystals No. 7B (Surface Treatment)

Description—These crystals are dissolved in water, and applied to the concrete surface with a stiff brush or broom in 2 coats of equal strength for wearproofing, waterproofing and dustproofing of same.

Covering Capacity—Approximately, $2\frac{1}{2}$ lb. will treat 100 sq. ft. of surface with 2 coats.

Iron-Clad Liquid Floor Hardener

Description—This material is flushed on the cement floor just as it comes from the container in 3 applications, for the wear-proofing and dustproofing of same.

Covering Capacity—Approximately, 1 gal. will cover 100 sq. ft., 2 coats, depending upon porosity.

Liquid Floor Hardener (Integral Method)

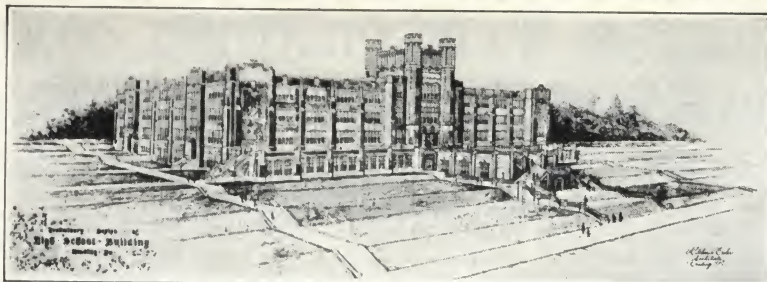
Description—This liquid is added to the water used in mixing the cement top coat for wearproofing, waterproofing and dustproofing cement floors.

Covering Capacity—1 gal. will harden, approximately, 100 sq. ft. of 1-in. top coat, 1:2 mixture cement mortar.

Crysteel Metallic Hardener No. 7

Description—This is a metallic powder that is mixed with the cement used for top coating. It forms a metallic crust that will withstand the most severe traffic. Designed for factories, warehouses, etc.

Covering Capacity—Approximately, 30 lb. will treat 100 sq. ft. of surface.



Senior High School, Reading, Pa.
RICHTER & EILER, Architects A. H. LEADER, Supt. of Bldgs. M. MELODY & SON, Contractors
Foundation walls, floors, etc., waterproofed with Aquabar Aquatite Integral Liquid Waterproofing. Subject to pressure of water

Wood Floor Preservative

A translucent liquid for preserving and dustproofing maple and yellow pine floors, without changing the appearance of the surface. It prevents rotting and decay, and adds to the wood those essential elements of preserving its life and appearance.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 350 sq. ft. per gal. for 2 coats, depending upon the porosity.

Elasticote No. 6 Waterproof Paint

Description—A highly specialized liquid cement coating for waterproofing and dampproofing exterior and interior concrete, brick, cement, stucco, plaster and masonry walls. Gives a handsome stonelike appearance and offers excellent wearing qualities. Made in various colors.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. for 2 coats.

Conco Cement Floor Paint

Description—For coating cement floors above or below grade. Conco Cement Floor Paint prevents dusting and disintegration of floors. It is extremely durable, and resists wear to a remarkable degree.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 150 sq. ft. per gal. for 2 coats.

Marine Waterproof Paint

Description—A decorative and protective coating for application to interior surfaces, swimming pools and surfaces immersed in water. It covers well and adheres firmly. Made in various colors.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. per gal. for 2 coats.

Roof Coating No. 5

Description—A pure Trinidad asphaltum product having remarkable adhesive and saturating properties for overcoating and waterproofing roofs of every description. Restores life and waterproofing properties to any roof which had been exhausted by exposure to the sun. It is applied cold with a brush.

Covering Capacity—Approximately, 100 sq. ft. per gal. for 1 coat.

Sterlite Flat Wal-Finish

A high grade washable paint for finishing interior plastered surfaces.

Wal-Wite Enamel and Undercoating (Mill White)

A high grade mill white possessing high light reflecting qualities. Particularly useful for application to walls, ceiling and columns for daylighting interiors. It retains its whiteness and can be repeatedly washed without injuring it. Will not turn yellow.

Fabricators Red Oxide, Carbonite Steel Coating (Structural Steel Coating)

A paint made of the best rust inhibitors or moisture excluders known. For the protection of structural steel. Resists electrolysis to the maximum degree.

Triple Seal System of Waterproofing

This system is used for waterproofing swimming pools, reservoirs, tunnels and basements where the water head is 2 ft. or more. It is a combination of the old membrane and the new integral systems.



Reservoirs, Roaring Creek Water Company, Shamokin, Pa.

GANNETT and FLEMING, Engineers
Two reservoirs waterproofed throughout with Aquabar Integral Waterproofing Compound No. 1. Reservoirs contain approximately 2,500,000 gal. each

THE BITU-MORTAR WATERPROOFING COMPANY, INC.

Manufacturers of Cement Waterproofing; Waterproofing Engineers and Contractors

TELEPHONE
CALEDONIA 5663, 5664

280 Madison Avenue
NEW YORK, N. Y.

Products

"B-M No. 78" BITU-MORTAR LIQUID WATERPROOFING COMPOUND.



Services and Guarantee Bond

Contractors for the execution of waterproofing in all sections of the country, making a specialty of difficult operations where other materials have failed.

Will furnish bond from any bonding company, when required, guaranteeing work to remain absolutely watertight for a long term of years.

An engineering department is maintained, which is at the service of all seeking advice on any questions concerning waterproofing of tunnels, subways, foundation walls, sewers, reservoirs, etc.

"B-M No. 78" Bitu-Mortar Liquid Waterproofing Compound

This is a bituminous emulsion which can be readily incorporated in ordinary portland cement mortar, rendering same absolutely and permanently impervious to water, even under severe pressure.

Mortar so prepared will bond perfectly to either old or new concrete, brick, stone or iron, and can be applied to surfaces even when water is coming through.



FISK BUILDING, 57TH STREET, BROADWAY AND EIGHTH AVENUE, NEW YORK, N. Y.

CARRERE & HASTINGS, Architects

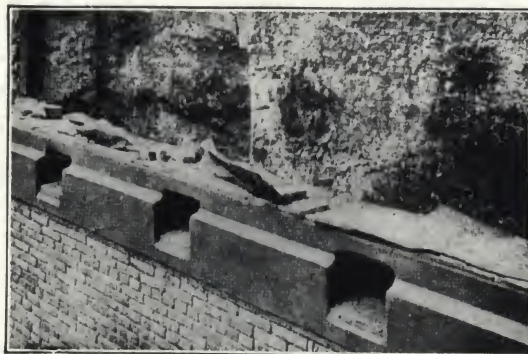
FRED T. LEY, Contractor

Suggestions for Application

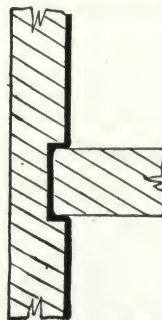
NATURE OF WORK
Tunnels, subways, cellar walls.

CONDITIONS
Already constructed. Water coming through floors, ceilings or sidewalls.

MATERIAL REQUIRED
Bitu-Mortar Liquid Waterproofing Compound, "B-M No. 78."



METHOD OF CARRYING WATERPROOFING BACK OF BEAMS



METHOD OF OBTAINING CONTINUOUS COATING WHERE INTERIOR WALL BUTTS AGAINST OUTSIDE WALL



METHOD OF WATERPROOFING UNDER GRILLAGES
A—First operation, "dampcourse"
B—Second operation
C—Third operation, finished floor

Partial List of Installations

- Architectural Insurance Co., Watertown, N. Y.; York & Sawyer, Architects; Charles I. Wills, Inc., Contractor
- Reconstruction Hospital, 100th Street, Central Park West, New York, N. Y.; York & Sawyer, Architects; Charles I. Wills, Inc., Contractor
- R. H. Macy & Co., W. 34th and 35th Streets, New York, N. Y.; Robt. D. Kohn, Architect; Marc Eidlitz & Son, Contractors
- New York County Courthouse, Pearl and Centre Streets, New York, N. Y.; Guy Lowell, Architect; George A. Fuller Co., Contractors
- American Museum of Natural History, 77th Street and Central Park West, New York, N. Y.; Trowbridge & Livingston, Architects; James Stewart & Co., Contractors
- Westchester Biltmore Country Club, Harrison, N. Y.; Warren & Wetmore, Architects; George A. Fuller Co., Contractors
- Ajax Rubber Co., Trenton, N. J.; Owner's Engineers; Owner's Contractor
- Munson S. S. Co. Building, Wall and Beaver Streets, New York, N. Y.; Kenneth Murchison, Architect; George A. Fuller Co., Contractors
- Kerr S. S. Co. Building, 38 Beaver Street, New York, N. Y.; Warren & Wetmore, Architects; George A. Fuller Co., Contractors
- Combustion Engineering Co. Building, 43-47 Broad Street, New York, N. Y.; Ludlow & Peabody, Architects; George A. Fuller Co., Contractors
- 7 Gold Street and 83 Maiden Lane Building, New York, N. Y.; Clinton & Russell, Architects; Cauldwell, Wingate Co., Contractors
- Jas. A. Hearn & Sons, 26-28 W. 13th Street, New York, N. Y.; Dunsmore & McClear, Engineers; R. H. Howes Construction Co., Contractors
- Astoria Gas Plant, Astoria, L. I. (Underground Tunnel); W. Cullen Morris, Engineer; George A. Fuller Co., Contractors

HERMAN G. LOEW, PRESIDENT and TREASURER ORSON CORNMAN, VICE-PRESIDENT EDWARD P. CAFFALL, SECRETARY

CAFFALL-CORNMAN CORPORATION

Waterproofing and Dampproofing Engineers and Contractors
"Caffall's Scientific Process"

305 Broadway
NEW YORK, N. Y.
TELEPHONE, WORTH 2414

17 N. La Salle Street
CHICAGO, ILL.
TELEPHONE, DEARBORN 2697

Services

WATERPROOFING and DAMPPROOFING ENGINEERS and CONTRACTORS, specializing in "CAFFALL'S SCIENTIFIC PROCESS" of PRESERVING, WATERPROOFING and CLEANING all kinds of buildings above grade.

"Caffall's Scientific Process" of Preservation

This process is the standard method of permanently preserving all masonry exposed to the weather, and is recognized as such by government, state and city authorities as well as by the scientists.

The process consists in applying a special preparation of paraffin and chemicals to the exterior walls of marble, granite, brick, terra cotta, stucco, and masonry of all kinds, either old or new. All stone is porous. Moisture penetrates it, especially when accompanied by strong winds. In communities where there is much smoke from factories, etc., carbon soot settles upon the surface and is carried into the pores by the rain. The union of this soot and moisture gives a sulphuric acid solution which quickly causes stone to crumble. Lime salts and frost also cause quick disintegration and are very damaging, especially when moisture is present.

The compound employed in this process is invisible, insoluble and imperishable. It penetrates the material to which it is applied to a depth of $\frac{1}{4}$ in. or more, depending upon the porosity of the stone, but it is possible to impregnate a brick through its entire thickness. It completely fills all pores or voids, forming an impenetrable barrier to water or moisture and preventing all disintegration.

The preservative used is unaffected by acid and alkali solutions, gases and moisture, and is highly resistant to oxidation. One treatment will last as long as the surface to which it is applied.

"Caffall's Scientific Process" is not an experiment. It has stood the test of time and has an enviable record for durability. Structures treated with it over 50 years ago are still waterproof and in good condition.

Many public buildings of historic interest, as well as churches, monuments, commercial buildings and many private residences have been successfully treated by this process, some of which are:

The Obelisk in Central Park, New York, N. Y.
Fraunces Tavern, Broad Street, New York, N. Y.
The new American Wing of the Metropolitan Museum, New York, N. Y.
Trinity Church, New York, N. Y.
Alexander Hamilton Monument, New York, N. Y.
Christ Church Cathedral, Hartford, Conn.
Buckingham Memorial Fountain, Chicago, Ill.
Residence, I. N. P. Stokes, Greenwich, Conn.
Residence, Carl Tucker, Mt. Kisco, N. Y.

Important Waterproofing Suggestions

There are certain vulnerable parts of the gable walls of buildings, which, if protected against the weather, will go far to insure a dry building. These are the parapet walls. If the average wall is examined, it will be found that the top of the parapet wall is the first

part of the masonry to show signs of disintegration and wasting away of mortar joints. If the following specifications are used, the penetration of dampness will be eliminated.

North and east exposures are always subject to dampness, but the commencement of the trouble is generally at the top of the building.

Specification Suggestions as Alternate Bid

When "Caffall's Scientific Process" is specified, the furring of walls is unnecessary from the standpoint of weather penetration, and no other form of waterproofing is required. This, with our guarantee, assures the architect and owner of a dry building over a long period of years.

Suggestion No. 1—All exterior walls above grade shall be treated with "Caffall's Scientific Process" for preserving and waterproofing, as applied by CAFFALL-CORNMAN CORPORATION, 305 Broadway, New York, N. Y.

Suggestion No. 2—Brickwork of penthouses, bulkheads, side, rear and fire walls topped with stone, tile or terra cotta from roof flashline over and including the coping, down to the lintel level of the top story windows shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by CAFFALL-CORNMAN CORPORATION, 305 Broadway, New York, N. Y.

Suggestion No. 3—Brick or stone work of chimneys above roof flashing shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by CAFFALL-CORNMAN CORPORATION, 305 Broadway, New York, N. Y.

Guaranteed Results

We guarantee that the masonry (stonework, brick or terra cotta) treated by us with "Caffall's Scientific Process" will not discolor, disintegrate, chip, break, crumble or allow the penetration of moisture or water for a period of twenty (20) years from date of treatment; or should any of the aforesaid defects occur during that period, we will treat same where necessary without charge—except in cases due to subsequent settlement of the building foundations or the side thrust of improperly constructed roofing.

References

New York, N. Y.

H. deB. Parsons, Consulting Engineer
Professor Charles P. Berkey, Consulting Engineer, Columbia College
Cass Gilbert, Architect
Grosvenor Atterbury, Architect
Walker & Gillette, Architects
Bowen Bancroft Smith, Architect
I. N. Phelps Stokes, Architect
Geo. B. Post & Sons, Architects
Cross & Brown, Real Estate
Julius Gregory, Architect
S. B. Eisendrath, Architect
Buchman & Kahn, Architects
C. P. Jennewein, Sculptor

Other Cities

Bennett, Parson & Frost, Architects, Chicago, Ill.
Whiton & McMahon, Architects, Hartford, Conn.
Brown & Von Beren, Architects, New Haven, Conn.
Ralph Hacker, Architect, Palisade, N. J.

THE PHILIP CAREY COMPANY

Manufacturers of Waterproofing and Dampproofing Materials

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

CAREY PERCOPROOF (LIQUID DAMP-PROOFING).

CAREY PERCOPROOF PLASTER BOND.

CAREY PLASTIC WATERPROOFING COM-
POUND.

CAREY WATERPROOFING PRIMER.

CAREY WATERPROOFING FELTS.

CAREY WATERPROOFING AS-
BESTOS FELTS.

CAREY WATERPROOFING
FABRICS.

CAREY WATERPROOFING AS-
PHALTS.

Also Carey Fabricated Mem-
brane; Carey Preformed Mem-
brane System of Waterproofing.

For Pipe Coverings, see pages
A210-211; for Built-up Roofing,
see pages A400-403; for As-
bestos Shingles, see page A415;
for Asphalt Shingles, see page
A421; for Flooring, see page
B1537.

Experience and Facilities

Established in 1873, THE PHILIP CAREY COMPANY has enjoyed over a half century of continuous growth. Our Waterproofing Engineers are at your command. Complete information, specifications and estimates gladly furnished on request.

Carey Percoproof (Liquid Dampproofing)

Under ordinary ground conditions two coats of Carey Percoproof (Liquid Dampproofing) applied on the outside of the foundation walls will give a dry basement. It keeps dampness from "percolating" through the wall but is not used where any amount of hydrostatic (water) pressure is present—see Carey Plastic Waterproofing Compound listed below. A black liquid, bituminous material applied cold, similar to paint, with a long handled brush. Covering capacity averages 100 sq. ft. per gallon. See Carey Dampproofing Specification "C."

Carey Percoproof Plaster Bond

Applied directly over rough hollow tile or brick upon which the plaster is to be applied without the use of furring or lathing. A thin, black, liquid, asphaltic compound, like thin paint, which penetrates and waterproofs the walls. Applied in single coat in order to keep the original rough surface of the wall so that the plaster will bond satisfactorily to same. Forms a barrier to infiltration (percolation) of dampness and prevents hideous plaster stains and loosening of the plaster wall. Also used on outside of masonry walls prior to stuccoing. See Carey Dampproofing Specification "B."



Applying Carey Percoproof Dampproofing Compound to the Outside of Foundation Walls

Carey Plastic Waterproofing Compound

A thick, plastic, asbestos waterproofing cement like a putty, applied cold with a trowel to foundation walls for uses similar to Percoproof (Liquid Dampproofing)—see above—except that it will stand moderate hydrostatic (water) pressures of 1 to 10 ft. Send for Carey Waterproofing Specification No. 31.

Carey Waterproofing Felts

These materials are high grade asphalt saturated rag felts.

A waterproof membrane built up of waterproofing felts according to our specification forms a flexible, economical, permanent application.

Carey Waterproofing Asbestos Felts

These felts are especially applicable to waterproofing floors in chemical plants and mill construction on account of their acid, alkali and fire resisting qualities.

Carey Waterproofing Fabrics

These materials are made from 100% pure cotton fabrics thoroughly saturated with a flexible asphaltic compound so as to insure an extremely high tensile strength with a reasonable percentage of stretch. They are applicable in waterproof membranes for railroad bridges and other structures where expansion and contraction or vibration are excessive.

Carey Dampproofing Specification "B"

For Dampproofing the Interior Surfaces of Outside Masonry Walls, Prior to Plastering

(1) **Work Included**—This specification contemplates furnishing all materials and labor required to properly apply Carey Percoproof Plaster Bond to the interior of all outside brick or masonry walls above ground level, prior to plastering.

(2) **Work Not Included**—This specification does not include pointing up masonry or plastering and cementing of any kind. All cracks and holes shall be carefully filled with portland cement mortar, prior to applying Carey Percoproof Plaster Bond. Twenty-four hours after applying Carey Percoproof Plaster Bond the plaster may be applied.

(3) **Materials**—1 coat Carey Percoproof Plaster Bond, 1½ gals. per 100 sq. ft.

(4) **Application**—After all cracks and holes have been filled carefully with portland cement mortar, and the wall is perfectly dry and free from any foreign matter that would interfere with the penetration or bonding qualities of the dampproofing coat, Carey Percoproof Plaster Bond shall be applied uniformly, with a good bristle brush, to the interior of outside masonry walls from grade level to roof.

In cases where the Carey Percoproof Plaster Bond can not be applied to the walls continuously through the floor construction, it shall be applied back on the ceiling for at least 12 in. from the wall.

Carey Percoproof Plaster Bond shall be applied behind window casings and to all cut-outs and recesses in the wall.



Applying Carey Percoproof Plaster Bond Prior to Plastering

A second coat of about 1 gal. per 100 sq. ft. shall be applied to all very absorbent portions of the wall only.

Carey Dampproofing Specification "C"

For Dampproofing the Outside of Foundation Walls, Concrete Bridges, Abutments, Culverts, Retaining Walls and Other Structures Below Ground Level

(1) **Work Included**—This specification contemplates furnishing all materials and labor required to properly apply Carey Percoproof (Liquid Dampproofing) to the outside of all foundation walls below ground level.

(2) **Work Not Included**—This specification does not include pointing up masonry or cementing of any kind. All cracks and holes should be carefully filled with portland cement mortar, and the surface shall be thoroughly cleaned and shall also be smooth and sufficiently dry to obtain good adhesion prior to applying Percoproof (Liquid Dampproofing).

Drain tile may be laid around the footings.

(3) **Materials**—1 coat Carey Percoproof (Liquid Dampproofing) 1½ gal. per 100 sq. ft.; a second coat Carey Percoproof (Liquid Dampproofing) 1 gal. per 100 sq. ft.

(4) **Application**—After all cracks and holes have been filled carefully with portland cement mortar, and the foundation wall is perfectly dry and free from any foreign matter that would interfere with the penetration or bonding qualities of the dampproofing coat, Carey Percoproof (Liquid Dampproofing) shall be applied uniformly with a good bristle brush or spraying machine to the outside of foundation walls from footings to ground level.

Not less than twenty-four hours after applying the first coat of Carey Percoproof (Liquid Dampproofing) a second coat shall be applied.

Carey Waterproofing Specification No. 32

For General Waterproofing

(1) **Work Included**—This specification contemplates furnishing all materials and labor to properly apply the built-up waterproof membrane to (state here surfaces to be waterproofed) below ground or water level.

(2) **Work Not Included**—This specification does not include pointing up the concrete, brick, stone, tile, masonry or cementing of any kind. All cracks, holes and voids shall be carefully filled with portland cement mortar. The surface shall be thoroughly clean and shall also be smooth and sufficiently dry to obtain good adhesion prior to applying the Primer.

(3) **Materials**—Carey Waterproofing Primer (1 gal.) 9 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 50 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Waterproofing Felt, 15 lbs. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft. Total approximate weight per 100 sq. ft. to be 179 lbs.

(4) **Application**—Carey Waterproofing Primer shall be applied uniformly and thoroughly brushed in. When the primer has dried to a slight tacky state the surface shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded the first sheet of Carey Waterproofing Felt. The successive sheets of felt shall overlap the previous sheet 25 in., making eight courses of asphalt and felt, including the primer. All the sheets of felt shall be solidly cemented together with asphalt so that at no place shall felt touch felt.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of 15-lb. Carey Waterproofing Felt cut to extend at

least 6 in. each way from the angle. Two such sheets shall be applied—one immediately after applying the primer, and another after the membrane is completed.

Carey Waterproofing Specification No. 33

For Waterproofing Floors in Mill Construction, Alkali, Acid and Fire Resistant

(1) **Work Included**—This specification contemplates furnishing all materials and labor to properly apply the built-up waterproof membrane to the wood floors in mill construction.

(2) **Work Not Included**—All knotholes and open cracks shall be tightly sealed. The floor shall be made free from splinters and nails before applying the waterproofing. Over the membrane shall be laid a second flooring and the flashings on the walls shall be covered with baseboards.

(3) **Materials**—Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 35-lb. Waterproofing Asbestos Felt, 35 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 15-lb. Waterproofing Asbestos Felt, 15 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey 15-lb. Waterproofing Asbestos Felt, 15 lbs. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.

(4) **Application**—The clean dry base floors shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded sheets of 35-lb. Carey Waterproofing Asbestos Felt lapped 2 in. Over this shall be applied 2 plies 15-lb. Carey Waterproofing Asbestos Felt overlapping one another 19 in. and also embedded in hot asphalt No. 114.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of 35-lb. Carey Waterproofing Asbestos Felt cut to extend at least 6 in. each way from the angle. Two such sheets shall be applied—one prior to applying the first sheet, another after the membrane is completed. A finishing coat of Carey Waterproofing Asphalt No. 114 shall be applied over the entire membrane.

Carey Waterproofing Specification No. 35

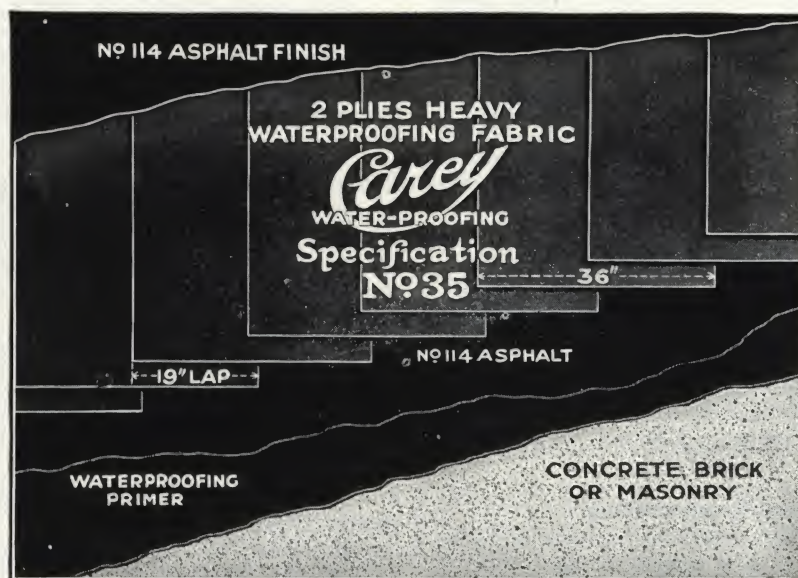
For Waterproofing Bridges and Structures Where Expansion and Contraction Are Excessive

(1) **Work Included**—Use paragraph 1 Specification No. 32.
(2) **Work Not Included**—Use paragraph 2 Specification No. 32.

(3) **Materials**—Carey Waterproofing Primer (1 gal.), 9 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 50 lbs. per 100 sq. ft.; Carey Heavy Waterproofing Fabric, 11 lbs. per 100 sq. ft.; Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.; Carey Heavy Waterproofing Fabric, 11 lbs. per 100 sq. ft. and Carey Waterproofing Asphalt No. 114, 25 lbs. per 100 sq. ft.

(4) **Application**—Carey Waterproofing Primer shall be applied uniformly and thoroughly brushed in. When the primer has dried to a slight tacky state the surface shall be mopped with Carey Waterproofing Asphalt No. 114, into which, while still hot, shall be embedded the first sheet of Carey Heavy Waterproofing Fabric. The second sheet of Carey Waterproofing Fabric shall overlap the previous sheet 19 in. and also be embedded in hot asphalt No. 114 so that at no place shall fabric touch fabric.

Reinforce all angles at corners, walls, etc., by cementing with Carey Waterproofing Asphalt No. 114 applied hot, into which shall be embedded one thickness of Carey Waterproofing Fabric cut to extend at least 6 in. each way from the angles. Two such sheets shall be applied—one immediately after applying the primer and another after the membrane is completed. A finishing coat of Carey Waterproofing Asphalt No. 114 shall be applied over the entire membrane.



CERESIT WATERPROOFING CORPORATION

Waterproofings, Dampproofings, Floor Hardeners, Protective Coatings

512-514 South Canal Street

CHICAGO, ILL.

Products

CERESIT WATERPROOFING COM-
POUND.

CERESIT WATERPROOFING POW-
DER.

CRESOLAC TRANSPARENT WATERPROOFING.

CERESIT METALLIC HARDENER.

INDURITE LIQUID HARDENER.

CRAXEMENT CONCRETE REPAIR COMPOUND.

CRESCRETE ACCELERATOR and FROSTPROOFING.

CEROX COLORED CEMENT.

CERETONE CEMENT COLORING PIGMENT.

CEM-BRIC WATERPROOF PAINT.

CERESIT ASPHALTIC DAMPPROOFING.

CERESIT ASPHALTIC PLASTER BOND.



value as an integral hardener and waterproofing agent.

Ceresit Metallic Hardener

A finely ground and graded metallic compound for incorporation in the top of wearing course of concrete floors. This material is particularly well adapted for heavy duty floors, producing a surface which is dustless and extremely dense and hard. It is furnished in gray or red.

Requirements—25 to 35 lb. to each 100 sq. ft., depending on traffic conditions.

Indurite Liquid Hardener

A colorless liquid for application to concrete floor surfaces. This material greatly increases hardness, and eliminates dusting. The treatment is made in two applications.

Requirements—1 gal. will treat 100 sq. ft.

Craxement Concrete Repair Compound

A special quick-setting repair cement for permanently repairing cracks, holes, breaks and worn spots in concrete floors. It bonds securely to old concrete and produces a hard, dense surface of high strength and wearing quality.

Cerox Colored Cement

A colored waterproof portland cement for use wherever colored concrete surfaces are required. Used in the same manner as standard portland cement. Made in a variety of colors. Eliminates measuring and mixing of colors and cement on the job.

Ceretone Cement Coloring Pigment

Ceretone densifies, hardens, waterproofs and colors cement mixtures. Its greatest use is for colored cement floors. It provides an attractive floor surface which is durable both as to service and permanence of color.

Ceretone colors are red, brown, buff, green and black.

It is shipped in 20 and 100-lb. containers.

Cem-Bric Waterproofing Paint

A specially prepared paint for use on concrete, brick and masonry surfaces. Dries to dense and hard surface.

Ceresit Asphaltic Dampproofing

A heavy asphaltic paint for application on foundations of concrete, brick, or other masonry, below grade, to protect against dampness or surface water. It is also used for a primer and cement coat for membrane waterproofing.

Covering Capacity—For 1-coat work, 1 gal. will cover 60 to 70 sq. ft. For 2-coat work, 1 gal. will cover 40 to 50 sq. ft.

Ceresit Asphaltic Plaster Bond

A heavy asphaltic compound for application to the inside surfaces of outer or exposed walls on which plaster is to be applied. This material prevents injury to the plaster from dampness.

Covering Capacity—For 1-coat work, 1 gal. will cover 60 to 70 sq. ft. For 2-coat work, 1 gal. will cover 40 to 50 sq. ft.

Service

Advisory engineering service available on waterproofing or concrete surfacing problems.

Literature

Bulletins describing materials and containing complete data sent on request.

Ceresit Waterproofing Compound

(a) An integral waterproofing in paste form.
(b) To be added to portland cement mixtures at the time of mixing.

(c) Its use increases workability.

(d) Reduces labor costs in placing.

(e) Permits reduction in water content without loss in plasticity.

(f) Densifies and permanently waterproofs concrete, cement stucco and cement plaster.

Requirements—For mass concrete, use 8 lb. per cu. yd. For portland cement plaster, use 2 to 3 lb. to each sack of cement. For portland cement stucco use 2 to 3 lb. to each sack of cement.

Standard Specification—All concrete [cement plaster] [cement stucco] shall be waterproofed by the addition of Ceresit Waterproofing Compound, an integral waterproofing, manufactured by CERESIT WATERPROOFING CORPORATION, Chicago, which shall be used in accordance with the manufacturer's directions.

Ceresit Waterproofing Powder

An integral waterproofing in powder form. Added to concrete at the time of mixing. This material performs the same function as Ceresit Waterproofing Compound.

Requirements—Use 2 to 3 lb. to each sack of cement. Mix dry with cement before adding water or aggregates to batch.

Cresolac Transparent Waterproofing

A transparent liquid applied with a brush or spray to concrete, brick or other masonry for protection against penetration of water or moisture. This material penetrates the surface pores and makes the treated surface water repellent. It does not affect or change the original color. It is particularly effective on concrete block or tile.

Covering Capacity—Two coats required. 1 gal. covers 200 sq. ft., 2-coat work.

Crescrete Accelerator and Frostproofing

For accelerating the set of portland cement and protection against freezing at low temperatures. Also of

HYDROSEAL WATERPROOFING COMPANY

FORMERLY CONCRETE WATERPROOF PAINT CO.
829-835 North 3rd Street, PHILADELPHIA, PA.

Products

HYDROSEAL BITUMASTIC COATINGS; PENETRIT[®] INTEGRAL WATERPROOFINGS; PENETRIT[®] FLOOR HARDENERS and COATINGS; HYDROSEAL METALTITE; KLING-KOAT CEMENT COATING; MASONRY COATINGS.

Below is a list of the specific materials for the average conditions.

Advantages

Years of specialized experience has taught us that the *proper application* is no less important than the use of the highest quality materials. This has led to the maintenance of reliable men with experience pertaining to the application of waterproofing and dampproofing materials.

In using our materials we co-operate with the architect to see that he receives the results that he desires, as well as to see that the material is being applied correctly.

Our liquid materials such as Hydroseals, Kling-Koat Cement Coating and Penetrite Transparent Waterproofing Compound, are applied by spray under 80-lb. pressure. This method insures the Hydroseal, etc., penetrating the surfaces by force, and at the same time gives the surface a coating, making a

HYDROSEAL

PENETRIT[®]

METALTITE

TRADE-MARKS

perfect plaster bond, dampproof coating or waterproofing.

The many prominent buildings on which our materials have been used successfully are permanent testimonials of the quality of our materials and our knowledge of waterproofing.

Policy

After more than ten years' experience in manufacturing waterproofing materials we are convinced that they should be made only of the highest quality.

From the time we started we adopted the policy of making the very best possible materials. Regardless of competition we have maintained the highest standard of our materials. *Due to our quantity production you can obtain the greatest possible value.*

Our customers appreciate that it does not pay to jeopardize the entire result of the work when the proportionate cost of the waterproofing materials is practically a few per cent of the entire contract. *We have never sacrificed the high quality of our products to meet competition.*

When you use materials manufactured by the HYDROSEAL WATERPROOFING COMPANY you are insuring yourself against unsatisfactory results.

Brands, Uses and Specifications

PURPOSES	MATERIAL	SPECIFICATIONS
For Dampproofing and Waterproofing Concrete, Brick and Cement		
To dampproof exposed walls to be plastered—unfurred or furred with hollow brick, furring tile or concrete blocks.	Hydroseal No. 330	Coat the interior of all exposed walls 1 coat, and, if necessary, 2
To prevent surface infiltration and dampness in basements and cellars	Hydroseal No. 640	Apply 2 heavy continuous coats
For dampproofing the interior of exterior walls above or below grade	Hydroseal Semi-mastic	To be applied (stipulate where) by a 4 knot brush, to be a continuous coating from grade to roof line, 1 ft. on ceiling
To prevent and resist severe conditions of dampness and water below sub-level	Hydroseal No. 640, in conjunction with burlap, felt or cheesecloth.	Apply No. 640, and burlap, etc., alternately 3 to 5-ply until the hydrostatic pressure is equalized
To render waterproof by physical mixture with concrete and cement	Penetrite Integral Waterproofing Paste	For ordinary work add 1 gal. to 32 gal. of water
	Penetrite Integral Waterproofing Powder	Use 2 lb. to a bag of cement; under most severe conditions 3 lb.
An iron waterproofing applied on the inside face of exterior walls below grade, and on top of structural slabs	Hydroseal Metaltite	To be applied and guaranteed by Contract Department of H. W. Co.
Used as an integral waterproofer, an integral hardener, as well as an anti-freeze	Conwatco Mix	Conwatco Mix as waterproofer for mass concrete, use 1 gal. to 15 gal. of gauging water
For Stainproofing Limestone and Marble		
For the protection of limestone, marble, etc., against stain caused by the cement through surrounding masonry	Hydroseal No. 309	Apply to all unexposed sides of stone. 1 continuous coat
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	Penetrite Transparent Compound	Apply 2 coats, having joints well mortared
For the Protection of Metal		
For prevention against electrolysis and corrosion of exposed structural steel	Hydroseal No. 352	Apply 1 shop coat, to be followed by a field coat, different color
For Waterproofing and Beautifying Concrete and Plaster Surfaces		
To beautify and protect exterior walls of brick, stucco cement, and concrete	Kling-Koat Cement Coating (flat and gloss)	Applied like paint, 2 coats
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	Penetrite Transparent Compound	Apply 2 coats, having joints well mortared
For Treatment of Floors		
To prevent the dusting and abrasion of concrete floors	Penetrite Floor Finish	Apply 1 coat primer and 2 coats finish. Allow 24 hours between applications
For application after cement or concrete floor is laid. Makes the floor hard, dustproof and waterproof	Penetrite Liquid Floor Hardener	One application is all that is necessary if the condition is not severe
Mixed with the cement to harden and waterproof	Penetrite Metallic Floor Hardener	Approximately 20 lb. to a sq. ft. in the 1-in. top coat
Used as an integral waterproofer, an integral hardener	Conwatco Mix	For mass concrete and top coat use 1 gal. of gauging water. For mortar work use 1 qt. to 1 bag of Portland cement
For Caulking		
	Hydroseal Caulking Compound	

CONTRACT WATERPROOFING CO.

INCORPORATED

Waterproofing Engineers and Contractors

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ST. LOUIS, MO.

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Consult Telephone Directory for Local Branch Office Addresses, or Write Home Office

Services

We are ENGINEERS and CONTRACTORS for the perfect WATERPROOFING, OILPROOFING, FROSTPROOFING or FUMEPROOFING of any structure of concrete, brick, tile or stone.

Ferro-Tite Method

Ferro-Tite, the iron method of waterproofing, is used in the performance of all of our contracts.

The surfaces are first thoroughly prepared, after which sufficient coats of Ferro-Tite are applied to secure the desired results.

The first coat penetrates the concrete and, on oxidation, expands and perfectly seals all pores of the concrete.

The succeeding coats form a solid sheet of oxidized iron on the surface. After these coats have thoroughly set, slush coats of sand and cement containing Ferro-Tite are applied, which restores the surface to the color of ordinary concrete.

Plaster may be applied directly to this surface, or it may be painted over.

Specifications

Walls—The following surfaces.....shall be waterproofed by the application of Ferro-Tite, the iron method of waterproofing as applied by the CONTRACT WATERPROOFING Co.

Floors—All floors resting on earth shall be waterproofed by the application



of Ferro-Tite, the iron method of waterproofing as applied by the CONTRACT WATERPROOFING Co.

This contractor shall apply his material to the top of the rough slabs for these floors, after which others shall at once apply the finish topping.

Guarantee

We will guarantee any surfaces waterproofed by us to be waterproof and dampproof for a period of ten years, subject to causes beyond our control, such as fractures in walls, etc.

Resistance to Hydrostatic Pressure

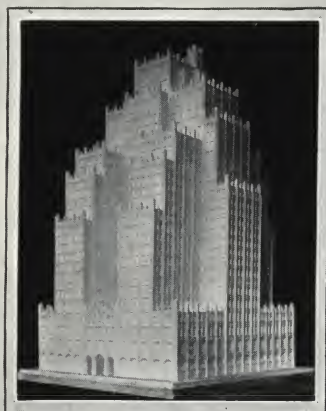
Although we prefer to, and usually do, apply Ferro-Tite to the inner surfaces of exterior walls, etc., it will withstand any pressure of water that the walls can withstand. This is also the case where Ferro-Tite is applied to the outside of exterior walls.

Engineers, Architects and Contractors

Write for our handbook on structural waterproofing, which contains valuable information, suggestions and hundreds of references from the foremost architects, engineers and contractors in the country.

Our reputation as waterproofers is based on accomplishment.

USE
FERRO-TITE
METHOD



BELL TELEPHONE BUILDING
ST. LOUIS
Mauran Russell & Crowell, Architects
Westlake Construction Co., Contractors



BOOK TOWER BUILDING
DETROIT
Louis Kamper, Inc., Architects
Starrett-Dicks Co., Contractors



LAKE SHORE DRIVE BUILDING
CHICAGO
Hooper & Janusch, Inc., Architects
Hallbauer-Labahn, Inc., Contractors



MISSOURI-PACIFIC BUILDING
ST. LOUIS
Mauran Russell & Crowell & E. M. Tucker
Architects
Humes-Deal Co., Contractors

THE ELATERITE PAINT & MANUFACTURING CO.

Waterproofing and Bonding Materials
DES MOINES, IOWA

EASTERN DISTRIBUTERS
ELATERITE PRODUCTS CORPORATION

NEW YORK, N. Y., 22 East 17th Street—Telephone Stuyvesant 9084 BOSTON, MASS., Room 819, 6 Beacon Street—Telephone, Haymarket 3346

PACIFIC COAST DISTRIBUTERS

SAN FRANCISCO, CAL., SAN FRANCISCO WATERPROOFING Co., 1372 Mission Street—Telephone, Hemlock 3930

Products

No. 60, DES MOINES ELATERITE for WATERPROOFING and BONDING; No. 65, DES MOINES ELATERITE for STONE BACKING.

Also manufacturers of Preservative Paints for all classes of surfaces, including Acid and Heat Resisting Paint, and Metal Protective Paint.

No. 60, Waterproofing and Bonding

No. 60, Des Moines Elaterite, is both a waterproofing and a bonding material. Its base is an intensely adhesive, extremely elastic, non-porous, acid resisting, absolutely waterproof hydro-carbon known as "mineral rubber." It seals the pores of concrete, cement, brick, tile or stone, destroys capillary attraction and provides a continuous film which completely shuts out dampness. In addition, its intensely adhesive quality makes it an ideal bonding material, permitting the direct application to it of plaster or stucco coats.

Uses—For waterproofing all brick, stone, concrete and cement surfaces and as an integral waterproofing to be mixed in concrete or cement mixtures and for bonding plaster, stucco, tile, linoleums, etc.

Advantages—Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room and saving in labor and material costs. It meets every waterproofing requirement, thus there is no need to specify a different material for outside foundations, inside walls, basement floors or bonding.

Application—Applied cold, it spreads rapidly with broad flat brushes or may be applied with an air gun or spray. No hot swabbing or layers of felt required and any workman can apply it.

Covering Capacity—100 to 150 sq. ft. (one coat) per gal. or from 80 to 100 sq. ft. (two coats) on cement, brick or stone, depending on porosity; 250 to 300 sq. ft. on wood or metal.

Specifications—(a) *For Waterproofing Substructures*—The waterproofing contractor shall apply a waterproof membrane of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING Co., Des Moines, Iowa, to the outside of all foundation walls to a point 6 in. above grade, including piers, and to be carried over all footings and properly joined to waterproofing course on outside walls. Membrane to consist of 2 coats properly applied so there shall be no pinholes or uncovered spaces. At least 24 hours must elapse after the application of first coat before applying a heavy second coat, allowing it to dry thoroughly before covering. Walls shall be cleaned thoroughly to remove all loose particles, must be dry and, if of concrete, thoroughly set before applying No. 60, Waterproofing and Bonding, Des Moines Elaterite.

DES MOINES
ELATERITE

TRADE-MARK



Applying Plaster Coat Directly to "Des Moines Elaterite" Waterproofing and Bonding Coat

(b) *For Dampproofing Interior Walls Which Are to Be Plastered, or for Waterproofing Exterior Walls Which Are to Be Stuccoed*—The contractor is to apply 2 coats of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by THE ELATERITE PAINT & MANUFACTURING Co.,

Des Moines, Iowa, over the inside surface of all exterior walls which are to be plastered, and outside surface of all walls which are to be stuccoed. The walls are to be clean and dry and the application to be so made that there shall be no pinholes or uncovered spaces. At least 24 hours must elapse between the application of the first and second coat, which is to be a heavy coat.

Plaster is to be applied directly over the coating of No. 60, Des Moines Elaterite, after the second coat is "set" but while it is still "tacky," though not sooner than 3 hours after the second application, nor longer thereafter than 10 days. Stucco is to be applied directly over the coating of No. 60, Des Moines Elaterite, while it is "tacky," but not sooner than three hours after application of the second coat nor longer thereafter than 10 hours.

The waterproofing and bonding coats may be applied with air gun or spray, if contractor prefers.

(c) *For Integral Waterproofing Use*—All mortar to be made waterproof must have No. 60, Waterproofing and Bonding, Des Moines Elaterite, as manufactured by THE ELATERITE PAINT & MANUFACTURING Co., Des Moines, Iowa, incorporated integrally, proportioned either with the water used for tempering or with the quantity of portland cement used in the batch in the following manner:

If proportioned with the water used for tempering it should be 1 to 8—1 part No. 60, Des Moines Elaterite, to 8 parts water.

If proportioned with the portland cement it should be 1 gal. No. 60, Des Moines Elaterite, to each 1½ bags of portland cement used.

The No. 60, Des Moines Elaterite, is to be added to the mixture in the foregoing proportions after the water has been put in for tempering, and the mixing is then to be continued until there is complete and thorough distribution throughout the mixture. It must not be added to the water before the latter has been put in for tempering the mixture.

This specification covers mortars for laying up brick or rubble stone; for stucco; plaster for coating the inside of cellar and other walls; for cement floor and roof toppings; for cement slabs to be spread over cinder fill in roof construction; for concrete not subject to heavy water pressure.

For integral mixture in waterproofing concrete which is subject to heavy water pressure the proportion should be changed to 1 part No. 60, Des Moines Elaterite, to 4 parts water used—1 gal. No. 60 to each 4 gal. of water. The No. 60 to be added after the water has been stirred into the mixture and the stirring continued until there is complete distribution.

No. 65 Stone Backing

Specification—All stone to be coated, before setting, on the five unexposed sides; also entire inner surface, including joints, to be coated after the stone is set with No. 65, Stone Backing, Des Moines Elaterite, as manufactured by THE ELATERITE PAINT & MANUFACTURING Co. of Des Moines, Iowa.

Prices and References

These will be gladly sent on request.



Protecting Stone Facing from Discoloration with "Des Moines Elaterite"

GENFIRE STEEL COMPANY

(THE GENERAL FIREPROOFING BUILDING PRODUCTS)

Waterproofing and Dampproofing Products and Technical Paints

YOUNGSTOWN, OHIO

For Branch Offices, see page B1294

Products

WATERPROOFINGS, Integral and Membrane; **DAMP-PROOFINGS**, above and below grade; **ROOFINGS**, built-up membrane and plastic; **CEMENT ACCELERATORS** and **FROST PREVENTIVES**; **FLOOR HARDENERS** and **PRESERVATIVES** for cement or wood, integral, plain and colored, and after-treatments; **STEEL and IRON PAINTS**; **ACID-PROOFINGS**; **BONDING COMPOUND**; **TIMBER PRESERVATIVE**; **OILPROOFING**.

For Steel Windows and Doors, see pages A948-949; for Metal Lath, Steel Joists and other Metal Products, see pages B1294-1297.

Waterproofings, Integral

GF Waterproofing Paste (GF 10)—An ammonium stearate paste used in the gauging water for densifying and waterproofing all kinds of concrete and cement work.

For mass concrete, 1:2:4 or 1:2½:5, mix 1 gallon GF 10 in every 34 gallons of water.

For cement floors, mortar, plaster or stucco, 1:2 or 1:2½, mix 1 gallon GF 10 in every 17 gallons of water.

GF Waterproofing Powder (GF 11)—This product is the same as the water repellent material formed by the combination of GF 10 with cement in concrete and cement work.

For all work mix, dry, 2 pounds of GF 11 with each bag of cement. Especially suitable for cast stone, cement blocks, and other similar work where a minimum of water is used.

GF Cement Accelerator (GF 12)—A colorless liquid to be mixed with the gauging water. It accelerates the set of cement so that concrete and cement work in 2 days is as hard, throughout its thickness, as ordinary work in 30 days. It raises the temperature of the mass and lowers the freezing point of water, so that it becomes a frost preventive, thereby eliminating the necessity of heating water, aggregates or finished work. It densifies the mass and makes cement work waterproof.

As an accelerator, it requires 1 gallon of GF 12 per barrel of cement, being mixed, for cement work, 1 gallon of GF 12 to 10 gallons of water.

As a frost preventive, lowest temperature for the next two hours after placing the work must be anticipated and GF 12 mixed with the gauging water in the following proportions:

Anticipated Temperature	Mixture
29° F.	1 gal. GF 12 to 10 gal. water
24° F.	2 gal. GF 12 to 10 gal. water
17° F.	3 gal. GF 12 to 10 gal. water

GF 14 Ironcote—A finely ground iron powder chemically treated to form a waterproofing for walls and floors subjected to hydrostatic pressure. To be mixed with water and applied with a brush in 4 or 5 coats to the surfaces of old or new construction required to be waterproofed.

Waterproofings, Membrane

GF Bitumen (GF 17)—A high grade pure bitumen to be melted and used hot, with either GF 18 Waterproof Felt or GF 21 Saturated Fabric. Remains elastic at zero and will not run or slide at 140° F.

Physical Properties GF 17

Weight per gallon.....	8.71 lb.
Specific gravity 60° F.....	1.05
Melting point B & R.....	150° to 170° F.
Flash point.....	450° F.
Ignition point.....	550° F.
Ductility 77° F. 5 cm. per min.....	20 cm.
Evaporation 320° F. 7 hrs.....	0.09%
Loss 50 gr. 5 hrs. 325° F.....	1%
Penetration: 32° F. 200 gr. 60 sec.....	10
77° F. 100 gr. 5 sec.....	28 to 40
115° F. 50 gr. 5 sec.....	75 to 100
Soluble in: Carbon disulphide.....	99.8%
Carbon tetrachloride.....	99.8%
86° naphtha.....	68%
Analysis: Ash.....	Trace
Sulphur.....	2.2%
Paraffin.....	0.7%
Coal tar.....	None

Quantities Required GF 17

2-ply work.....	13 gal. per 100 sq. ft. of surface
3-ply work.....	17 gal. per 100 sq. ft. of surface
1 mop coating.....	5 gal. per 100 sq. ft. of surface

On concrete it is better to use first a priming coat of GF 16 to give proper bond and penetration to the GF 17.

GF Waterproof Felt (GF 18)—A strong, bitumen-saturated felt, made of all rag stock weighing 15 pounds per 100 square feet, single-ply. Each fiber is coated and impregnated with bitumen. Used with GF 17 Bitumen in alternate layers of GF 17 and GF 18 to form a built-up membrane waterproofing.

For ordinary work use 2 plies of GF 18 and 3 coats of GF 17. Against water pressure use 3 plies of GF 18 and 4 coats of GF 17.

GF Saturated Fabric (GF 21)—A cotton duck fabric, saturated with GF 17 Bitumen. For use in deep foundations or on bridges and floors subject to vibration and stresses.

Use 2 plies of GF 21 and 3 coats of GF 17.

Physical Properties GF 21

Width unsaturated.....	37 in.
Width saturated.....	36 in.
Weight unsaturated, per sq. yd.....	5 oz.
Weight saturated, per sq. yd.....	13 oz.
Min. tensile strength per lin. in. lengthwise.....	65 lb.
Min. tensile strength per lin. in. crosswise.....	50 lb.
Threads per lin. in.....	22 to 26
Flexible.....	0-250° F.
Stretch.....	10%

Dampproofings

GF Brush Coating (GF 16)—A pure bitumen paint, applied cold as a brush coating to the exterior faces of walls below grade, and on concrete underbed below wood floors and sleepers. Applied in 1 coat, afterwards touching up any bare spots. Never use any kind of brush coating on the interior of a wall below grade, but use portland cement plaster with GF 10.

GF Mastic Cement (GF 250)—A heavy plastic coating, applied cold with a trowel for the same uses as GF 16.

Can be applied to damp surfaces, such as newly built concrete walls where it is desired to proceed with the backfilling at once. Also as a dampcourse across footings or over tops of foundation walls, turning up 6 inches on inside faces of walls.

Made also in colors for use in calking around window frames, and pointing up joints and cracks in masonry or stucco.

GF 270—A special form of GF 250 made in light and dark gray of a heavy consistency to be used by hand for calking purposes.

GF Transparent Waterproofing (GF 100)—A transparent, pore filling liquid containing 38% of waterproofing elements, which remain, as a water repellent filling, after the volatile vehicle has evaporated. For waterproofing exposed exteriors of brick, stone, stucco or concrete, and interiors of tanks and reservoirs. Prevents efflorescence and staining or discoloring. Must not be applied when temperature of the surface is below 60° F.

To be applied in 2 coats at intervals of 24 hours, all open joints and cracks being first pointed up with GF 250 Colored.

GF Brick and Cement Coating (GF 101)—A high grade paint for the same uses, under the same conditions, as GF 100. It is unaffected by the alkalis and lime of cement and will not crack or peel. Made in various colors.

Applied in 2 coats under the same conditions as GF 100.

GF Thinner (GF 101)—To be mixed 1 gallon with 5 gallons GF 101, to form a priming coat for GF 101, on new or absorbent surfaces.

GF 102 Cement Paint—A dry cement paint powder to be mixed with cold water. For application with a brush or spray to any kind of masonry or wood exterior walls or interior walls and ceilings. Made in light and dark red, gray, buff, green, white and ivory.

GF Dampproof Coating (GF 200)—A bitumen paint to be applied to interior surfaces of exposed brick, stone or tile walls above grade. Dries tacky so that lime plaster can be applied directly to it any time within 30 days. Must not be applied to cement surfaces, unless a mechanical bond for the plaster is obtained by chipping, and must never be applied to any surface intended to receive a portland cement plaster. (Use GF 10 integrally.)

Applied cold with a brush, so that surface is black and shiny, giving all bare spots a second coat.

Analysis GF 200

Gravity at 60° F.....	20°
Specific gravity at 68° F.....	0.957
Non-volatile components consisting of pure bitumen (Gilsonite 20%).....	60%
China, wood oil and volatile vehicle consisting of a distillate of a bitumen base.....	40%
Coal tar or pitch.....	None

GF Stainproof Backing (GF 220)—A bitumen paint to be applied cold to the built-in parts of all cut stone, to prevent staining and discoloration through penetration of alkalis and moisture from the masonry.

Analysis GF 200

Bitumen.....	60%
Volatile vehicle.....	40%
Coal tar or pitch.....	None

Applied cold with a brush, either at the yard or on the ground, touching up all bare spots just before building in.

GF Crystalrox (GF 145)—A fine white powder to be dissolved in water and applied to the exposed faces of all cut stone, marble or cement work, to harden the surface and prevent stains and discolorations.

Also for application to freshly lime or cement plastered walls, to interpose a neutralizing film between the caustic alkalis of the surface and the decorative finish.

Dissolved in water and applied in 2 coats as follows:

1st coat—2 pounds GF 145 in 1½ gallons of water.

2nd coat—2 pounds GF 145 in 1 gallon of water.

Floor Hardening and Preserving

GF Cement Accelerator (GF 12)—Described before under Waterproofings. Used in the mixing water in proportion of 1 gallon of GF 12 to 10 gallons of water will harden and set the floor throughout its thickness in 2 days, as ordinary work in 30 days.

Made also in colored paste form, red, brown, buff, gray and green to make an integrally colored cement floor equal in appearance and durability to tile. Use minimum of ½ gallon of red, 1 gallon of green or ¼ gallon of each of the other colors per bag of cement, increasing these quantities if a deeper color is desired.

GF 12 Colored Wax—A floor wax made in the same colors as GF 12 colored, for application to colored cement floors to give a gloss finish and to rectify patchiness of the surface due to poor workmanship in laying.

GF Metallic Hardener (GF 140)—Pure iron particles properly graded and specially treated to become temporarily non-absorbent. To be mixed dry with equal weight of cement and troweled on to the surface of a cement floor at time of laying. Use 15, 25 or 30 pounds of GF 140 per 100 square feet of surface, according to severity of wear.

GF Crystalrox (GF 145)—A colorless powder to be dissolved in water and applied in 2 coats to the set up surface of an old or new cement floor.

1st coat—2 pounds GF 145 in 1½ gallons of water.

2nd coat—2 pounds GF 145 in 1 gallon of water.

This gives a 17% solution of chemical hardener over every foot of surface. Floors can be used between applications.

GF Floor Enamel (GF 155)—A colorless or colored cement floor paint containing a minimum of pigment, just sufficient to hide or cover any stains or discolorations of the surface, being unaffected by the alkalis of cement. Applied in 2 coats with an interval of 24 hours between. Very dusty, porous floors or floors laid directly upon the ground should first receive a priming coat of GF 155 Transparent. Made in colorless, red, brown, gray and green.

GF Wood Floor Preservative (GF 160)—A highly wear resistant transparent oil filler and finish combined, for either hard or soft wood floors, that is unaffected by water, oils, alkalis, etc. Prevents dry rot, shrinkage and splintering. Gives an eggshell, gloss finish, that can be varnished, waxed or polished. One coat sufficient for years of constant wear. Surfaces must be clean and dry.

Roofings

Membrane GF 17, GF 18, and GF 21—Described previously under Waterproofing. Use 3 plies of GF 18 Felt, each stuck and coated with hot GF 17 Bitumen, using altogether 17 gallons of GF 17 per 100 square feet of surface, or, 2 plies of GF 21 Fabric similarly stuck and coated with GF 17, using altogether 13 gallons of GF 17 per 100 square feet of surface. If the GF 21 is turned up 6 inches on parapet walls, etc., no metal flashings will be required.

Plastic GF Mastic Cement (GF 250)—Previously described under Dampproofing. To be applied cold with a trowel to any kind of new or old roof surface, forming a tough, elastic waterproof coating, that will be unaffected by the elements. In all cases, except tin or metal, apply first a brush coat of GF 250 Primer. Form 6 or 8-inch flashings of GF 250 on all

parapet walls, etc. If roof is to be walked on, cover with a single layer of GF 18 Felt.

GF Primer (GF 250)—A brush coating to be applied cold to all porous surfaces as a primer for GF 250 Mastic Cement.

GF 250 Brush Coating—A brush coating, containing asbestos fiber and of a similar nature to GF 250 Mastic Cement, to be used cold for recoating and repairing all kinds of built-up membrane roofings.

GF 250 Colored—A trowel coating, for the same purpose as GF 250 Mastic Cement, made in brown, red, gray, buff and green.

Coatings for Structural Steel, Iron and Timber

Steel and Iron—GF 300 Steel Coating—A shop coating for structural steel, composed of zinc and lead chromates with Jellatung rubber resin and China wood oil, forming a rust inhibitive, elastic, protective coating; 1 coat to be applied before assembling and a second coat after riveting is completed. If a colored finish is desired for exposed work, such parts to receive a final coat of GF 300 after erection.

GF Alkali Coating (GF 325)—A bitumen paint containing only 34% of volatile vehicle. To be used over GF 300 as a final coat on structural steel embedded in masonry or exposed to the weather. Insulates and prevents electrolytic action.

GF Galvanic Primer (GF 350)—A transparent coating that penetrates the greasy film left by the galvanizing process, bonds to the iron and forms a bond for any ordinary linseed oil paint.

Applied in 1 coat to a clean, dry surface.

Timber—GF Timber Preservative (GF 550)—A combination of creosote, zinc salts and copper, for application to structural timbers to be embedded in earth or masonry, or exposed to the elements. Prevents dry rot and disintegration from heat, cold, dampness, oils, insects and fungi. Applied cold as a brush coating or by dipping.

GF Wood Preservative (GF 160)—Described previously under Floor Hardening and Preserving. By combining with the natural saps of the wood it protects them against drying out or rotting away, which causes shrinkage cracks in trusses, posts and other structural members.

Applied in 1 coat to a clean, dry surface.

Acidproofings

GF Acidproofing (GF 99)—A transparent brush coating to be applied to any structural surface, forming a durable film that renders the surface immune to the action of acetic acid, alcohol, alkalis, ammonia, blood, caustic soda 50%, disinfectants, ensilage, garbage, hydrochloric acid 25%, lactic acid, live steam, malic acid, molasses, muriatic acid, oxalic acid, picric acid 25%, septic fluids, sewage, smoke, sodium chloride, sugar, tannic acid, wine.

GF Bitumen (GF 17)—Previously described under Waterproofings. Applied hot to protect against alum, ammonia, hydrofluoric acid, hydrochloric acid, mineral acids and dilutes, nitric acids, picric acid, sulphuric acid.

GF Crystalrox (GF 145)—Previously described under Floor Hardening and Preserving. Dissolved in water and applied in 2 coats to protect concrete and cement work against creosote, lactic acid, malic acid, molasses, sugar.

GF Bitumen Paint (GF 220)—Previously described under Dampproofing. Applied cold with a brush to protect against acetic acid, mineral acids and dilutes, cyanides.

Bonding Concrete

GF Bonding Compound (GF 400)—A combination of chemicals, forming a powerful acid powder to be dissolved, 2 pounds of GF 400 in 1 gallon of water, and applied to any concrete or cement surface, floor or walls, to open the pores and expose fresh cement and aggregate to afford a monolithic bond for new work; developing a bonding strength of 80 pounds per square inch.

Oilproofing Concrete

GF 141—A finely ground pure iron powder for mixture with cement and sand, 1 part GF 141, 3 parts cement, 1½ parts sand; to be wet up and applied in 2 coats, scratch and finish, to a total thickness of about ½ inch, as an oilproof, plaster coat finish, to walls and floors of concrete oil storage tanks.

Service and Handbooks

The Waterproofing Handbook covers all ordinary problems in waterproofing, dampproofing and preservation of different parts of building construction. We also maintain a Waterproofing Service Department at Youngstown, Ohio, whose advice and assistance are supplied without cost or obligation.

A. C. HORN COMPANY

Chemical Products for the Conservation of Buildings
Room 505, Horn Building, LONG ISLAND CITY, N. Y.

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Agencies Located in Principal Cities of United States, Canada, South America and Australia
The Names of our Distributors and Nearest Points of Distribution will be given on request

Products

HYDRATITE INTEGRAL WATERPROOFINGS for concrete; DEHYDRATINE DAMPPROOFING COMPOUNDS; SYMENTREX, Decorative Waterproof Coating for concrete and masonry; KONCREX, Decorative Coating for cement floors; VULCATEX CALKING COMPOUND, for windows and joints; HORN'S DRY COLORS for coloring cement, mortar and stucco; STAYBRITE for coloring, hardening and waterproofing cement floor finish in one operation; HORNSTONE CRYSTALS for dustproofing and hardening cement floors; FERRO-FAX METALLIC FLOOR HARDENER; TRIPLEFLEX COTTON FABRIC for membrane waterproofing; KERAMIK KEMIK PROCESS for producing pottery effects in concrete.

Also Kopper Karbol Wood Preservative; China Flat Wall Paints; Bondsit for Bonding Old and New Concrete; Expansion Joint Cement; Durock, a Decorative Waterproof Coating, can be applied on green concrete and wet surfaces.

Service

We have a waterproofing engineering staff that designs materials and methods for unusual situations, offered gratis to engineers, architects and contractors. *An architect's folder, containing specifications on individual sheets*, offered free on request.

References

In our thirty years of experience, we have had tests made by governmental departments, engineers, laboratories, etc., and we have a long list of jobs where our materials have given satisfactory service in every section of the world.

Hydratite Integral Waterproofing Compound

A compound to be mixed with cement to make permanently watertight concrete mixtures. Made in paste and powder form. Paste is a white, smooth material to be dissolved in gauging water and distributed by it through the concrete or cement mortar. In mass concrete, use 1 part to 33 parts of water; in cement plaster and stucco work, 1 part to 17 parts of water.

Dehydratine Dampproofing Coating

These black compounds are applied to the inside surfaces of exterior brick, stone and terra cotta walls, dampproofing them and providing insulation. Dehydratine No. 1 brush coating for use on brick, stone or terra cotta. Dehydratine No. 10 trowel coating for use on brick walls only. The use of these materials eliminates the necessity of furring and lathing. Gypsum plaster may be applied directly to the dampproof film thus provided.

Dehydratine No. 2 Transparent Exterior Waterproofing Brush Coating

A transparent liquid for dampproofing and reducing the porosity of brick, stone, stucco, masonry or concrete surfaces. It is applied with a brush and has a high penetrating capacity, thereby completely filling the pores and preventing absorption. It is applied on the outside of the building only.

Dehydratine No. 3 Stone and Trim Stainproofing Backing

A specially prepared, quick-drying, black, brush coating to be applied on all unexposed surfaces of cut stone or of wood trim.

Vulcatex Calking Compound

Vulcatex is a permanently elastic material, unaffected by the changes in temperature: Is unexcelled for calking windows, pointing up terra cotta and masonry joints, and for

expansion joints in concrete or masonry. It is made in gray, red, and brown.

Hornstone Crystals

A chemical floor hardener composed of mineral salts, dissolved in water. It is flushed over cement floors, producing a harder, more compact and dustless surface, that is proof against absorption of all liquids for all time. It can be used on old or new floors.

Ferro-Fax Metallic Floor Hardener

A ground metallic aggregate and hardener introduced into the top surface of cement floors when laid, and mixed with cement finish coat or topping. Ferro-Fax insures a smooth, hard, dense surface that withstands severe traffic. Furnished in gray, black, red or green.

Keramik Kemik Process (Patent Applied For)

A balanced penetrant which reacts chemically with the lime content of the portland cement in floors, producing the color effects which are ordinarily obtained in pottery by the burning-in of similar metallic salts by fire. The possibility of scoring the concrete to resemble tile suggests unlimited appeal of texture and color similar to Rookwood.

The finished floor is hard and dustproof as well.

Gives same desirable results when used with stucco.

Staybrite (Integral Coloring, Waterproofing and Hardener for Cement Floor Topping)

This material integrally colors, hardens and waterproofs cement floor topping in one operation. Furnished in following colors: Tile Red, Mexican Red, Japanese Black, French Gray, Persian Yellow, Alaskan Brown, Linoleum Brown, China Blue, Egyptian Green.

Horn's Dry Colors—Coloring for Cement, Lime and Composition Mixtures

These colors are high grade metallic oxides, and have great tinctorial strength. They are unaffected by the actinic rays of light as well as by the various chemical reactions prevalent in cement mortar and masonry.

These colors are economical as but small quantities are required to the bag of cement, and because of the small percentage needed to permanently color cement for floors and mortar, the strength of the cement is maintained.

Quantities Required per Bag of Cement—Tile Red, 8 lb.; Mexican Red, 8 lb.; Japanese Black, 3 lb.; Persian Yellow, 8 lb.; Alaskan Brown, 10 lb.; Linoleum Brown, 10 lb.; China Blue, 8 lb.; Egyptian Green, 8 lb.

The foregoing proportions are for maximum depth of color. Lighter shades are obtained by reducing the quantity of color per bag of cement used.

Dehydratine No. 80 Liquid Integral Cement Accelerator, Antifreeze Compound and Hardener

A liquid compound to lubricate, harden and permanently strengthen cement, mortar and concrete mixtures. Cuts the time and labor by accelerating the set of cement. In freezing weather, it acts as an Antifreeze, makes cement mortar more "fatty" and increases the bond in masonry work. It is mixed in the gauging water.

Koncrex Liquid Protective Coating for Cement Floors

Prolongs the life of cement, producing a hard, dustproof, washable surface, impervious to the destructive action of oils and other liquids.

THE HYDROLITHIC WATERPROOFING CO., INC.

Engineers and Contractors for Waterproofing
1401-2 Commonwealth Building, PITTSBURGH, PA.

TELEPHONE, COURT 1161, 1162

EASTERN REPRESENTATIVE: TAYLOR-HYDROLITHIC Co., 32 Pearl Street, NEW YORK, N. Y.—Telephone, Bowling Green 5055

Services

We are ENGINEERS and SPECIALISTS for WATER-PROOFING, making a specialty of Cement Coat Waterproofing.

We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, boiler rooms, elevator pits, etc.; guaranteeing a positive and permanent waterproofing for all kinds of masonry construction.

Our Engineering Department is always at the service of architects, contractors, or others.

Advantages

The advantages of our Hydrolithic System over the old membrane method or integral waterproofing are many, as follows: it is permanent; it is cheaper, no extra supporting walls are required; no additional floor finish is necessary; ease and economy with which repairs can be made; it can be applied without delaying the other building trades; it can be applied as readily to old buildings as to new; it forms a good wearing surface on the floor and an attractive wall finish; it is not affected by heat and can be used in boiler rooms and other places where the heat would destroy pitch and felt waterproofing.

Thirty Years without a Failure

All work is executed in the well-known Winslow's Hydrolithic System which was invented by E. J. Winslow more than 30 years ago. It is the original plaster coat method and, although its wonderful success has inspired a host of imitators, it is still easily the leader in its field. During the thirty years it has been in use, we have not had a failure.

Application

Hydrolithic is applied as a cement plaster coat to the inside of exterior walls and top of floors. Wall coatings are $\frac{5}{8}$ in. and floor coatings 1 in. thick, all surfaces being thoroughly chipped and cleaned before application. Due to the special qualities of Hydrolithic and the expert care with which it is applied, a perfect bond is secured. Hundreds of successful installations are in existence all over the country where Hydrolithic has for many years remained absolutely dry, although subjected, in some cases, to very high hydrostatic pressure.

Registered

HYDROLITHIC

TRADE-MARK

Specifications

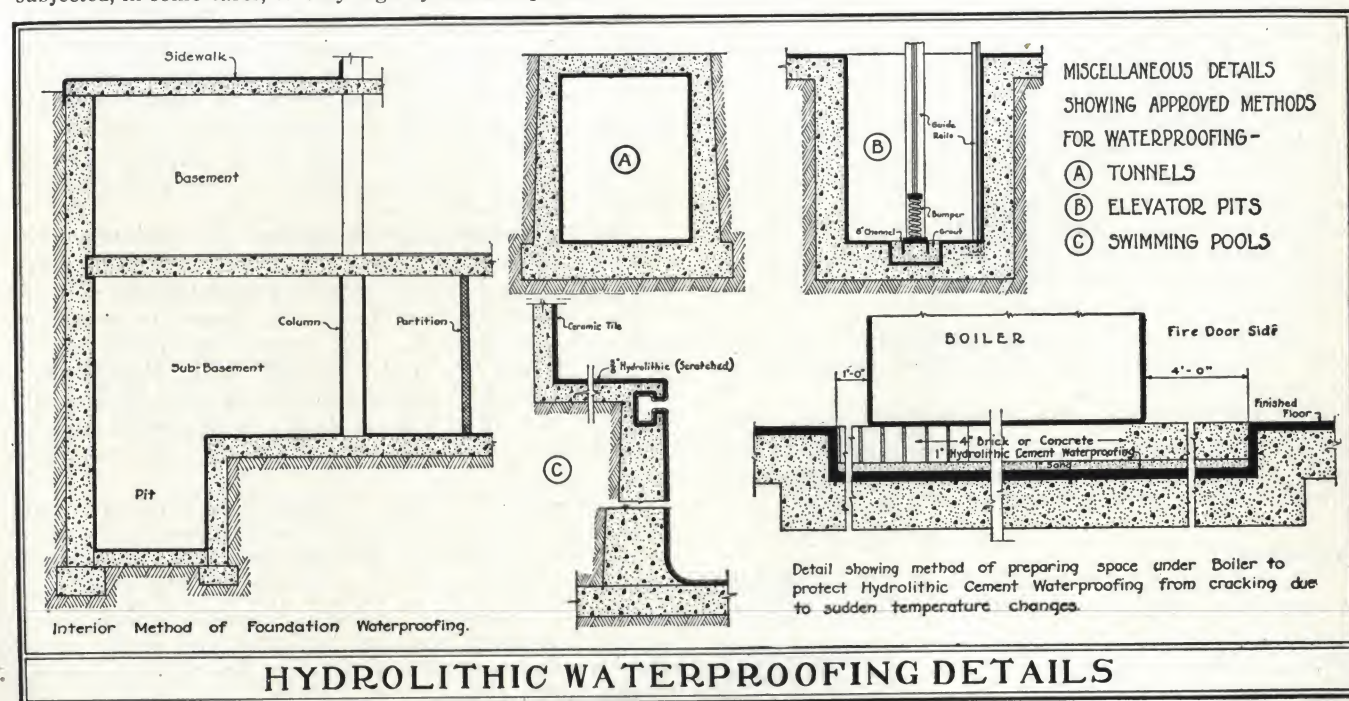
The interior surface of all exterior walls to a height of . . . feet above the finished basement floor and the upper surface of the concrete floor slab of the entire basement [sub-basement] as well as all trenches, pits and machinery foundations shown on the plans, shall be waterproofed with Winslow's Hydrolithic Cement Coatings, applied by THE HYDROLITHIC WATERPROOFING CO., INC. All surfaces, before waterproof coating is applied, shall be thoroughly chipped and cleaned. Wall coating shall be $\frac{5}{8}$ in. thick, applied in 2 coats, thoroughly floated and troweled to a smooth and even finish, free from imperfection. Floor work shall be 1 in. thick and serve the double purpose of a waterproofing agent and a wearing surface. Floor coating shall be floated and finished as described for wall coating.

Guarantee—THE HYDROLITHIC WATERPROOFING CO., INC., shall furnish a written guarantee covering their work for a period of three years. During this time they shall, at their own expense, promptly repair any leaks which may develop; providing such leaks are not due to structural changes in the building or to external damage to the waterproofing for which they are not responsible.

Representative Contracts

BUILDING	LOCATION	ARCHITECTS
Mellon National Bank	Pittsburgh, Pa.	Trowbridge & Livingston and E. P. Mellon
Exchange National Bank	Pittsburgh, Pa.	Weary & Alford
Joseph Horne Store	Pittsburgh, Pa.	Benno Janssen
Colonial Trust Company	Pittsburgh, Pa.	F. J. Osterling
Professional Building	Pittsburgh, Pa.	Hunting, Davis & Dunnells
Catholic Boys High School	Pittsburgh, Pa.	Edward A. Link
Fifth Avenue Building	New York, N. Y.	Maynicke & Franke
Manhattan Eye & Ear Hospital	New York, N. Y.	York & Sawyer
Standard Oil Building	New York, N. Y.	Carrere & Hastings
Oil City National Bank	Oil City, Pa.	Weary & Alford
B. F. Goodrich Company	Akron, Ohio	Wright & Henderson
Third National Bank	Springfield, Mass.	Starrett & Van Vleck
U. S. Post Office	Asbury Park, N. J.	U. S. Government
Victor Talking Machine Co.	Camden, N. J.	Ballinger & Perrot
Standard Sanitary Co., Bldgs.	Various Cities	Hunting, Davis & Dunnells
Peoples National Bank	Jackson, Mich.	Rockers & Votet
National Exchange Bank	Roanoke, Va.	Wyatt & Nolting
New York Harbor Dry Dock Co.	Staten Island, N. Y.	McKenzie, Voorhees & Gmelin
Bell Telephone Buildings	Various Cities	

Hundreds of other structures over the United States.



LEWIS ASPHALT ENGINEERING CORPORATION

SUCCESSORS TO GARDINER AND LEWIS, INC.

ENGINEERS AND MANUFACTURERS

Specializing in Protection Against Water and Corrosion

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CHICAGO, ILL., Tacoma Building

Karnak Membrane Waterproofing System

The Karnak system is based on the use of a highly refined and very ductile asphalt, reinforced and held in place by a strong elastic interlocking membrane, made of cotton cloth saturated with asphalt. Because Karnak asphalt contains no impurities or foreign matter and because this waterproofing is held in place by a strong elastic binder, less plies are required than in felt systems. In the usual case, 2 plies of Karnak fabric with 3 heavy moppings of Karnak asphalt will give absolutely adequate results.



Uses—This system will be found to be thoroughly dependable for use on building foundations, bridges, viaducts, pump wells, retaining walls and wherever sub-level construction is exposed to water pressure.

Karnak Asphalt—Melting point 150° to 160° F.; penetration at 32° F. not less than 10, at 115° F. not more than 100; ductility at 77° F. not less than 30 cm.; loss in weight and penetration under the standard A.S.T.M. heat test, less than 0.5% and 10%, respectively.

Karnak Fabric—An elastic cotton fabric, thoroughly impregnated with Karnak Asphalt, having a minimum tensile strength of 50 lbs. per in. and a minimum stretch of 10% in either direction. The thread count shall be between 18 and 26 threads per inch assuring an open mesh. The raw weight shall be less than 4½ oz. and the saturated weight from two to three times the raw weight.

Architects' Specification—The waterproofing course shall consist of 2 plies of Karnak Fabric and 3 layers of Karnak Asphalt, applied in strict accordance with the manufacturer's directions.

Tests—Every lot of asphalt and fabric is tested at the source by an independent laboratory which places its seals and identification numbers on each package. A copy of this test will be sent directly to the architect by the testing laboratory.

Publications—We have bulletins covering all points: a technical discussion of bituminous waterproofing; lists of architects, engineers and railroads who use Karnak; lists of typical Karnak installations; detailed descriptions of some particularly interesting projects.

Karnak Cut-backs and Plastics—We make a complete line of primers, brush plastics, trowel plastics, joint fillers.

Karnak Special Purpose Asphalts—To meet the needs of manufacturers. State your needs to our Engineering Department.

Karnak Roofing—The same as the waterproofing blanket. Particularly adaptable for roofs protected with tile or concrete because the expansion of the surfacing will not tear the roofing blanket.

Krodeproof

A Preventive of Corrosion and a New Method of Applying Asphalt as a Waterproofing Agent—Krodeproof consists of minute particles of asphalt suspended in water. When applied to any surface, wood,



steel or concrete, the water evaporates and the asphalt particles flow together and coalesce, leaving a protection coating of asphalt.

Advantages—Krodeproof, being a dispersion of asphalt and water, is always applied cold. It can be applied to damp or dry surfaces with an air spray, brush or trowel; and it may be built up to any thickness. After the Krodeproof has set up it will not flow, bleed or run at any temperature up to 300° F.

Uses—Krodeproof is most effectively used wherever protection is required against moisture, acid or alkali fumes.

Users—Railroads; against locomotive gases, brine drip and on the decks of concrete bridges, and retaining walls.

Marine; against salt water corrosion.

Contractors and engineers; against moisture below grade for cut stone backing and for surfacing roofs.

Hydro-electric plants; on penstocks, transmission towers, etc.

Manufacturing plants; for lining coal bunkers, for lining acid chimneys, boiler setting compound, etc.

Coverage—80 sq. ft. per gal. on steel; 40 sq. ft. per gal. on concrete.

Korkseal

Korkseal is an asphalt plaster used for the protection of cork board insulation. It is made from Krodeproof mixed with asbestos, which gives a smooth-troweling plastic, very easy to apply, firmly bonding to the corkboard—setting up into a tough rubbery protection coating which will not crack, and will not permit the penetration of moisture into the corkboard—thereby preserving the original usefulness of the insulating material and preventing the absorption of odors.



Engineers and contractors have found Korkseal more efficient, and less expensive. A representative list of installations will be sent on request.

Refrigeration Specifications—To maintain the efficiency of corkboard as an insulator, it must be kept dry; to do this it is necessary to keep all "live" air out of the corkboard. Therefore: (1) Prime the masonry wall with Krodeproof. (2) Erect the corkboard to the primed masonry wall with 180° M.P. Karnak Asphalt. (3) Protect exposed surface with a ¼-in. coat of Korkseal. All of these materials to be applied strictly in accordance with the instructions of the manufacturer.

Korkseal for Pipes—An asphalt plaster made from Krodeproof and inert materials producing a softer surfacing than Korkseal. Korkseal for Pipes is applied cold with a trowel, on to the surface of the cork pipe cover after installation, giving a seamless asphalt coating which protects the cork perfectly, and at the same time makes a less expensive job, but one more attractive in appearance.

MINWAX COMPANY, INC.

Engineers and Manufacturers of Waterproofing and Protective Products

270 Madison Avenue
NEW YORK, N. Y.

230 East Ohio Street
CHICAGO, ILL.

FACTORY: DELAWANNA, N. J.

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CANADIAN REPRESENTATIVE: THE RAINES CO. OF CANADA, 1008 Anderson Street, MONTREAL, QUE.

Products

WATERPROOFING, DAMPPROOFING, ASPHALT PRODUCTS, PROTECTIVE COATINGS AND FINISHES.



Consultation and Service

The pages which follow present, in condensed form, complete data on Minwax products. A more detailed discussion is furnished in separate bulletins, which will be gladly furnished on request. Our engineers will present complete recommendations on design and specifications and furnish estimates either on the entire problem or on some specific detail or question. Consult with local representative where possible, or write direct giving details as completely as practicable.

Through 21 years of study and experience in this

field, our purpose has been to develop for each problem the material best suited for that particular group of conditions. The record of accomplishment made by each product establishes its outstanding efficiency and permanence, and, in many cases, has created new standards of service.

To list or recount the accomplishments of these years in the limits of this catalogue is impracticable, but complete detailed data and a list of nearby installations will be gladly furnished on request.

To assist the architect in immediately locating information on the kind of work he is interested in, we are furnishing a paragraph index below. Necessarily this index cannot perfectly cover all the possibilities of the several materials, but the heading and descriptions will suggest further uses.

Guide and Index for Minwax Materials

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Minwax Membrane Waterproofing System

(1) **For Bridges, Pools, Reservoirs, Tanks, Subways, Floors, Roofs, Foundations, Sidewalks, etc.**—The Minwax Membrane System is the original cotton fabric or elastic system. It consists of hot mopping of Minwax Waterproofing Asphalt reinforced with Minwax Fabric which has previously been saturated with the same asphalt.

The asphalt possesses four requisite qualities to an unusual degree: Permanence, elasticity at all temperatures, toughness at all temperatures, and smooth flowing and high filming qualities.

Minwax Fabrics are woven from a long-fiber cotton and embody to the highest possible degree all the necessary properties: permanence, strength and elasticity at all temperatures, ease in handling and placing without wrinkles. They become an integral part of the mopping courses.

Note: The MINWAX COMPANY, INC. manufactures two standard Fabrics: Specification Fabric 80-lb. strength, Cotton Cord Cloth 50-lb. strength. Higher strength will give greater protection and is generally recommended. Bulletin No. 31 gives complete data.

(2) **Uses**—The Minwax Membrane System is recommended by the Joint Committee on Concrete and Reinforced Concrete for all locations where thorough waterproofness is required. Being elastic and stretchable, it is the logical system for slab, pool, floor or deck conditions exposed to variations in temperature or vibration where danger of cracking or checking definitely exists.

(3) **Tests**—Pittsburgh Testing Laboratories show an elasticity of over 10% for the completed waterproofing.

Tests by Columbia University show that the completed waterproofing will stretch, without rupture, $\frac{1}{4}$ in. at 0° F. under field conditions.

Tests by the Pittsburgh Testing Laboratories show that the completed 2-ply unsupported membrane is waterproof up to a bursting pressure of 374 lb. per sq. in.

(4) **Approvals**—Since introduced by this company in 1906, the Minwax Membrane System has established the standard of waterproofing efficiency. The results obtained with the Minwax System definitely established the superiority and greater final economy of the cotton fabric system over all others in the face of slightly higher first cost, and largely formed the measure for the standards established by the American Society for Testing Materials, American Specification Institute, Federal Specifications Board and the United States Bureau of Standards.

Minwax materials meet and exceed all requirements of these specifications and deliver many valuable properties which could not be included in a general open specification.

(5) **How Shipped**—Fabric, 50-yd. rolls 36 in. wide; asphalt, 50-gal. sheet metal drums.

(6) **Specification**—The waterproofing shall consist of not less than 2 plies of Minwax Specification Fabric (Cotton Cord

Cloth) and 3 moppings of Minwax Waterproofing Asphalt applied by experienced mechanics in accordance with the manufacturer's directions.

All surfaces shall be smooth, firm and temporarily dry. Completed work shall be protected from puncture.

(7) **Slabs, Sidewalks, Floors, Promenades, etc.**—Membrane waterproofing shall be continuous, extending over and into expansion joints and connected to wall waterproofing, or flashed 3 in. above finished grade.

(8) **Pools, Tanks, etc.**—Reinforce all corners and angles with 18-in. strip. Build first ply on walls, lapping 6 in. out on floor. Build two-ply on floor, lapping 6 in. up on wall. Build second ply on walls. Provide 9-in. flange on all pipes for flashing. Waterproofing shall turn over top of wall and across floor where necessary. Use third ply on pools in upper stories.

Note: Do not place tile directly on waterproofing membrane. There should be a minimum of 3 in. of concrete or 4 in. of brick between tile and waterproofing.

(9) **Showers**—Two-ply membrane waterproofing shall be installed continuous over entire surface of the shower stall floor, and shall extend up on sidewalls or curbing at least 6 in. In no case shall this distance be less than 3 in. above finished shower stall floor level. Waterproofing on walls shall be 1-ply carried to height shown.

Note: Tile can be applied over membrane in stalls only. In rooms handle as for swimming pools.

(10) **Foundations**—From grade, membrane waterproofing shall be carried down outside of walls, through at footings, across basement floor, under and around all pits and trenches, and under or up all columns, forming a complete, watertight envelope. Protect all waterproofing with 1-in. coat of cement mortar.

Where impossible to work outside of wall, build brick course against sheathing, apply waterproofing and cast wall against same.

Where waterproofing must be applied inside structural walls, cover same immediately with concrete designed to hold existing pressure.

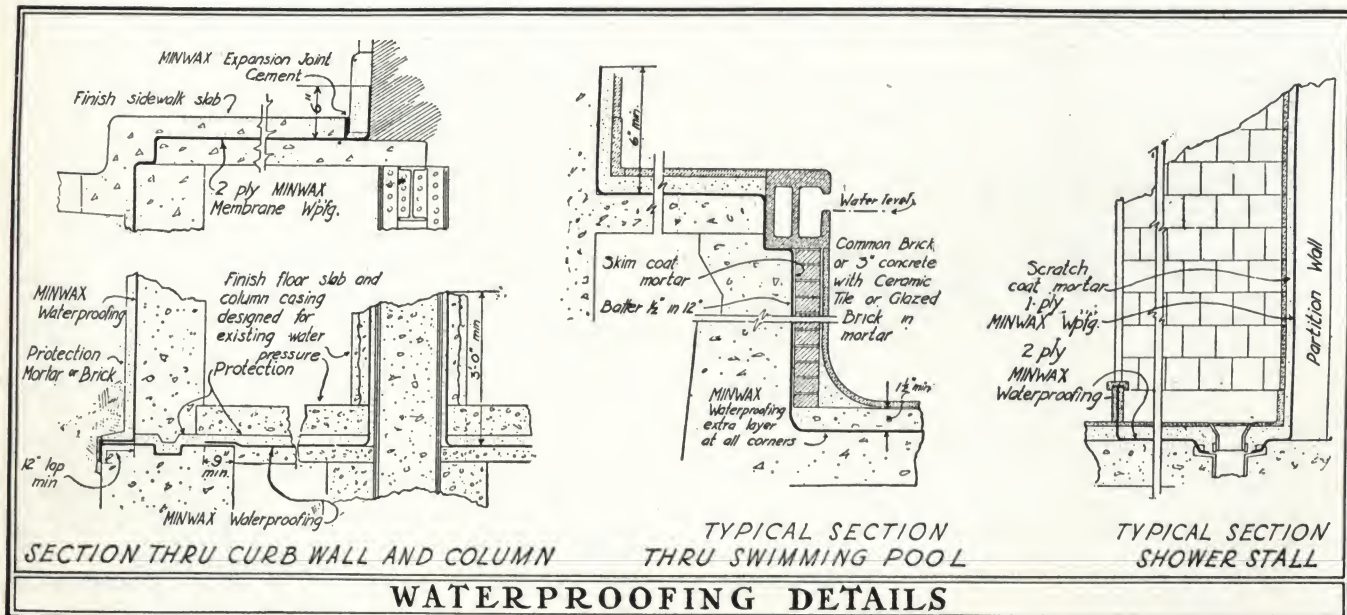
Provide pumping to remove all pressure and seepage, and keep surface dry during waterproofing and until concrete has set.

(11) **Quantities**—Use $12\frac{1}{2}$ yd. of fabric per ply and 4 to 5 gal. of asphalt per mopping for each 100 sq. ft. of surface.

(12) **Number of Plies**—Use a third ply on heads of over 15 ft. or under difficult working conditions.

Minwax Fibrous Brush Coat

(13) **For Dampproofing the Backs of Abutments, Retaining Walls, Foundations, etc.**—This material is applied cold (as delivered) with a long handled roofer's brush. It eliminates heating equipment cost, wastage, etc. It is a combination of Minwax Asphalts and special graded asbestos fiber. The asphalts penetrate the surface and a soft, sticky, fibrous skin is formed which closely approximates a full membrane system in efficiency.



This coating can not be chipped or flaked off, and backfilling handled in a normally careful manner will in no way cut or damage it.

(14) **Covering Capacity**—Approximately 100 sq. ft. per gallon per coat.

(15) **How Shipped**—In 5, 30 and 55 gal. containers.

(16) **Specification**—Walls shall be coated from grade to footing with 2 thorough applications of Minwax Fibrous Brush Coat, allowing 12 hours to elapse between coats. Materials shall be applied cold, without adulteration, with a long handled roofer's brush and well brushed into all surfaces, leaving no voids. Backfill in not less than 12 hours, exercising care to prevent damage of surface. Material shall be thoroughly stirred before and during application.

Note: It is important to provide subsoil drainage to carry off water and prevent development of hydrostatic pressures.

Special Asphalt Fillers for Sidewalk Lights, Grooves, Expansion Joints, etc.; Putties and Caulking Compounds

(17) **Minwax Vault Light Cement**—An asphaltic cement for sidewalk or vault light joints and other horizontal grooves and joints as in promenade decks, etc. It develops a strong watertight bond to concrete, stone or metal and its reliability has made it a standard in the trade. It will not "stew" under sun action or become brittle in cold weather. Use only in joints and grooves that are nearly level. Prime the joints with Minwax Asphalt Primer, heat the Minwax Vault Light Cement and pour it into the joints.

(18) **Minwax Fibrous Expansion Joint Cement**—For expansion joints in waterproofing membrane or joints where there is considerable movement. Prime the joints with Minwax Asphalt Primer, heat the fibrous expansion joint cement and pour it into the joints.

How Shipped—Both Minwax Vault Light and Fibrous Expansion Joint Cement are shipped in 1, 5 and 25-gal. containers (231 cu. in. per gal.)

(19) **Minwax Caulking Rope**—A moulded, fibrous, asphaltic rope for vertical joints, grommets, etc. Made in $\frac{3}{16}$, $\frac{5}{16}$ and $\frac{7}{16}$ -in. sizes. Shipped as desired.

(20) **Minwax Fibrous Mastic No. 1**—A black fibrous asphaltic putty compounded of Minwax Asphalts and asbestos fiber for caulking around windows. Will not harden or become brittle. Applied cold as received, this material is of proper consistency for use in hand caulking gun.

Covering Capacity—One gallon will fill 45 to 70 ft. of $\frac{1}{2}$ -in. joint.

(21) **Minwax Fibrous Mastic No. 2**—A stiffer grade asphaltic putty for application with trowel. Especially valuable for damp courses and for making tight joint between concrete and brick or for shrinkage joints in concrete. It will bond firmly to fresh concrete or mortar.

Covering Capacity—One gallon spreads over 10 to 14 sq. ft., $\frac{1}{8}$ in. thick.

How Shipped—Minwax Fibrous Mastics shipped in 1, 5, 30 and 55-gal. containers.

(22) **Minwax Caulking Compounds (Gray)**—A special elastic non-staining composition that never becomes hard and adheres strongly to all materials. Made in standard gray, special colors extra. First coat the sides of joint with Minwax Caulking Primer when filling joints in stone or wood. Used also for glazing in steel or wood sash. Made in consistencies for trowel and for hand gun.

How Shipped—1, 5, 25, 100, 500 and 800-lb. containers.

Specifications—

(23) **Wood Windows, Doors, etc.**—Pack space to within $\frac{3}{4}$ in. of face with oakum and fill solidly with Minwax Fibrous Mastic No. 1, forced in with hand caulking gun. Replace staff bead, or finish to smooth triangular bead.

(24) **Steel Windows**—For new work butter inside edge of masonry opening or surfaces of sash to be embedded, with thin coat of Minwax Fibrous Mastic No. 2. Caulk finished job or

old work around head, jamb and sill carefully with Minwax Fibrous Mastic No. 2, finishing to neat bead.

(25) **Waterproof Cut-off for Damp Courses, Window Sills and Heads, Parapets, Footings, Joints, etc.**—Prime surface with Minwax Asphalt Primer and trowel on good heavy coat of Minwax Fibrous Mastic No. 2. Set masonry, sill or coping. For severe exposures use fabric reinforcing as recommended in paragraph 26. Caulk coping joints with Minwax Fibrous Mastic No. 2 or Minwax Caulking Compound (Gray).

(26) **Spandrel Waterproofing**—Apply 2 good trowel coats of Minwax Fibrous Mastic No. 2 reinforced with 1 layer of Minwax Cotton Cord Cloth, extending from within 1 in. of face of wall at base of beam, up face and across top of beam, under back-up tile, turning up 4 in. or connecting with inside dampproofing.

(27) **Pointing Stone, Terra Cotta, etc.**—Rake out all joints for elastic pointing $\frac{3}{4}$ in. deep. Paint sides thoroughly with Minwax Caulking Primer, and fill with Minwax Caulking Compound, color to match or as selected. Horizontal joints in copings, cornices, sills, etc. especially important.

Minwax Bituloid for Protecting Metal, Wood or Concrete Against Acids, Alkali, Water, Brine and Corrosive Gases (Emulsified Asphalt)

(28) Minwax Bituloid consists essentially of fine asphalt particles suspended in water and has the same protective value as a hot mopped-on coating of acidproof asphalt without the difficulty and expense of the latter. Minwax Bituloid adheres perfectly to damp surfaces. Applied cold with brush or spray, it reaches cracks and corners apt to be overlooked in mopping. Made plain and fibrous for brush or trowel application.

(29) In addition to its use as dampproofing, Bituloid can be mixed with sand and cement for flooring or floor patching and is especially valuable for cork protection in refrigeration work.

Covering Capacity—Average 80 sq. ft. per gal. per coat.

How Shipped—In 1, 5, 30 and 50-gal. containers.

(30) **Specifications**—All surfaces to be coated shall be free from oil and loose scale. No coating work shall be carried on at a temperature below 40° F.

Apply 2 generous coats of Minwax Bituloid, flowing it on with a soft, long bristle brush, or use a spray. Allow first coat to become touchdry before proceeding with the second coat. Material shall be applied in consistency as received, first stirring it thoroughly.

Minwax Transparent Waterproofings for Waterproofing, Frostproofing, Stainproofing and Preserving Concrete, Brick, Stucco and Stone

(31) There are three types of Minwax Transparent Waterproofings: Minwax Clear Waterproofing for concrete, stucco, stone and brick surfaces; Minwax Heavy Clear Waterproofing for especially porous brick, stucco or concrete and for surfaces subject to immersion; Minwax Colorless Waterproofing for limestone, artificial stone, cream faced brick and other light colored surfaces. These three types are necessary to most efficiently meet the wide variety of conditions and materials for which a penetrative surface waterproofing is required.

(32) **Advantages**—All Minwax Transparent Waterproofings are liquids applied as received with a brush or spray. Ease of application assures positive effective results regardless of the character of the surface. When applied they penetrate into and below the surface for a considerable depth, sealing all pores and making the material waterproof. There is, therefore, nothing to be worn off, broken through or to scale loose; the waterproofing is really inside the surface. Minwax Transparent Waterproofings are applied as the final application, protecting the finished job, sealing craze checks and porous spots. They are independent, positive insurance against moisture penetration. Their waterproofing value is highly permanent, the result of the mineral wax base, and is proven by 21 years' service and test.

How Shipped—All Minwax Transparent Waterproofings are shipped in 1 and 5-gal. cans, 30 and 55-gal. drums.

(33) **Minwax Clear Waterproofing**—For concrete, stucco, stone and brick surfaces. A light amber-colored liquid which, when applied, penetrates deeply into the surface and cures, depositing a tough mineral gum which, in two applications, will completely

fill and seal the surface. Its action is purely physical or mechanical rather than chemical and is absolutely positive and independent of the nature of the surface to be waterproofed. It does not form any film or deposit on the surface or change the texture in any way. It changes the color slightly, which change decreases in time.

Covering Capacity—200 to 250 sq. ft. per gal. per coat on concrete and stucco. 150 to 200 sq. ft. per gal. per coat on brick.

(34) **Specification—General**—Surfaces shall be thoroughly dry, clean, sound and carefully pointed. No work shall be done at temperatures below 50° F. Brush dirt and dust off surface and apply 2 thorough coats with a brush or air spray, saturating and working the material into every part of the surface at each coat. Waterproofers shall do further incidental pointing, rubbing Minwax Pointing Paste into small cracks or holes immediately after application of first coat. Allow 24 hours between coats.

(35) **Wall Waterproofing**—All exposed surfaces must be waterproofed from roof flashing over and including coping and down outside surface to grade. Test all brick joints and repoint as necessary, repairing or replacing loose stucco or concrete. Test and carefully recaulk all window and door frames. (See Minwax Caulking Compounds.) Apply 2 coats as above specified.

(36) **Preventing Efflorescence**—Wall must be allowed to become absolutely thoroughly dry, work should only be undertaken under most favorable conditions. Clean off efflorescence with wire brush or dilute muriatic acid solution. When surface is thoroughly dry proceed as above for wall waterproofing.

(37) **Minwax Heavy Clear Waterproofing**—For especially porous brick, stucco or concrete and for surfaces subject to immersion. This material is heavier grade having a larger percentage of mineral wax and is applied and functions in the same way as Minwax Clear Waterproofing.

Covering Capacity—Same as for Minwax Clear Waterproofing.

Specifications—The same as for Minwax Clear Waterproofing.

Special Note: No work shall be done at temperatures below 60° F.

(38) **Minwax Colorless Waterproofing**—For limestone, artificial stone, cream colored face brick and light colored surfaces. This material, developed from Minwax Clear Waterproofing, deposits a superrefined mineral wax supplemented by certain preservative water-repellent chemicals and causes absolutely no change in color even on the lightest surfaces.

(39) On cut stone, Minwax Colorless Waterproofing performs four important functions: (1) Applied in 1 coat at the mill it protects the surface of the semicured stone from the absorption of dirt and stain while in transit and prior to setting. (2) Applied as a back coating it prevents the penetration of moisture from concrete or brick from discoloring the stone. (3) In the completed job it waterproofs the exposed surface so as to prevent the accumulation of grime and stain and assists in keeping the building in a light clean condition. (4) It prevents water and frost action and serves as a protective preservative treatment against disintegration and weather.

Covering Capacity—200 to 300 sq. ft. per gal. per coat.

(40) **Specifications—General**—Same as for Minwax Clear Waterproofing except that this material can be satisfactorily applied at temperatures down to 35° F.

(41) **Cut Stone (new)**—All stone shall be absolutely clean and dry before application of the waterproofing. The face and back of all stones shall be given 1 saturating coat of Minwax Colorless Waterproofing carried over 1 in. from each face on the "beds" and "builds." After erection and cleaning and when dry, all exposed surfaces shall receive the second thorough saturating coat of Minwax Colorless Waterproofing. Special attention shall be paid to horizontal and projecting surfaces as at cornices, copings, etc.

(42) **Existing Stone Work**—Surfaces shall be cleaned down by washing with soap and water or sandblasting and shall receive 2 thorough saturating coats of Minwax Colorless Waterproofing applied with a brush or spray 12 hours between coats.

Minwax Brick and Cement Coating for Waterproofing and Decorating Exposed Surfaces of Cast Concrete, Brick or Stucco

(43) This Minwax product is a pigment coating produced in a series of attractive flat color tones. It is a combination of the highest grade inert mineral pigments obtainable in a carrying vehicle based on Minwax Clear Waterproofing (one of the oldest, best known and most efficient mediums for exposed wall waterproofing).

This vehicle not only binds the coating on the wall surface so that it stays put, but it penetrates and eliminates the porosity factor and thus prevents the possibility of a dusty, loose coating.

It is not saponifiable and will not burn or peel from alkali action. The coating penetrates and becomes part of the concrete or brick, and the Minwax Clear Waterproofing vehicle penetrates well below the surface and permanently waterproofs it.

The effect produced is flat, without a painty sheen. It changes the texture of concrete or stucco but slightly and maintains the tone of the structural material and gives it the fresh, clean, uniform color selected. On masonry and brick, it gives a whitewash effect.

Applied with a brush or spray. Handles with unusual ease. Covers rapidly and effectively.

(44) **Uses**—Because Minwax Brick and Cement Coating is primarily a waterproofing, it is a very efficient means of decorating and beautifying concrete, brick or stucco and of preserving them from the disintegrating effects of water and frost.

Recommended also as a coating for light courts where a durable, fadeproof, white surface is desired.

(45) **Colors**—Finished in 11 standard colors: white, cream, yellow, cement gray, limestone gray, caen stone, green, brownstone, terra cotta, water blue and brick red. Special colors extra.

Covering Capacity—Varies between 160 and 250 sq. ft. per gal. per coat, depending upon the roughness and porosity of the surfaces to be treated.

How Shipped—In 1, 5, 30 and 55-gal. containers.

(46) **Specifications**—All exposed surfaces as directed shall receive 2 thorough coats of Minwax Brick and Cement Coating, color as selected. These surfaces shall be thoroughly dry, clean and sound, and shall be subject to the approval of painter before work proceeds. They shall be brushed to remove dust immediately before application of first coat. No work shall be carried on at temperatures below 45° F. The first coat shall be thinned with Minwax Brick and Cement Thinner according to the porosity of the surface. (Average conditions require from 10% to 20%). Painters shall do incidental pointing of open cracks or joints rubbing them full of Minwax Pointing Paste immediately after first coat is applied, brushing surplus from edges of crack and retouching to uniform appearance. When dry retouch light spots in surface with first coat mixture. After 48 hours apply second coat using material as received.

Note: It is especially important that parapets and horizontal surfaces should be done with greatest care. For dampproofing work all exposed surfaces from roof flashing to ground must be coated as per paragraph 35.

(47) Newly laid brick walls or new cast concrete surfaces shall receive 1 saturating coat of Minwax Neutralizer (see paragraph 49) to be followed when thoroughly dry by the first coat of Minwax Brick and Cement Coating.

(48) On old work, a sound solid surface must be obtained to get satisfactory service from coating. Wire brush surface thoroughly and repair and repoint all loose mortar or concrete. Use Minwax Pointing Paste (see paragraph 50) for filling small cracks and holes.

(49) **Minwax Neutralizer**—This is a water solution and a chemical which preages the concrete surface, reducing alkali activities and assuring maximum coverage and effectiveness from Minwax Brick and Cement Coating. Recommended for all new work.

Covering Capacity—150 sq. ft. per gal. One saturating coat required.

How Shipped—1, 5, 30 and 50-gal. containers.

(50) **Minwax Pointing Paste**—A special putty for filling small cracks and holes in stucco, concrete or brick work. Rub in crack and remove surplus from edges with stiff brush. Can be mixed with portland cement to stiffen.

Colors—The same as Minwax Brick and Cement Coating.

How Shipped—½, 1 and 5-gal. cans.

Minwax Plasterbond Dampproofing

(51) Applied in 2 good brush or spray coats to inside of wall beneath the plaster finish. It cures tacky and remains pliable and elastic indefinitely. It forms a tough, rubberlike, absolutely impervious, waterproof and dampproof skin that bonds securely to wall and plaster. It eliminates furring and prevents staining.

Covering Capacity—80 to 125 sq. ft. per gal. per coat.

How Shipped—In 5, 30 and 55-gal. containers.

Note: Not recommended for concrete ceilings or conditions where the weight of the plaster may be largely suspended on the coating.

Minwax Concrete and Terrazzo Floor Finish for Concrete, Terrazzo, Tile and Composition Floors

(52) Minwax Concrete and Terrazzo Floor Finish

fills the pores in the surface and subsurface of concrete floors with a tough mineral gum. Applied cold as a liquid after the floor has dried and cured, its action is mechanical and positive, creating an absolutely dense smooth surface. It thus eliminates the cause of dusting and disintegration and prevents the penetration of water, stains or liquids of any sort. The mineral gum is highly resistant to and gives maximum protection against the action of *brine, creamery and packing plant acids, or oils and dilute acids* found in industrial plants, and makes the floors highly *sanitary*. Floors subjected to heavy trucking have delivered years of service without needing retreatment.

On terrazzo and marble tile it brings out color, creates an easily cleaned sanitary surface and prevents dusting and staining. On composition and magnesite it prevents stains, kills salts and prevents disintegration by water.

Covering Capacity—Concrete and composition, 200 to 400 sq. ft. per gal. per coat; terrazzo, marble and tile, 400 to 600 sq. ft. per gal. per coat.

How Shipped—In 1, 5, 30 and 55 gal. containers.

Specifications—

(53) **Concrete, Magnesite, etc.**—Floors shall be clean and dry. For concrete and composition floors, apply 2 saturating coats with "T" head cotton floor mop leaving no puddles or excess material, allowing 12 hours to elapse between coats. Allow second coat to cure 24 hours before walking over floor.

(54) **Terrazzo, Tile, etc.**—Mop up surface with water to remove all dust and as soon as surface appears uniformly dry apply first coat of Minwax Concrete Floor Finish. Cross-mop first coat to even out and take up surplus. After 24 hours apply second coat in same manner. Very dense tile or terrazzo should be wiped up with dry rags 2 hours after each coat.

Specifications for Staining and Coloring Concrete Floors—

(55) The floors shall be clean, dry and absolutely free from dust and stain. Apply 1 thorough coat of Minwax Colored Concrete Floor Finish with a mop, cross-mopping the surface half hour after application to spread material uniformly. After 24 hours apply second coat in exactly the same manner, and about 2 hours after applying the second coat, wipe up the surface thoroughly with dry rags.

(56) Penetrating and permanent stain colors are added to Minwax Concrete and Terrazzo Floor Finish at the factory and the Minwax Colored Concrete Floor Finish delivered on the work ready for use. These stains bite well into the surface, giving a soft textured color that will resist even concentrated wear. It is especially valuable for integrally colored concrete and magnesite floors that show uneven appearance.

Colors—Made in tile red and linoleum brown.

Minwax Concrete Floor Binder

(57) This material is a heavier special grade developed from Minwax Concrete and Terrazzo Floor Finish and is designed for binding together the surface and subsurface particles of a granular, soft or sanding concrete floor. It will create a sound, durable surface.

It is not recommended for average sound concrete floors. On such surfaces Minwax Concrete Floor Finish should be specified and used.

(58) **Specifications**—Two thorough coats applied with long handled brush. First coat thinned 10% with turpentine.

Packages—Same as for Minwax Concrete Floor Finish.

Minwax Concrete Floor Paint

(59) A high quality long-lived durable floor enamel. Two coats recommended.

Standard Colors—Buff, light gray, dark gray and red.

Covering Capacity—500 sq. ft. per gal. per coat.

Minwax Flat Finish for Wood Floors and Trim

(60) For finishing, preserving and staining wood floors and trim. It is a combination of certain carefully blended oils and mineral waxes in the natural and carrying a series of clear stain colors.

Applied in saturating coats, it penetrates rapidly, filling the wood with a tough mineral gum. In its natural or clear color (without stain) it does not darken the wood, but by waterproofing and stainproofing, insures the permanence of the clean, fresh surface.

(61) **Effects**—In general, the effects produced are of the natural wood stained to the color selected and with a soft waxy sheen. A paste filler can be used where a closed, uniform surface is desired and where the wood is open grained.

(62) **Economical in First Cost and Maintenance**—Minwax Flat Finish offers important savings, not only in first cost, but in cost of maintenance. It accomplishes results in 2 easily applied coats, reducing the cost per square foot or finished woodwork to the minimum.

It is non-fading and sunfast, highly water-repellant and water-resistant, and will give unusual service on exterior trim exposed to the weather. Under all conditions maintenance is startlingly simple—a cloth dampened with Minwax Flat Finish and used to wipe down the surface will brighten and renew the finish without showing patches or laps, and, periodically used, will maintain permanently and enhance and enrich the beauty of the finish.

Colors—Minwax Flat Finish is made in the following stain colors: No. 9 (natural); No. 11 (light oak); No. 12 (dark oak); No. 13 (walnut); No. 716 (dark walnut); No. 750 (Jacobean); No. 15 (mission green); No. 16 (mahogany).

How Shipped—Shipped in 1, 5, 30 and 55-gal. containers.

(63) **Specifications—Trim**—Wood shall be clean, dry and carefully sanded and shall be stained and finished with 2 coats of Minwax Flat Finish applied with a brush and in color as selected. Each coat shall be wiped with rags in 2 to 6 hours to remove surplus. Allow 12 hours between coats. Do not apply at temperatures below 55° F.

(64) **Floors**—Wood shall be clean and dry and shall be carefully scraped or sanded with the grain (all old finish, varnish, shellac or wax shall be removed). Apply 2 coats Minwax Flat Finish, color as selected, as directed for trim. Protect and, on completion of building, clean floors and apply polish with weighted brush or electric polisher. For high polish apply Minwax Finishing Wax before polishing.

(65) **Maple Floors—Partial Penetration**—Apply 2 thorough saturating coats of Minwax Flat Finish No. 9 in accordance with above directions, using special care to remove all surplus after each coat. Close off the floors and protect them against traffic for at least 3 days to permit perfect curing of the materials. Then cover the floor with paper or clean sawdust until ready for final occupancy.

Note: The stain colors are not recommended for maple floors.

(66) **Minwax Penetrating Finish**—Will penetrate the full thickness of 1-in. flooring, sealing and filling the surface and protecting the whole body of the wood, will retard dry rot, warping, swelling, etc. Curing to a tough gum, it binds the surface fibers with tough wear-resisting material.

(67) **Complete Penetration**—Apply 1 thorough even coat of Minwax Penetrating Finish with a brush using 1 gal. for each 350 sq. ft., working it well into the wood. Wipe up the surface thoroughly with clean cloths in not less than 12 nor more than 24 hours after application to remove any excess material. Close off the floor from traffic for from 1 week to 10 days before placing same in service. If necessary, floors can be washed with soap and cold water after thoroughly cured.

Minwax Acid Stains

(68) True fuming water stains that develop and burn the color on and into the surface of the wood. Produced in three tones: No. 120, light fume; No. 122, Flemish; No. 123, dark Flemish.

Shipped—In ½, 1 and 5-gal. glass containers.

Covering Capacity—Approximately 300 sq. ft. per gal.

Specification—Apply Minwax Acid Stain with a brush or sponge as conditions require. Sand lightly where dry and apply Minwax Flat Finish, color to be selected. Colored fillers should be added to No. 9 Flat Finish and wiped off ½ to 1 hour after applying.

Minwax Finishing Wax

(69) A special hard drying wax to be applied over Minwax Flat Finish where a high wax luster is desired. As already noted, open grained wood can be filled before waxing. Apply with a cloth and polish with a weighted brush.

Packed in 1, 3½ and 7-lb. containers.

MITCHELL-RAND DAMPPROOFING CORP.

Manufacturers of M-R Protective Coatings

15 Vesey Street
NEW YORK, N. Y.

Products

DAMPPROOFING (Interior):

- M-R FURRING COMPOUND.
- M-R SEMI-MASTIC.
- M-R DAMPPROOFING MASTIC.
- M-R STONE BACKING COMPOUND.

INTEGRAL WATERPROOFING:

- M-R DOUBLE STRENGTH WATERPROOFING PASTE.
- M-R LIQUID WATERPROOFING.

EXTERIOR WATERPROOFING (above Grade):

- M-R COLORLESS WATERPROOFING.
- M-R BRICK and CEMENT COATING in colors.
- M-R SUPERIOR CEMENT COLORS.

M-R SHIELD BRAND CONCRETE FLOOR WAX.

Also M-R Anti Freezing, Liquid and Cement Accelerator, M-R Caulking Cement, M-R Roofing Cement, M-R Fibre Roof Coating, M-R Black Asphalt Paint, M-R Expansion Joint Asphalt and Gilsonite, Waxes and Asphalts.

Experience

In 1902 we started the manufacture of dampproofing compounds under formulae developed by L. F. Rand, Chemist, and many of the largest buildings throughout the country, representing all classes of structural work, are references to the quality and durability of these products. Twenty-five years of exhaustive research and extensive experiments have produced a line of waterproofing and dampproofing compounds that makes the trademark "M-R" synonymous with first quality.

Our contracting department, in charge of experienced men, will estimate on furnishing and applying M-R Furring Compound, M-R Semi-Mastic, M-R Dampproofing Mastic, M-R Colorless Waterproofing and M-R Cement and Stucco Coating; also on pointing up brickwork, waterproofing exterior brick, stone or stucco buildings, and the calking of window and door frames. Only expert mechanics are employed in each special line.

We manufacture the compounds. We do the work.

Experience proves that the only satisfactory way to dampproof is by the use of an asphalt-gilsonite mixture, applied in sufficient quantity.

M-R Furring Compound

This is a black, elastic, waterproof material, and specified extensively by prominent architects and builders. It is applied by means of a brush to the interior of outside walls above the grade level prior to the application of plaster. This compound prevents the penetration of dampness, and renders the inside of walls verminproof and stainproof.

M-R Furring Compound is recommended for use, also, on terra cotta ceilings and furring to prevent plaster from staining; it bonds perfectly with plaster.

The material can be employed with equal effectiveness for rough concrete surfaces, but should not be used on smooth concrete, to which portland cement mortar or plaster is to be directly applied.

The approximate covering capacity of M-R Furring Compound is 60 sq. ft. per gal., 1 coat. It is shipped in barrels, half-barrels and 5-gal. containers.

Typical Specifications—Preparation of Surfaces—Point up all voids and breaks in masonry surfaces specified to be dampproof. Patch defective brickwork at ceiling due to cen-



tering. Treat similarly the angle of wall and ceiling with cement or lime mortar to form a continuous surface.

Application—The interior surfaces of exterior exposed walls to be plastered, are to receive 2 coats of M-R Furring Compound, and in accordance with directions of the manufacturer, the Mitchell-Rand Mfg. Co. M-R shall be applied between floor level and ceiling below. Where the arches are placed prior to this application, the coating shall be carried back 12 in. from the outer walls on the underside of the connecting ceiling.

Cut-outs, wall chases, etc., shall be coated thoroughly before pipes, or other work is installed.

M-R Semi-Mastic

Recommended for use on hollow back-up tile walls, where there are deep corrugations in the tile.

Made of high grade asphaltic gums interlaced with asbestos fiber. Has a soft consistency which enables it to be easily applied with heavy roof brushes.

An application gives a coating many times heavier than ordinary dampproof paint.

In one day a man can apply, approximately, one 50-gal. barrel. Packed in 50-gal. barrels, half-barrels and 5-gal. pails.

Specifications—The work included consists of dampproofing of all exterior walls above grade.

All surfaces shall be dry and free from dirt and foreign matter. All vertical and horizontal mortar joints are to be pointed up by the mason contractor to the satisfaction of the dampproofing contractor.

The Semi-Mastic is to be applied with a brush, in 2 coats and shall be returned on the reveals of openings, carried around the column castings and concrete beams adjoining such surfaces in and around all chases, recesses and cut-outs and extend 12 in. on the adjoining concrete slabs.

The material shall be M-R Semi-Mastic. One gallon is to cover not more than 30 sq. ft. and the dampproofing contractor is to state in his estimate the number of 50-gal. barrels of dampproofing material he agrees to use on this job. This is to be checked by general contractor and verified by architect.

M-R Dampproofing Mastic

A black, plastic, waterproof compound, containing only the best ingredients and blended under a scientific process. It is applied with a trowel, similar to cement or any other plastic substance, and is ready for immediate service as received in original packages; no heating or thinning necessary.

Used extensively on the interior of outside walls instead of dampproof paint. It bonds perfectly with plaster, absolutely prevents the penetration of dampness, and makes the inside of walls verminproof and stainproof. Furring and lathing are unnecessary when this material is used.

The approximate covering capacity is 20 sq. ft. per gal. on brickwork. It weighs about 10 lb. per gal., and is shipped in barrels, half-barrels and 5-gal. containers.

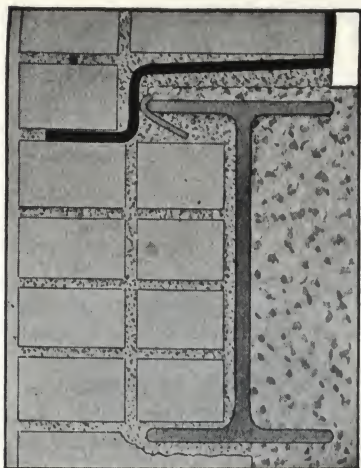
Typical Specifications—Preparation of Surface—Point up all voids and breaks in masonry surfaces specified to be dampproof. Patch defective brickwork at ceiling due to centering. Treat similarly the angle of wall and ceiling with cement or lime mortar to form a continuous surface.

Application—The interior surfaces of exterior exposed walls to be plastered, are to receive 1 troweled coat of M-R Dampproofing Mastic, and in accordance with directions of the manufacturer, the Mitchell-Rand Mfg. Co. M-R Waterproof Plastic shall be applied between floor level and ceiling below. Where the arches are placed prior to this application, the coating shall be carried back 12 in. from the outer walls on the underside of the connecting ceiling.

Cut-outs, wall chases, etc., shall be coated thoroughly before pipes, or other work is installed.

Dampproofing Spandrel Beams—A most effective method is the M-R System using M-R Mastic as described in the following specifications:

Scope of Work—The work included in these specifications and shown on the drawings consists of the dampproofing of the spandrel beams, excepting such work as may be specifically excluded.



Standard M-R Method of Dampproofing the Spandrel

and extend back on the floor 2 in. beyond the line of the inside wall.

(b) A layer of 1-ply Barrett's Black Diamond Roofing Felt.

(c) A protective coat of M-R Dampproofing Mastic, applied to the upper surface of the felt.

The foregoing to constitute a 3-course job.

Material—Shall be M-R Dampproofing Mastic made by the Mitchell-Rand Mfg. Co., 15 Vesey Street, New York City.

Material is to be used from original package, as delivered from the Mitchell-Rand factory, without thinning or adulteration. One gallon is to cover not more than 12 sq. ft. and the dampproofing contractor is to state in his estimate the number of 50-gal. barrels of dampproofing material he agrees to use on this job.

It shall be the duty of the general contractor to record both the number of barrels delivered and used; he shall transmit these figures to the architect for verification with the contract.

M-R Stone Backing Compound

A black, alkaliproof and waterproof paint that protects granite, limestone, Bedford stone, marble or any other cut stone from chemical action and discoloration due to alkali in cement. One gallon applied by means of a 4 or 6-in. flat varnish brush will cover approximately 125 sq. ft. Packed in barrels, half barrels and 5-gal. pails.

Specifications—All surfaces in contact with masonry (the top, bed, sides, and back) are to be thoroughly coated to within 1 in. of the face to prevent staining. The surface of the stone should be dry and clean to insure adhesion; the coating should be continuous, even, and all Lewis holes, anchors, and recesses should be coated. After the cut stone is set it is advisable to apply an additional coat on the back.

M-R Colorless Compound

A colorless liquid for dampproofing the outside face of brick walls where it is undesirable to use a paint on account of such material changing the texture or color of the bricks.

Shipped in barrels, half-barrels, 5-gal. containers, and 1-gal. cans.

Specifications—Preparation of Surfaces—Point up all walls wherever necessary, and fill all spaces and voids around window frames and other openings. Walls shall be perfectly dry and surfaces free from foreign matter.

Application—All walls, sills and lintels shall be treated with 2 coats of M-R Colorless Compound, and in accordance with the directions of the manufacturer, the Mitchell-Rand Mfg. Co. The coats shall be applied on successive days, viz., one coat shall be applied when the surfaces are perfectly dry, as noted, and the other coat given the next day.

M-R Brick and Cement Coating

Made in standard colors and white. Used to waterproof and beautify surfaces of concrete, stucco, brick and plaster, both interior and exterior. It prevents hair-cracking and is absolutely waterproof.

Application—All surfaces shall be dry and free from dirt and foreign matter.

The general contractor shall leave the surfaces to be dampproofed troweled smooth; all voids shall be filled with cement mortar, leaving a slight bevel, not to exceed $\frac{1}{4}$ in. to the foot, sloping towards the outside of the building.

The work of dampproofing shall be performed in accordance with the "M-R System of Dampproofing Spandrel Beams," i.e.:

(a) A coat of M-R Dampproofing Mastic, troweled $\frac{1}{8}$ in. thick, shall be applied 2 in. inside the line of outside face brick

Applied in same manner as ordinary paint. Due to its unique film structure, the dampness always present in cement and brick cannot cause it to peel and in this regard it is quite unlike oil paint.

It does not alter the texture of the surface to which it is applied. It dries to a soft, artistic, flat or mat finish which is an integral part of the surface itself, and it may be scrubbed and washed without injuring the film.

Specifications—Loose particles are to be thoroughly cleaned off the surface with a wire brush, and any appearance of salts removed with a solution of muriatic acid and water (1 part to 10) before the coating is applied.

Apply 2 coats of M-R Brick and Cement Coating, of selected color, with a full, wide, clean brush—brushing to settle it into place, only, and not for the purpose of extending it. Allow 24 to 48 hours between coats.

First coat may be thinned with 1 pt. of turpentine to the gallon. Second coat to be applied as received in the original package.

M-R Double Strength Waterproofing Paste

This is an integral waterproofing compound, used for making concrete, cement, mortar and stucco waterproof. It is very effective and in wide use.

It is a smooth plastic material. When used, it is first dissolved in the gauging water, which insures an even and uniform distribution throughout the mass. This method is decidedly economical, and makes possible the solution of different waterproofing problems; it is also very useful in connection with the repairs of a completed structure, as the operation is carried on entirely from the inside.

The material is shipped in barrels, half-barrels, 5-gal. containers, and 1-gal. cans.

Specifications—One gallon of M-R Waterproofing Paste dissolved in 35 gal. of water will waterproof 1 cu. yd. of concrete; 1 gal. of M-R Waterproofing Paste dissolved in 17 gal. of water will waterproof 100 sq. ft. of cement-finish floor, wall or stucco 1 in. thick; 1 gal. of M-R Waterproofing Paste dissolved in 35 gal. of water will waterproof 1 cu. yd. of dry cement and sand for laying up brick or stone walls.

M-R Liquid Waterproofing

This is a liquid with a calcium base, and is used in the gauging water for making concrete, cement mortar and stucco waterproof. It is also used for cement floors where a dense hard non-dusting waterproof finish is desired. Packed in 50-gal. barrels, half-barrels, and 5-gal. pails.

Specifications—M-R Liquid Waterproofing is mixed in the proportions of 1 gal. to 35 gal. of water. This gauging water is used to wet the aggregates in the usual way.

M-R Superior Cement Colors

These are imported iron oxide colors and are non-fading. In pulp or dry. They tend to retard excessive moisture absorption, even to the extent of making the concrete slightly waterproof. They are not susceptible to the action of cement alkalis. They are *all color*, neither lime or any other filler is added. Being unadulterated, *less* is required. As their name implies, they are superior in brilliancy and strength as many tests prove. They consist largely of metallic and mineral oxides, the small percentage of other color material being of such a nature that it has no injurious effect on the bond, cohesive ultimate and tensile strengths of concrete.

M-R Shield Brand Concrete Floor Wax

A high grade wax for treating and polishing old and new concrete floors. Readily cleaned. Gives high luster.

References

Savoy-Plaza Hotel, New York, N. Y.
Bank of America, New York, N. Y.
Standard Oil Building, New York, N. Y.
New York County Courthouse, New York, N. Y.
Federal Trust Co., Newark, N. J.
Prudential Insurance Building, Newark, N. J.
Erie Trust Co., Erie, Pa.
Breakers Hotel, Palm Beach, Fla.
Rhode Island School of Design, Providence, R. I.
Rhode Island Hospital, Providence, R. I.
Rhode Island Trust Co., Providence, R. I.
Allerton Houses, Chicago, Ill., and Cleveland, Ohio
Atlanta Department Store, Atlanta, Ga.
Magnolia Oil Building, Dallas, Tex.

NATIONAL WATERPROOFING CO.

Waterproofing Engineers and Contractors

1077-1081 Columbus Avenue
BOSTON, MASS.

Products and Services

ENGINEERS and CONTRACTORS for WATERPROOFING, DAMPPROOFING and OILPROOFING.

KENNELLY'S LIQUID (INTEGRAL) WATERPROOFING and OILPROOFING for concrete.

KENNELLY'S DAMPPROOFING PAINT and COMPOUND.

KENNELLY'S CONCRETE FLOOR HARDENER.

General

We will absolutely guarantee all waterproofing done by us to be watertight. We will dampproof without discoloring the outside of any concrete, brick or stone structure and will guarantee the work to be absolutely moistureproof. We will apply a floor hardener to any concrete surface and guarantee the work against dusting or softening of the surface. All work done by us will be carried on in such a manner that no delay will be caused the general contractor or any part of the work.

Engineering Department

Our engineers are always at the service of architects, engineers, contractors and owners for the solution of waterproofing problems, for preparing specifications and for estimating the cost of waterproofing all concrete structures, foundations, tunnels, dams, reservoirs, swimming pools, etc.

Kennelly's Liquid Waterproofing (Integral Method)

Kennelly's liquid waterproofing is an integral waterproofing liquid which crystallizes in the mass as the cement sets, sealing completely and permanently the voids or pores between the sand and cement against the passage of liquids, even under heavy pressure. It is used in concrete or cement mortar to prevent the penetration of water or dampness. Having practically the same specific gravity as water, it immediately becomes part of the tempering water when poured into the barrel, thus becoming evenly distributed throughout the mass. Kennelly's liquid waterproofing not only renders concrete, mortar and stucco permanently impervious to water, but prevents discoloration and efflorescence, gives additional protection to the reinforcement and increases rather than decreases the strength of the mass. It does not affect the color or setting of cement mortars or concrete.

Kennelly's Plaster Waterproofing

If a watertight plaster finish is desired, put the compound into the water used in making mortar and then place the mortar on the surface to be covered and work it out to the desired finish. By this method, concrete, cement mortar and stucco are rendered permanently moistureproof and pressureproof, the finished surface is not discolored, and the strength of the concrete is increased rather than decreased.

Kennelly's Exterior Dampproofing (Colorless)

A colorless liquid for dampproofing exterior surfaces of stucco, brick, stone and concrete masonry. Also

extensively used as a sizing for lime plaster on interior walls before paint is applied. It is applied with a brush. Efflorescence and blotches are caused by the absorption of atmospheric moisture and exudation of gypsum and lime. By the use of our dampproofing, we have overcome these disfiguring features without discoloring the original surface or joints.

We will guarantee to make any building dampproof by this method at a reasonable cost.

Kennelly's Interior Dampproofing (Dark)

A compound for coating interior surfaces of brick, stone or hollow tile walls. Forms a continuous waterproof film or coating on the surface, completely sealing walls and preventing penetration of moisture. This method eliminates furring and lathing and thus effects a great saving, as the plaster may be applied directly to this coating.

Kennelly's Concrete Floor Hardener

A liquid compound either *mixed with the concrete* finish in new floors or *applied to the surface* of old as well as new floors. In buildings subject to heavy wear, the dusting of a concrete floor induces disintegration and crumbling of the concrete and thus ruins the floor. Our hardener insures against dusting, and provides a non-absorbent surface, more impervious to wear than ordinary concrete, makes a durable top surface, and provides a sure non-slip foothold.

Specifications

Integral Waterproofing and Oilproofing—To each 50 gals. of water (1 bbl.) used in tempering the mass concrete, add 6 qts. of Kennelly's Liquid Waterproofing, thoroughly mixing the concrete and carefully spading it into place so as to avoid stone pockets.

Plaster Waterproofing—Material used in same proportion as for integral work, mixing the waterproofing with water used in making concrete mortar and then placing the mortar on the surface to be covered, using 6 qts. of waterproofing to 50 gals. of water.

Dampproofing—Thoroughly clean surfaces to be dampproofed by washing with warm water. Allow to dry, and then apply dampproofing with brush, covering surface well. Allow 4 or 5 hours to elapse before making second application, and when thoroughly absorbed, make a third application.

Concrete Floor Hardener—First thoroughly clean the floor surface to be treated by scrubbing with warm water, thereby removing all foreign particles, etc. Allow to dry, and then apply the floor hardener with brush, covering the surface well and allow to dry for at least 4 or 5 hours before making a second application. Should any dry spots appear, treat with another coat of hardener.

References

Fuller & Robinson Co., 95 State Street, Albany, N. Y.
Crocker Burbank & Co., Fitchburg, Mass.
Federal National Bank, Boston, Mass.
Pennsylvania Sugar Co., Philadelphia, Pa.
Westcott & Mapes, Inc., New Haven, Conn.
Stone & Webster Engineering Corp., Boston, Mass.
General Electric Co., Pittsfield, Mass.
United Illuminating Co.'s Plants, Bridgeport, and New Haven, Conn.

THE OBELISK WATERPROOFING COMPANY

Caffall Process—the Heat Method

TELEPHONE
ASHLAND 1740, 1741

1 Madison Avenue
NEW YORK, N. Y.

BOSTON OFFICE: 950 Park Square Building—Telephone Hancock 0033

Services

Exterior Surfaces of Stone, Brick and Stucco Buildings, above grade, TREATED with the CAFFALL PROCESS, the Heat Method.

Business, Residential and Monumental Buildings and Churches Restored, Dampproofed and Preserved; Exteriors of Delicate Marble Preserved from Weather Disintegration; Monuments Restored and Preserved.

Guarantee

Work done under contract with a 10-year guarantee, or a cost-plus-percentage basis without guarantee.

Process

New Structures—The surface is tested and structural defects, if any, are made good. The wall is then impregnated to considerable depth with a melted wax compound forced in by heat.

Old Structures—Where masonry walls leak but material disintegration has not occurred all joints are tested and made sound where necessary, and the entire surface, including joints treated as above.

Where the surface has disintegrated from weather attack, it is restored to sound condition, joints are re-pointed, and the entire surface treated as above. The treatment leaves the appearance unchanged, and one treatment will last for the life of the building.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat dries out the surface and forces

penetration of preservative material. On cooling, the wax congeals and becomes an integral part of the material at and below the surface.



Plymouth Rock
Treated 1921

Durability

The principal components can not be easily oxidized and are insoluble in water, acidulated or alkaline solution, or gases. This is the only preservative process having a successful history covering any considerable period. Buildings treated more than fifty years ago are still dry.

Cost

Cost can be ascertained on application to the company. It is determined by the following elements:

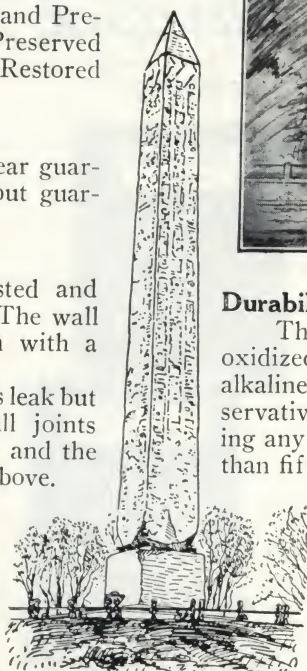
Character of material to be treated.

Condition, whether newly erected, old, or requiring renovation.

Area requiring treatment.

Character of surface, whether plain or ornamental.

Location of building or monument.



Obelisk or Cleopatra's Needle

Restored and preserved by Caffall Process, the heat method, in 1885



Berkeley-Carteret Hotel, Asbury Park, N. J.

WARREN & WETMORE, Architects

TURNER CONSTRUCTION Co., Builder



Walker-Lispnard Telephone Exchange of the New York Telephone Co., New York, N. Y.

McKENZIE, VOORHEES & GMELIN, Architects

THE PAR-LOCK APPLIERS

Par-Lock for Plastering, Waterproofing, Dampproofing and Cork Insulation

PARENT COMPANY
THE PAR-LOCK COMPANY
CLEVELAND, OHIO

Products

PAR-LOCK, the method of mechanically applying waterproofing asphalt compounds; also the method of mechanically building out a coarse rock grit key when used for plastering purposes.

The Par-Lock Appliers have complete equipments in their possession. Their crews are made up of trained, experienced men.

Estimates will be furnished and contracts completed promptly.

Par-Lock Specifications

Below are listed the various forms of standardized Par-Lock specifications.

Par-Lock Plastering (No Scratch Coat Required)—Form "A"—Preparation for plastering horizontal concrete, concrete tile and tile surfaces, except roof slabs. On roof slabs, use specification "B."

Form "B"—Preparation of surfaces to be plastered. To supplant furring and to seal positively against air filtration and dampness. For use on concrete, brick or tile filled exterior wall surfaces and roof slabs. Also on vertical concrete and terra cotta and gypsum surfaces.

Floor Finish—Form "C"—Waterproofing and binding plastic floor finish except below grade line.

Waterproofing—Form "D"—For waterproofing surfaces to be finished with portland cement or tile and for bonding thin portland cement, and tile finish to structural bodies, laboratories, basements, swimming pools, tunnels, etc.

Form "E"—"Cotton membrane waterproofing" for heavy waterproofing on basement walls, floors, footings, swimming pools, tanks, etc.

Form "F"—For light waterproofing of footings, outside walls below grade line, basement floors, tunnels, etc.

Form "G"—"Membrane waterproofing" for heavy waterproofing to resist hydrostatic pressure (tunnels, swimming pools, reservoirs and deep basements).

Form "H"—For waterproofing bridge decks, basement floors, tunnels, etc.

Dampproofing—Form "I"—Dampproofing walls to be furred, and for coating cinder fill mixtures under matched flooring.

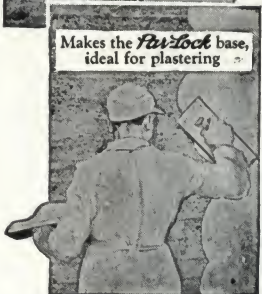
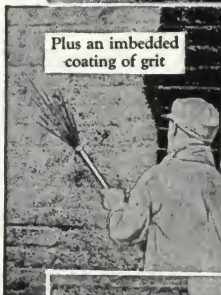
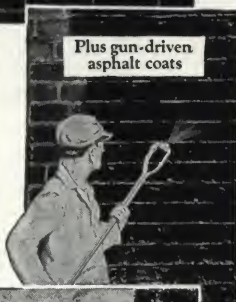
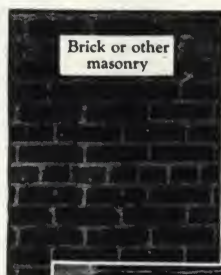
Form "J"—For dampproofing tile wall surfaces to be plastered. May be used where hand applied bond paints are specified, except on concrete and ceiling surfaces.

Form "K"—A gun applied built-up mastic for surface finishing, cork and other insulating materials. This specification may be built-up, airtight and dampproof or waterproof where required.

Note: If you do not have these specifications on file, they will be sent on request.

Par-Lock

TRADE-MARK
Patented—Registered



List of Par-Lock Appliers

THE PAR-LOCK APPLIERS OF ALBANY
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45 Commercial Wharf, Boston, Mass.

THE WESTERN NEW YORK PAR-LOCK APPLIERS, INC.
958 Ellicott Square Building, Buffalo, N. Y.

THE PAR-LOCK APPLIERS OF CHICAGO
122 So. Michigan Avenue, Chicago, Ill.

THE PAR-LOCK APPLIERS OF CLEVELAND
404 Hunkin-Conkey Building, Cleveland, Ohio

THE PAR-LOCK APPLIERS OF COLUMBUS
751 So. Cassingham Road, Columbus, Ohio

THE PAR-LOCK APPLIERS OF MICHIGAN
2511 First National Bank Building, Detroit, Mich.

THE PAR-LOCK APPLIERS OF KANSAS CITY
2035 E. 19th Street, Kansas City, Mo.

THE PAR-LOCK APPLIERS OF MINNEAPOLIS
200 Builders Exchange, Minneapolis, Minn.

THE PAR-LOCK APPLIERS OF NEW YORK CITY, INC.
50 Church Street, New York, N. Y.

THE PAR-LOCK APPLIERS OF EASTERN PENNSYLVANIA, INC.
1700 Walnut Street, Philadelphia, Pa.

Branch Offices
Wilkes-Barre, Pa., 904 Second National Bank Building

Scranton, Pa., Cedar Avenue
Bethlehem, Pa., 215 Vineyard Street

THE PAR-LOCK APPLIERS OF PITTSBURGH
207 Fulton Building, Pittsburgh, Pa.

THE PAR-LOCK APPLIERS OF ST. LOUIS
515 Chemical Building, St. Louis, Mo.

THE PAR-LOCK APPLIERS OF TORONTO
2258a Bloor Street, Toronto, Ont.

THE PAR-LOCK APPLIERS OF NEW JERSEY, INC.
339 Broad Street Bank Building, Trenton, N. J.

Branch Office
Newark, N. J., 322 Federal Trust Building, 24 Commerce Street

THE PAR-LOCK APPLIERS OF YOUNGSTOWN
503 City Bank Building, Youngstown, Ohio

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PITTSBURGH, PA., 1213 Chamber of Commerce Building
NEW YORK, N. Y., 40 East 34th Street

Missouri Corporation

KANSAS CITY, Mo., 407 Dwight Building
SAN FRANCISCO, CALIF., 625 Underwood Building

Services

Real WATERPROOFING can not be accomplished by haphazard methods. It is a specialized engineering problem, requiring study and wide experience with all materials and methods, used under all sorts of conditions.

It is with this in mind that we offer our services and solicit consideration wherever WATERPROOFING, DAMPPROOFING or PROTECTIVE WORK is required. Information or suggestions, based on our past experience, will be cheerfully given at all times. This applies to Basement Walls and Floors, Pits, Tanks, Swimming Pools, Cisterns, Tunnels, Subways, Concrete Bridges, Retaining Walls, Roundhouses, Piers, etc.

Material

The PERMANENT WATERPROOFING Co. adopts the material best adapted to the conditions which must be met.

Application

The waterproofing can be applied to either the *Inside* or *Outside* surfaces of walls after all forms are removed, and to the top of rough floor slabs and footings, in the form of brush coats or in combination of brush and plaster coats.

Appearance

The finished surfaces are left with a finish and color similar to cement brush coat or cement plaster. The surface in either case may be plastered or painted or finished with any type of cement, marble, or terrazzo surfacing.

Paint will not be discolored.

Resistance to Pressure

Applied either upon the inside or outside of walls, this waterproofing will resist any hydrostatic pressure which the wall is capable of withstanding.

Permanency

This material is not a simple coating, subject to injury by ordinary wear and abrasion or by changing atmospheric conditions. It will not "slump," crack or scale. It possesses much chemical vitality and in combination with water becomes very active. It works its way into the pores of the concrete, expands and unites chemically as well as mechanically with the structural materials, forming a strong and impenetrable mass.

The depth of the penetration varies in accordance with the porosity of the masonry—being greatest where the voids are most numerous and seepage most likely. The result is a surface which is part of the wall or slab and can not be removed without actual cutting. Not only does the material form a *permanent waterproofing*, but it also serves as a preservative and strengthener of the masonry.

Bonding Qualities

It is indispensable where a perfect bond between rough slabs or walls and finish coatings of cement, terrazzo, marble, tile, etc., is required.

Working Conditions

The efficiency of any material or methods depends in the last analysis upon workmanship.

The material is mixed with water, and the work can be done at a time when the working conditions are most favorable. This makes possible the highest class of workmanship when combined with the employment of intelligent experienced workmen, properly directed.

Outstanding Features

Waterproofing placed upon the *inside* or *outside* of wet walls, which penetrates and becomes part of the walls or floors.

Waterproofing which actually increases, rather than decreases, the strength and efficiency of the concrete, stone or brick.

Waterproofing which is continuous and assures (instead of breaks) the bond between footings and walls. This should be considered in case of lateral pressures.

Waterproofing which introduces no foreign or injurious materials into the concrete.

Waterproofing which assures bond between rough surfaces and finish and which is not injured by contact or vibration.

Waterproofing which eliminates the necessity for double or protective walls and slabs.

Waterproofing which offers peculiar resistive qualities to sulphurous fumes, gases, acids, fire and electrolysis.

Waterproofing which may readily be repaired in case of structural cracks.

Waterproofing which is *less expensive* than any other real waterproofing.

Waterproofing which is absolutely *guaranteed*.

Specifications

Walls—All outside walls and areas exposed to seepage shall be waterproofed by the PERMANENT WATERPROOFING Co.'s method on the inside surfaces from floor level to outside finished grade level. This work to be done before partitions or other obstructions are installed.

Inside walls and columns extending through the basement slab shall be waterproofed or dampproofed as may be required—upon both sides from the top of the footings to the outside finished grade level.

Floors—After the rough slab has been poured and sufficiently set it shall be thoroughly cleaned and waterproofed according to PERMANENT WATERPROOFING Co.'s method, and finished with a slush containing good sharp torpedo sand to give a good bond surface for the topping. This work shall be done before partition walls, machinery bases, conduits, etc., are placed.

Immediately before the topping is applied wash this surface well and apply a bonding coat of cement and Permanent Waterproofing and thoroughly brush into the slab. Apply finish in the usual way.

Disintegration Problems

The disintegration of concrete, brick and stone surfaces has been studied by us for a number of years. During that time we have handled a number of problems of this nature, and have also made a number of tests under field conditions. We would be pleased to furnish detailed information regarding them.

THE SANDUSKY CEMENT COMPANY

Manufacturers of Integral Waterproofing
CLEVELAND, OHIO

BRANCH OFFICES

CINCINNATI, OHIO, Builders Industries Building
DIXON, ILL., 34 Dixon National Bank Building

NEW YORK, N. Y., 350 Madison Avenue
TOLEDO, OHIO, 1004 Second National Bank Building

FACTORIES

BAY BRIDGE, OHIO

SILICA, OHIO

DIXON, ILL.

YORK, PA.

Product

MEDUSA WATERPROOFING, the standard of integral waterproofing quality for twenty years, in either Powder or Paste form—the original integral concrete waterproofing.

For Medusa Portland Cements, see pages A39-43; for Medusa Cement Paint, see page B1689.

Output

3,000,000 lbs. of waterproofing.

Packages

Medusa Waterproofing Powder is furnished in 40-lb. paper lined cloth sacks. A quart weighs one pound.

Medusa Waterproofing Paste is furnished in metal containers, with large friction seal tops, 1 gal. (8 lbs.) and 5 gals. (40 lbs.) each, packed for shipment in substantial crates of six 1-gal. or two 5-gal. cans each. A pint weighs 1 lb.

Literature

New Medusa literature, in standard size 8½x11 in., describing many uses for Medusa Waterproofing Powder and Paste, will be sent on request.

Uses

Medusa will give positive waterproof and damp-proof results in construction of concrete reservoirs, water towers and tanks, swimming pools, tunnels, disposal plants, pumping stations, elevator pits, stucco, basement walls and floors, cisterns, cement blocks, cast stone, etc.

Medusa Waterproofing Comes in Two Forms

Medusa Waterproofing Powder—Medusa Waterproofing Powder is white, finely ground and highly water-repellent. When mixed with any reliable brand of plain portland cement, in proper proportions, it is uniformly distributed through the concrete, being entrapped or held in place by the cement, sand and aggregate. Due to its water-repellent nature, it prevents the absorption or percolation of water, ground or drainage water, spring water, dampness or moisture from the earth or atmosphere.

For every bag of portland cement used, mix 2%, or 2 lbs., of Medusa Waterproofing Powder if you want absolutely waterproof concrete.

Medusa Waterproofing Powder is furnished in 40-lb. paper lined cloth sacks, enough to mix with and thoroughly waterproof, 20 bags of portland cement.

Medusa Waterproofing Paste—Medusa Waterproofing Paste contains the same percentage of water-repellency as Medusa Waterproofing Powder. Its effect on the concrete mass is exactly the same as that of Medusa Waterproofing Powder. It is a heavy paste, to be dissolved in the gauging water used to mix the concrete.



TRADE-MARK

Two per cent of Medusa Waterproofing Paste by weight of the cement, or 2 lbs. per sack, is the correct proportion to render concrete and cement work permanently waterproof.

Integral Method of Waterproofing

Since the earliest days of the manufacture of portland cement in this country, the need for preventing the absorption of water by concrete has been fully recognized. Concrete contains many microscopic pores or capillary tubes constituting from 20% to 40% of the cubic contents. Water enters concrete because of the physical law of capillary attraction and its natural absorptive qualities. To make it waterproof, the absorptive properties must be destroyed.

Medusa Waterproofing becomes an inseparable part of the concrete itself. Designed to be mixed with concrete, to lubricate the particles and form an integral part of the mixture, it thus becomes an inseparable part of the mass, being tightly sealed within the concrete.

Medusa Waterproofing will positively and permanently render concrete dampproof and waterproof. The integral method of waterproofing is economical, it does not require additional excavation on the exterior of basement or foundation walls, it does not require additional brick or concrete protecting walls, no difficulty experienced in making joints around pipes and at the bottom of outside walls, at footings, at junction of the basement floors and footings, and wherever horizontal or vertical joints occur. Blind leaks are not possible in integral waterproofing. Leaks due to settlement cracks can be economically repaired.

Waterproofed Cement Plaster Coat Method

This is a permanent and inexpensive method of rendering a completed concrete or masonry structure dampproof and waterproof. The fact that it results in a clean, neat and pleasing surface renders its use satisfactory for plastering or lining basement walls, for surfacing floors, and other interior work.

A Word as to the Quantity of Waterproofing Needed

Though somewhat less than the quantity recommended may be used in many cases with excellent results, it has proved advisable in any structural work to have a reasonable factor of safety.

The need of such a factor of safety will be appreciated when the varying conditions affecting concrete work are considered.

Specifications vary considerably and so also do the aggregates selected.

It has been found that the quantity prescribed, 2% of the weight of cement (8 lbs. to the barrel) is the correct amount to be used. A reasonable factor of safety is included in this figure and we advise that this specification be rigidly maintained.

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street
CHICAGO, ILL.

Products

ASPHALT and ASPHALT-FIBER COMPOSITIONS; PLASTIC CEMENTS; ROOFINGS.

Expansion Joints

Type B Expansion Joint—A pre-moulded bituminous composition containing a high percentage of pure blown bitumen which is reinforced with saturated and unsaturated vegetable fiber. The special asphalt makes it exceptionally rigid in warm weather and gives it remarkable plasticity at low temperatures. It is advantageous because of its low moisture absorption, resistance to wear, long life and valuable functioning power. Its field of application includes concrete sidewalks, driveways, courts, basements, and other types of monolithic construction where expansion must be provided for.

Webbed Expansion Joint—Has reinforced felt sides, a fibrated bituminous core having a bitumen content of 80%. This is not a homogeneous structure but a reinforced saturated felt sided joint meeting all specifications for a joint of this description.

Type D Expansion Joint—This joint differs from ordinary materials since it is compressible within itself. The matted fiber core is waterproofed with a substantial layer of asphalt but can be compressed to one-half its thickness without being forced from the crevice. This important property makes it the ideal material for joints in bridges, stadiums, reservoirs, concrete conduits, roofs, etc. When placed between masonry and built-in structures such as sash, door frames, etc., it provides a cushion connection which means better construction.

Sewer Pipe Joints

Servicised premoulded sewer pipe gaskets comprise the most modern and efficient method for jointing sewer pipe. The consistency is such that they can be readily calked into place and because of their wedge-shaped section a tight joint is obtained without additional sealing materials. They are prepared in strips for all sizes of clay and concrete pipe and can be made in special shapes for other purposes.

Their flexibility, resistance to sewer liquors, resistance to plant growth, and ease of installation make them superior to the ordinary oakum-cement joint.

Servicised Sewer Pipe Compound—An asphalt-mineral mixture prepared for the pouring of joints. It is very inert and adheres very tenaciously to the pipe surface. When properly installed, joints made with this compound will withstand pressures often in excess of the strength of the pipe itself.

Roofing Materials

Built-up Roofing—Servicised built-up roofing involves the use of the highest grade saturated felts and Servicised long life asphalt. It may be laid up with from 2 to 5 layers of saturated felt depending upon the specifications and surfaced with either a cap sheet or sand and gravel finish. All sheets are cemented together into a monolithic flexible roofing by special Servicised Mopping Asphalt.

Asphalt Shingles—Red or green slate surfaced asphalt shingles are furnished in both the slab and hexagon form. Weights vary with the grade of shingle to a maximum of about 260 lb. per square for the extra heavy.

Slate Surface Roll Roofing—Slate surface roofings are furnished with the standard weights of felt, and in red and green colors. Rolls contain 108 sq. ft. and when wrapped complete weigh about 85 lb.

Servicised Roof Cement—A highly waterproof and inert plastic material which is prepared in several consistencies for troweling. The most severe weather conditions do not cause it to run and the tough flexible properties are not lost in cold weather. It is invaluable for sealing crevices, roof flashings, skylights, and similar places where hot material cannot be poured or is otherwise unsuited.

Servitite Asbestos Roof Cement—This coating provides a material for surfacing leaky built-up roofs with an impervious non-cracking layer of bitumen. The superior grade of asphalt used makes it highly weatherproof and the long fibered asbestos prevents the cracking which usually takes place after several years.

Servicote Asbestos Fibre Coating—A high grade fibrated liquid coating of a brushing consistency adapted for coating



new and defective built-up gravel, tin, slate surfaced, and smooth surfaced roofs. Easily applied and forms impervious, tough, elastic surfacing at exceptionally low cost.

Servicised Roof Paint—A paint prepared for coating saturated felt roofs to prevent them from drying out and losing their moisture resistance. It can be easily applied with a brush and forms a highly economical surfacing material.

Servicised Flashing Blocks—Specially shaped bituminous felt blocks which eliminate many of the troubles encountered obtaining a weathertight joint between the roofing materials and the vertical walls. They are made in a standard size and laid directly in the masonry wall in place of the equivalent brick. The prepared roofing is embedded in a slot in the block and by the use of either lap cement or roof cement a watertight joint is obtained. The value of a permanently sealed flashing can be appreciated by the numerous leaks which develop at this point when ordinary methods are used.

Flooring

Servicised Mastic Flooring is prepared in tilelike slabs which can be laid directly on a mopped coat of bitumen. The time-consuming method of troweling a plastic flooring as well as the inconvenience of hot mix application are eliminated. The material can be furnished in various shades ranging from red to black and in tiles of any desirable dimension. These mastic floors are resilient, noiseless, waterproof, and durable and are recommended for office buildings, industrial buildings, platforms, etc.

Felt Brick

Servicised Felt Brick is an asphalt-felt composition made in standard brick size for wall construction. A facing of felt brick in foundations gives a superior type of dampproofing as well as heat insulation. They are laid using a bituminous cement which, after the evaporation of the solvent, becomes tough and flexible and binds the bricks into an almost solid asphaltic layer.

Bituminous Packing

Bitupack is a stranded bituminous composition which is moistureproof, plastic, and easily calked into place. As a calking material it surpasses the ordinary stranded fibrous materials, because it is not subject to deterioration. It can be used sealing sidewalk crevices, around lamp posts and other structures set in concrete slabs, for sewer pipe joints, and numerous other places where a waterproof packing is advantageous.

Asphalt

Servicised asphalts are pure blown products prepared from high grade petroleum fluxes. Materials of various consistencies can be furnished according to specification and include products suitable for roof coating, saturating, mopping, waterproofing, rubber compounding, cements, etc. Much stress is laid on the fact that all these materials are remarkably free from brittleness at low temperatures.

Insulation

Servicised Insulating Blocks owe their high insulating value to the cellular unpenetrated fiber which comprises the chief filling material. Sufficient bitumen is incorporated to make the material unaffected by moisture and to act as a binder. For refrigerator walls this is very important since the insulating properties do not change even if moist conditions prevail. Low temperature insulation for other industrial purposes is efficiently and economically provided by the use of this Servicised product.

Gray Filler

Where a waterproof seal is required and where black asphalt is unsightly, Servicised Gray Filler is the logical material. It is very adhesive and can be poured at a temperature of about 250° F. It cools very rapidly and remains plastic over a wide range of temperatures. For vertical or inclined crevices it is compounded to a troweling consistency which hardens to a tough plastic material on exposure to the air. Liquid gray filler can be poured cold and is especially suitable for small openings and hair cracks.

SOMMERS & CO., LTD.

Manufacturers of Permantite Waterproofing Products

342 Madison Avenue

NEW YORK, N. Y.

Products

PERMANTITE LIQUID INTEGRAL WATERPROOFING.

DAMPPOOFING COATING; GRAY ELASTIC CEMENT; CEMENT COLORS.

Also Liquid Integral Cement Hardener; Anti-Freeze; Steel Coating; Foundation Coating; Stone Backing Paint; Semi-mastic Dampproofing; Mastic Dampproofing; Liquid Asbestos Roof Coating; Permantite Cement Floor Hardener; Liquid Protective Cement Floor Coating; Transparent Dampproofing; Masonry Coating in colors.

Services

SOMMERS & Co., LTD., are sole manufacturers of Permantite Waterproofing Products.

The personnel of SOMMERS & Co., LTD., includes waterproofing engineers and construction specialists. These men, with their fifteen years' experience, are at the disposal of architects and engineers, and will be glad to aid in solving waterproofing problems.

Where necessity demands special products, Sommers' chemists will gladly work them out in the laboratory.

Permantite Liquid Integral Waterproofing

A concentrated liquid waterproofing compound for waterproofing concrete and cement mortar.

Placed in the gauging water of the concrete, it acts as a lubricant and densifier of the concrete reducing the power of absorption and the permeability of the mass. In addition, it will hasten the initial set and strength. Used in cold water it will reduce the freezing point of the water.

Advantages of Permantite—Simplicity of use; low first cost; effectiveness, permanence.

Permantite concrete, owing to decreased porosity is more resistant to wear and to acids and alkalis.

Permantite has a lubricating action on the cement which causes the concrete or cement mortar to become more plastic and workable, producing a smoother and more waterproof surface than untreated concrete.

Tests—Show that Permantite Liquid Integral Waterproofing in addition to waterproofing adds to the early strength of concrete—the time when strength is most needed.

Tests of specimens cured in air show Permantite to be effective in increasing the impermeability and the strength of concrete and cement mortar at all ages.

Quantity to Be Used—

- 1 gallon to cubic yard of 1-2-4 concrete.
- 1 gallon to 100 square feet cement mortar 1-in. thick.
- 1 gallon to 1000 brick, 1-3 mortar.
- 1 gallon to 25 square yards of stucco.

Packages—Shipping weight, 11 pounds per gallon. Put up in 55-gallon drums, 30-gallon half drums, 5-gallon pails, 1-gallon cans (6 to a case).

PERMANTITE
TRADE-MARK

Dampproofing Coating

For the dampproofing of brick, stone or terra cotta walls above and below ground.

Permantite Dampproofing Coating is a black, elastic, full bodied, slow drying waterproofing and dampproofing compound applied with a brush to the interior surface of exterior walls.

Forms a perfect bond for plaster (not on concrete) and aids to insulate the surface to which it is applied.

Covering Capacity—80 square feet to the gallon, one coat.

Packages—Shipping weight, 9 pounds per gallon. Put up in 55-gallon drums, 30-gallon half drums, 5-gallon pails, 1-gallon cans (6 to a case).

Gray Elastic Cement—Pointing and Calking Compound

For calking window and door frames, pointing masonry and terra cotta joints and flashings of all kinds.

A plastic material composed of weatherproof, waterproof and elastic bonding oils and gums, properly reinforced to permanently fill interstices. Will remain elastic and unaffected by weather.

Other Colors—Also made in black, buff, red and brown.

Packages—Put up in barrels, half barrels, 5-gallon pails, 1-gallon cans (6 to a case). Shipping weight, 15 pounds per gallon.

Cement Colors

For cement, mortar, stucco, plaster and composition flooring. Will give useful, permanently pleasing and decorative effects.

Permantite Cement Colors consist largely of metallic and mineral oxides and have great strength and permanence. They will assist in strengthening and waterproofing the mortar. Permantite colors are very economical due to small quantities required.

Colors—Black, cream buff, oxide red, brilliant red, deep brown, blue and green.

Packages—Packed in barrels, 100 to 600 pounds, approximately. Black is packed only in 12½-pound bags (12 to a case).

A Few References—Building, Location and Architect

Federal Reserve Bank, New York, N. Y., York & Sawyer
Marshall Field Residence, Huntington, N. Y., John R. Pope
Harkness Residence, New London, Conn., Jas. Gamble Rogers
Hotel Shelton, New York, N. Y., Arthur Loomis Harmon
Municipal Building, Brooklyn, N. Y., McKenzie, Voorhees & Gmelin
Hotel, Port Jervis, N. Y., H. L. Stevens & Co.
Apartments, New York, N. Y., J. E. R. Carpenter
Vanderbilt Clubhouse, Deepdale, L. I., N. Y., Warren & Wetmore
Grasslands Hospital, Valhalla, N. Y., Walker & Gillette
Theater, Valley Stream, N. Y., H. G. Wiseman
State Hospital, Brooklyn, N. Y., Sullivan W. Jones
Fillee Residence, New York, N. Y., McKim, Mead & White
Dutch Church, Bronxville, N. Y., Harry Leslie Walker
Corn Exchange Bank, New York, N. Y., Fellheimer & Wagner
Nativity School, Poughkeepsie, N. Y., Philip W. McGovern
Residences, Kew Gardens, N. Y., Haugaard & Burnham

THE SULLIVAN COMPANY

Cement Mixing Compounds; Technical Paints and Building Products

GENERAL SALES OFFICE

MEMPHIS, TENN.

CABLE ADDRESS
"SULCO, MEMPHIS"

SALES OFFICES

LOS ANGELES, CAL.

CASPER, WYO.

HOUSTON, TEX.

TULSA, OKLA.

MONTREAL, CANADA

EXPORT: OILFIELD EQUIPMENT Co., Inc., 30 Church Street, NEW YORK, N. Y.

Products

Waterproofing, liquid, paste and powder; Dampproofing; Acidproofing; Rustproofing; Concrete Hardeners; Wood Preservatives; Portland Cement Paint; Caulking Compounds; Canvas Preservatives; Cement Coatings; Cement Patching Compounds; Mastic Flooring; Stucco and Composition Flooring; Mortar Paste and Stucco Colors; Plaster Bond and Stone Backing; Fireproof Nailing Concrete; Oilproof Coatings; Slipproof Cement Grains; Cement Accelerators, colorless and colored; Iron Cement; Wood Cement; Tile Cement; Freezeproofing Compounds; Wax Compounds; Floor Dressings; Boiler Compounds; Boiler Putty; Roofing Paints and Cement; Aluminum Paint; Shingle Stains; Metallic Hardeners; Bonding Compound; Technical Paint and Varnish; Plastic Paint; Tiles.

Description and Uses of Products

Konset, an Integral Cement Mixing Compound—When mixed with concrete, provides four desirable conditions:

(1) Accelerates the initial and final set and increases the early tensile strength.

(2) Gives greater plasticity and workability.

(3) Increases density, making it hard and waterproof.

(4) Increases freezing resistance.

Konset is also made in any color in dry powder form, which produces any desired color effect in cement mixtures, such as floors, walls, mortar joints, and it is also used for making cement, brick and tile.

By using Konset in colorless or colored form you save time, labor and money, and at the same time make a surface that is hard, waterproof, and dustproof. This product is a lasting benefit to architects, engineers, contractors and owners.

Kemi-kal Cement Surface Hardener—In liquid or crystal form. This chemical is for hardening and dustproofing cement floors, walks and roads after they are laid. It also is used for stucco and plaster.

Konseal—A colored liquid filler for hardening and dustproofing cement floors after they are laid; serviceable and ornamental. A sanitary treatment for cement and concrete surfaces. Made in all colors.

Kontite-Portland Cement Paint—A flat coating in dry powder form made from portland cement. It is mixed with water instead of oil, for stucco, brick, stone, plaster, wall board, and all interior and exterior surfaces; is fire-resisting, sanitary, odorless and weatherproof. Made in gray, blue, red, buff, brown, green, white and cement color; or any shade to match.

Sulco Liquid Waterproofing—A liquid integral waterproofing for all mass concrete or any place that portland cement requires waterproofing.

Sulco Waterproofing Powder—For mixing with the dry cement before sand and water are added.

Sulco Waterproofing Paste—A heavy white paste which is added to the gauging water that is used for mixing the concrete.

Rustcotine—A chemical compound in which petroleum products are used as a base vehicle to carry the rust inhibitive chemicals which prevent rust and corrosion. Made in a paste and a semipaste form, and does not harden like a paint.

Sulco Mortar and Stucco Colors—Sulco Mortar Colors possess the characteristics of durability and permanency as they will not fade. The colors run uniformly as to shade, due to the special process used in manufacturing. Sulco Paste Mortar Colors are the finest and strongest for tinting mortar, or cement; quick setting, dustproof, waterproof and freezeproof.

KONSET

REG. U.S. PAT. OFFICE



Sulco Oilproof Coating—A liquid coating for oilproofing all surfaces that come in contact with gasoline, kerosene, naphtha, crude oil and its by-products.

Wood-Seal—Preserves new or old wood floors, composition floors, cork, rubber and linoleum; prevents warping, wear, rotting, disintegration or splintering.

Sulco Wood Preserving Oil—A product of wood obtained from the tar produced from the distillation of hardwood—principally oak, hickory, beech, birch and maple. Protects wood from rotting, checking, swelling and shrinking. Experts are available for the solution of any waterproofing problem or other technical information.

Iron-Cote—A metallic hardener for concrete floors in factories, garages, loading platforms, piers, packing houses, etc. It is composed of finely ground iron and other materials; is incorporated in the topping of concrete floors, making them capable of standing the effect of heavy service and protecting them against dusting.

Bux-Skin—A liquid for preserving and rendering awnings, tents, tarpaulins, curtains, covers, fisherman's riggings, hatch covers, canvas and cotton duck goods proof against mildew and water.

Art-Cote—Plastic paint for obtaining rough plastered wall effects.

Aztex—Chemical cement stains.

Sulco Niloak Tile—For Egyptian, Indian or Aztec motifs.

Cemset Quick Setting Compound—This solution will accelerate cement and freezeproof concrete at 15° above zero without the use of salamanders or other devices.

Sulco Slipproof Grains—An abrasive material in loose form for impregnating cement or composition floors or stair treads to prevent slipping.

Fibermix—For floors, roofs, partitions, plaster and stucco. Nailing concrete and fiber mix combined.

Sulco Glazing and Caulking Compound—For bedding, glazing and caulking skylights, conservatories, hothouses, sheet metal frames, window frames, wood sashes, roofs, walls, concrete copings, swimming pools, tile floors, seams in boats, etc.

Sulco Plaster Bond, Dampproofing and Stone Backing—A dampproof bonding paint, permanent and adhesive.

Sulco Wax Compound—For polishing and treating old and new cement and wood floors; gives a beautiful luster. Easy to clean and soft under foot.

Sulco Boiler Compound—A scale solvent for treating boiler feed water. Prevents corrosion.

Sulco Iron Cement—For smoothing the surface of steel and iron castings and repairing blowholes and other defects, filling up spongy castings, covering up countersunk bolt heads, pipe joints, or all places where an iron or steel patch is required.

Deflect-O-Lite Aluminum Paint—Deflects the solar heat and keeps the surface cool, protecting it against corrosion. For coating steel storage tanks, water tanks, steel bridges, metal buildings, penstocks, boilers, smokestacks, gas holders and all metal surfaces, concrete, brick and plaster.

Other Sulco Products—We make a specialty of manufacturing railroad and industrial paints and varnishes on specifications; so in purchasing material of this kind you are buying high class products 100% pure, which include: inside white; flat wall paints; factory paints; shingle stains; roof coatings; roofing cements, etc.

Catalogue

Write for our catalogue "Life Preservers for Buildings and Equipment," which includes list of representative users.



L. SONNEBORN SONS, INC.

Floor Treatments, Waterproofing Materials, Decorative and Technical Paints

GENERAL OFFICES

114 Fifth Avenue

NEW YORK, N. Y.

BRANCH OFFICES

BALTIMORE

BOSTON

CHICAGO

SAN FRANCISCO

PHILADELPHIA

PITTSBURGH

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LOS ANGELES

SEATTLE

FACTORY: BELLEVILLE, N. J.

SOUTHWESTERN DISTRIBUTORS: SONNEBORN BROS., DALLAS, TEX.

Products

"LAPIDOLITH," the Liquid Chemical Hardener and Dustproof for concrete floors and Waterproof for concrete and stucco walls.

"SONNEBORN'S CEMENT FILLER and DUSTPROOFER" for cement floors (transparent and in colors).

"HYDROCID" WATERPROOFING PRODUCTS for interior and exterior surfaces.

"LIGNOPHOL," a Preservative for wooden floors.

"CEMCOAT," an Improved Mill White.

"CEMCOAT" FLOOR ENAMEL.

"SONOTINT," a Flat, Washable Wall Coating.

"MARVELWITE," a Fume and Heat-resisting Enamel.

Also Amalie Structural Steel Paints, Galvacote, a coating for galvanized iron; Amalie Pipe Enamel; Amalie Radiator Enamel; Amalie Stack and Boiler Paints; Amalie P & D House Paints; Enamelife.

Hardening, Dustproofing and Waterproofing Old or New Concrete Floors

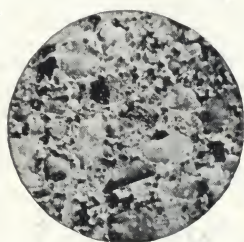
"Lapidolith"—A liquid chemical which penetrates concrete floors, rendering them hard, dustproof, wear-proof and watertight. When applied to old concrete floors, "Lapidolith" will prevent further dusting and disintegration. It does not change the color of concrete.

An Investigation of the Action of "Lapidolith" on Concrete—Following is an extract from the official report of Prof. R. J. Colony of Columbia University, New York, as the result of an examination by him, under the microscope, of treated and untreated concrete:

"The external application of 'Lapidolith' to concrete surfaces results in (a) the formation of an optically isotropic but crystalline substance, derived by a reaction between components of the 'Lapidolith' and the cement matrix of the concrete which (b) has a tendency to fill in voids and cavities and act as a binding agent, thus rendering the surface smoother and more uniform."



No. 1. Untreated Concrete



No. 2. Lapidolized Concrete

Microphotographs of Specimens of Concrete

Magnified 50 diameters

No. 1. Note large numerous voids (black spots) and roughness of surface.

No. 2. Note roughness is reduced and voids filled with network of newly formed hard crystalline substance

Application—"Lapidolith" is mixed with water and flushed on the floor as per detailed directions to be furnished.

Special Service Work—We also contract to apply "Lapidolith" with our own men under the supervision of a service engineer on areas of 20,000 sq. ft. or over at a substantial saving to the owner in material and labor.

Specification for Concrete Floor—Harden and dustproof the following concrete floor (.....) or as noted on the drawings with 3 applications of "Lapidolith," manufactured by L. SONNEBORN SONS, INC., New York, N. Y., and applied as per their directions.

Filling and Dustproofing Concrete Floors Subject to Light Wear

"Sonneborn's Cement Filler and Dustproof," for concrete floors where there is no excessive wear. Furnished either transparent or in attractive gray shades. Covering capacity per gal., 1 coat, is 350 sq. ft.; 2 coats, 200 sq. ft.

Specification—Fill and dustproof the following cement floors (.....) with 2 coats of "Sonneborn's Cement Filler and Dustproof" manufactured by L. SONNEBORN SONS, INC., New York, N. Y., applied as per manufacturer's directions.

"Hydrocide" Waterproofing Products

"Hydrocide" No. 633 (Also Hydrocide Mastic and Semi-mastic)—Plaster bond for dampproofing the inner surfaces of outside walls above foundations.

Ready for use, applied cold with a brush. Saves furring and lathing expense. Should not be applied to smooth concrete surfaces which are to be plastered unless walls are sufficiently roughened. Covering capacity per gal., 1 coat, is 65 to 100 sq. ft.

"Hydrocide" No. 648 (Also Hydrocide Mastic and Semi-mastic)—For waterproofing outer surface of foundation walls and footings.

Ready for use, applied cold with a brush. Covering capacity per gal., 1 coat, is 65 to 100 sq. ft.

"Hydrocide" No. 611—For the protection of unexposed surfaces of limestone, caen stone, marble and other fine stones, from stain caused by absorption or communicated by surrounding masonry. Covering capacity from 250 to 350 sq. ft. per gal.

"Hydrocide" Integral Powder—For waterproofing mass concrete, concrete walls, floors, elevator, boiler and battery pits, swimming pools, water tanks, etc. Mix 2 lb. of "Hydrocide" integral powder with each bag of portland cement, then add to sand and stone mixtures.

"Hydrocide" Integral Paste—For waterproofing cement, stucco and mortars. For every bag of portland cement, use 1½ qt. of a mixture consisting of equal parts of "Hydrocide" paste and water.

Waterproofing Exterior Walls Above Grade without Changing Appearance of Walls

"Hydrocide Colorless" contains no wax, paraffin or similar substance disfiguring the surface.

Grade "A" for light colored surfaces, such as plain concrete and stucco, etc.; "B" for red and buff brick, colored concrete and stucco; "D" for very porous surfaces, such as limestone, concrete cast stone, etc.

Preservative for New and Old Wood Floors

"Lignophol" is a preservative composed of natural wood gums and oils. It penetrates to a considerable depth below the surface of a wood floor, filling the voids in and between the cells and fibers. Prevents splintering, cracking, warping and dry and wet rot.

"Lignophol" also acts as a dampproofing and dust-proofing. Contains a powerful fungicide which checks the growth of fungus and mold. It prevents the disintegration of the wood fibers. It makes floors resilient and more resistant to heavy traffic and wear.

"Lignophol" is satisfactory for wood floors of all kinds in office buildings, churches, schools, hospitals, factories, bakeries, laundries—in fact, in all buildings.

"Lignophol Wax Finish"—For dance floors, residence floors and wherever a medium or high gloss is desired. One coat produces a medium gloss; 2 coats produce a high gloss. Lignophol Wax Finish is also very satisfactory for wood trim.

Covering Capacity—One gallon covers about 350 sq. ft., 1 coat, or about 200 sq. ft., 2 coats. New floors require 1 coat; floors subjected to heavy traffic and old floors should receive 2 coats. Furnished in four colors: natural, light oak, medium oak and dark oak.

Specifications—After scraping, all wood flooring shall be given 1 application of Lignophol, manufactured by L. SONNEBORN SONS, INC., New York (color to be selected) and applied in accordance with manufacturer's directions. (Specify 2 coats for floors subjected to heavy wear.)

Lignophol Wax Finish—For medium gloss: After scraping, all wood flooring shall receive 1 application of Lignophol Wax Finish, manufactured by L. SONNEBORN SONS, INC., New York (color to be selected) and applied in accordance with manufacturer's directions. About 6 hours following application, the surface should be polished. (For high gloss specify 2 coats. Apply second coat after first coat has been polished.)

"Cemcoat," a Sanitary, Washable, Light-reflecting Enamel Paint for Interior Walls and Ceilings

A white enamel paint which will stay as white as the most expensive enamels. Very opaque, 2 coats will cover as well as 3 coats of ordinary lead and oil paint. Is not poisonous. Is sanitary, can be washed with soap and water or even with a hose without affecting the surface. Will not peel, crack or blister if properly applied to a normal surface.

For Interior Walls—Can be used on concrete or any other masonry materials, wood or metal. A coat of "Cemcoat" flat undercoat followed by a coat of "Cemcoat" finish will give best results. For very porous surfaces 1 coat of Amalie gypsum size and 2 coats of "Cemcoat."

White Gloss Finish "Cemcoat"—Reflects all the light and disseminates it equally throughout the room. It is also more easily cleaned than the eggshell or flat.

Eggshell Finish "Cemcoat"—Recommended for

walls and ceilings in offices, schoolrooms, etc., where glare is to be avoided.

Colors—Made in all standard colors.

Covering Capacity—Approximate number of square feet per gallon, per coat:

	First Coat	Second Coat
Concrete	250	300
Brick	250	300
Plaster	300	350
Wood	400	450
Metal	400-500	500-600

Exterior "Cemcoat" for Exterior Walls

For decorating and dampproofing exterior walls above grade. Comes in 12 attractive colors, flat or gloss finish.

Covering Capacity—On concrete, brick, stone and stucco, approximately 175 sq. ft. for 2 coats; on wood and metal 250 sq. ft. for 2 coats.

"Cemcoat" Floor Enamel

A very durable and elastic floor coating which comes in 8 colors and dries with a high gloss. One gallon covers approximately 200 sq. ft. with 2 coats.

"Sonotint," a Flat Washable Oil Paint for Interior Walls and Ceilings of Hospitals, Schools, etc.

A flat oil paint ready for use, which has all the softness and finish of water colors, with the advantage of being washable. It reflects the light without glare. Manufactured in 16 different shades. A color card will be sent on request. "Sonotint" forms a very hard elastic surface not affected by soap and water. Being very opaque, 2 coats cover perfectly and set without showing brush marks.

Covering Capacity—Will cover approximately 250 sq. ft. per gal., 1 coat.

"Marvelwite," an Enamel Which Resists Chemical Gases, Fumes and Vapors

An enamel to meet demand for an intensely white wall coating which has highest resistance to conditions which turn color of average enamels. Highly resistant to influences of most chemical gases, fumes and vapors as they exist in laboratories, tanneries, bleacheries, textile mills, laundries, bakeries, chemical plants, hospitals, operating rooms, rubber and tire plants.

Covering Capacity—"Marvelwite" enamel, 500 sq. ft. per gal., 1 coat. "Marvelwite" undercoating, 350 sq. ft. per gal., 1 coat.

Further Information

The following printed matter sent on request:

"Specification Data" Portfolio to fit standard correspondence files comprising: floor treatments, damp-proofing and waterproofing; interior and exterior painting, technical paints.

Individual Specification Sheets on "Lapidolith," covering schools, hospitals, factories, warehouses, packing plants, bakeries, creameries, garages, power plants.

Circular: "A Scientific Investigation of the Value of 'Lignophol.'"

Booklet: "Preservative and Strengthening of Wood Floors."

Samples treated with Lapidolith, Lignophol, Cemcoat, etc.

LIGNOPHOL
FOR WOODEN FLOORS
TRADE-MARK

Cemcoat
TRADE-MARK

SONOTINT
TRADE-MARK

MARVELWITE
TRADE-MARK

THE TRUSCON LABORATORIES

Integral Waterproofings, Dampproofings, Floor Hardeners

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Products

INTEGRAL WATERPROOFINGS for concrete and portland cement mortars.

DAMP-PROOFINGS.

CEMENT FLOOR HARDENERS.

ANTI-FREEZE MIXTURES.

For Paints and Varnishes, see pages B1668-1669.

Architectural Service

THE TRUSCON LABORATORIES manufacture a complete line of waterproofings and paint coatings formulated to meet each individual requirement. The representatives of THE TRUSCON LABORATORIES are technically trained men whose duty it is to assist architects, engineers and owners in the selection of the proper material to meet their protective and decorative problems, by making a complete study of the requirement and furnishing detailed recommendations as desired and without obligation.

Truscon Waterproofing Paste, Concentrated

Definition—An integral compound for producing thoroughly waterproof concrete or cement mortar. It is adapted to waterproofing concrete construction of various kinds—foundations, reservoirs, tunnels, dams, cisterns, etc. Also used for waterproofing old brick, concrete and stone structures through the agency of a cement plaster coat into which the waterproofing is introduced. Truscon Waterproofing Paste is also used for producing waterproof cement stucco and cement mortar.

How Used—Truscon Waterproofing Paste, Concentrated, is incorporated into concrete or cement mortar through the medium of the water used for tempering the mix. Being in paste form, it diffuses itself readily through the water, forming a milky mixture. This milky appearing mixture of paste and water is used for tempering concrete or cement in the place of clear water.

Advantages—(1) Water repellent; kills capillary absorption of moisture into concrete or cement plaster. Since "plugging the pores" of cement is physically impossible, the repellent feature of Truscon Waterproofing Paste is the most practical and scientific method of waterproofing.

(2) Colloidal; is concentrated colloid and hence adds to the normal colloidal content of cement mortar, thus increasing its resistance to weathering and wear.

(3) High concentration and freedom from useless filler—it is all waterproofing—contains no clay, lime or such material.

(4) In paste form—the form most easily mixable with wet concrete or cement mortar batches. This insures even distribution of the waterproofing.

(5) Inert—does not react chemically with cement; hence does not lower the strength of the concrete.

(6) Lubricates the mix by cutting the "skin strength" of water—producing a concrete which "chutes" easily to the forms, also a more dense and compact concrete. In the case of cement mortar or stucco, "lubrication" makes these materials of creamy consistency and much easier to apply. Avoids mottling of surface of cement stucco.

(7) Insoluble in water—hence can not be washed out of the concrete or affected by time or weathering. This is an important point because so many of the waterproofings on the market will dissolve in water.



Specifications for Waterproofing Mass Concrete

Estimate 7 lb. of Truscon Waterproofing Paste to the cubic yard of concrete. Applicable to concrete foundations, reservoirs, tunnels, cisterns, swimming pools, etc.

Method—Water tightness shall be secured by the addition of Truscon Waterproofing Paste, concentrated, to all water used to temper the dry mixture of cement and aggregate in the proportions, and mixed, as directed below.

Ingredients and Proportions for Concrete—The concrete composing the structure shall consist of 1 part of cement, 2 parts of sand and 4 parts of stone (1:2:4) properly graded in size from coarse to fine.

The waterproofing is added in the proportion of 1 volume of Truscon Waterproofing Paste to 36 volumes of water in the following manner:

Mixing—First, mix 7 gal. Truscon Waterproofing Paste with 5 gal. of water. Second, use 1 qt. of this paste and water mixture to each bag of cement, adding same to the dry cemented aggregate. Then temper with clear water as usual.

Placing—All concrete shall be placed in one continuous operation, each pouring being thoroughly spaded. In cases where joints are unavoidable, care shall be taken to clean and roughen the old surface, and have it thoroughly wet and slush coated immediately before placing additional concrete.

Specifications for Waterproof Cement Plaster Coat

Estimate 6 lb. of Truscon Waterproofing Paste to the 100 sq. ft. of $\frac{3}{4}$ -in. plaster coat applied to the walls, and 16 lb. of paste to the 100 sq. ft. of 2-in. finish applied to the floor. Applicable to reservoirs, swimming pools, cisterns and similar forms of masonry construction, whether of brick, stone or concrete.

Method—Water-tightness shall be secured by plastering the interior surface of the structure with a continuous coating of portland cement mortar waterproofed with Truscon Waterproofing Paste, Concentrated.

Ingredients and Proportions for Waterproofed Plaster Coat—The mortar composing the plaster coat shall consist of 1 part of cement and 2 parts of clean sand (1:2), free from organic matter and uniformly graded.

Preparation—The waterproofed cement mortar shall be prepared by thoroughly tempering (to required consistency) a dry mixture of 1 part of cement to 2 parts of sand, with water to which Truscon Waterproofing Paste, Concentrated, has been added in the proportion of 1 part of paste to 18 parts of water, and thoroughly mixed as follows:

First, mix 1 gal. of Truscon Waterproofing Paste with 1 gal. of water. Second, use 2 qt. of this mixture to each bag of cement, adding same to the dry cement and sand. Then temper with clear water as usual.

Preparation of Surface to be Coated—Before plastering the waterproofed cement mortar on to the hardened concrete, brick or masonry, proper precautions should be taken to insure thorough bonding and keying of the plaster coat to the wall.

Application of Coating to Sides—Immediately after applying a slush coat, the waterproofed plaster shall be applied in 2 coats each $\frac{3}{8}$ in. thick as per specifications of the manufacturer, the second coat being applied just before the first has reached its final set.

Application of Floor Coating—Floors shall be prepared and treated with equal care as the walls to insure proper bonding of the mortar, and finished with a waterproofed cement mortar to a thickness of 2 in. Special care must be exercised in joining the wall coating to the floor coating, so that there is a continuous waterproof coating over the entire surface.

Pressure—When moisture is seeping through the walls, proper drainage must be provided during the application and setting of the plaster coat, until such time as the plaster coat has set and is capable of resisting pressure of its own adhesive strength.

Truscon Ferritex

Dampproof wash for cement or concrete surfaces.

A pulverized iron compound, made chemically active, that when used as a brush coat over concrete or porous masonry, plugs up the pores and acts as a dampproofing.

It is often desirable to specify Ferritex as a dampproofing for the interior of cellar walls or concrete tanks where a black dampproofing compound would not give service and a water-proof cement plaster coat is found too expensive. It is to be noted, however, that where a decided hydrostatic pressure is encountered Ferritex is not recommended. For such severe conditions, the only remedy is the use of Truscon Waterproofing Paste Concentrated applied in a plaster coat.

Specifications for Ferritex

All concrete shall be dampproofed by the application of (1 to 5) thorough brush coats of Truscon Ferritex, (a porous concrete requires a greater number of brush coats than a dense concrete,) as manufactured and recommended by THE TRUSCON LABORATORIES, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly cleaned of dirt, grease and foreign matter.

Application—Ferritex powder as received in the can from manufacturer, shall be mixed with water in the proportion of 4 lb. of Ferritex to the gallon of water and applied to the surface with a good, stiff, bristle brush. Allowing from 5 to 6 hours in between coats for drying. The mixture must be kept continually agitated during each application, to insure powder remaining in suspension in the water.

Truscon Stuccotex

Paint for wet concrete and masonry.

A hydraulic paint for uniforming concrete and masonry surfaces, or for decorating wet or damp stone, brick or concrete surfaces, such as swimming pools, retaining walls, etc., on which oil paints cannot be successfully used.

Stuccotex is a dry powder which is mixed with water to the right consistency and brushed on to the surface after that surface has been thoroughly saturated with water.

Stuccotex does not flake nor crumble.

Covering Capacity—125 sq. ft. per gal., 2 coats.

Specifications for Stuccotex

All wet surfaces shall be given 2 coats of Truscon Stuccotex, as manufactured by THE TRUSCON LABORATORIES, Detroit, Mich.

Condition of Surface—Surfaces to be treated with Stuccotex shall be free of all loose particles, paint, cold water paint, size, oil, grease or any other foreign matter which would retard or prevent direct contact of Stuccotex with the surface.

Preparation—Mix Stuccotex thoroughly with water in the proportion of 10 lb. of dry powder with 2½ qt. of water. Mix only enough for immediate use. Any Stuccotex that has been mixed longer than two hours shall be thrown away.

Application—To the water saturated surface (not merely wet, but saturated) apply the first coat of Stuccotex, brushing same carefully into the pores. After the first coat has set about 12 hours, thoroughly saturate surface and apply a second coat.

Caution: Keep Stuccotex surface wet—during very warm or dry weather, spray the surface for several days while painting. Keep Stuccotex container dry and tightly covered.

Truscon Plaster Bond

A black compound for dampproofing interiors of exposed masonry walls. Plaster Bond remains flexible and tacky, providing a permanent bond for a scratch coat of plaster troweled directly on to it, thus eliminating furring and lathing. Plaster Bond is not recommended for use on ceilings.

Covering Capacity—About 80 sq. ft. per gal., 1 coat.

Specifications for Plaster Bond

The inside surface of all exposed walls of the entire building shall be given 1 uniform application of Truscon Plaster Bond as manufactured by THE TRUSCON LABORATORIES, Detroit, Mich.

The coating shall be perfectly continuous over the entire surface. In cases where the Plaster Bond cannot be run continuously back of the floor construction, it shall be applied back on the ceiling for at least 12 in. from the wall.

Special care shall be taken to coat all portions of the wall where there is any cutting out to permit the passage of pipes subsequent to the application of the Plaster Bond. All portions of the wall which are particularly absorbent shall be given a retouch coat, so that the entire area will have an even, uniform appearance.

The plaster shall not be applied until 24 hours after the wall has been coated with Truscon Plaster Bond.

Foundation Coat

A black coating furnished ready for use (no heating) for dampproofing masonry walls below grade. Apply with a large mop or brush. More economical and satisfactory than coal, tar, or pitch.

Covering Capacity—80 sq. ft. per gal., 1 coat.

Specifications for Foundation Coat

General—The outside surface of all foundation walls shall be given 2 uniform applications of Truscon Foundation Coat as manufactured by THE TRUSCON LABORATORIES, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly dry and free from any adhering earth or foreign matter so as to insure the thorough penetration and bond of the Foundation Coat.

Application of First Coat—Truscon Foundation Coat shall be applied over the dry masonry surface with a large brush or mop, exercising special care to insure a uniform continuous coat. Allow 24 hours for drying time and apply second coat in one continuous application.

Truscon Foundation Coat shall be allowed to dry for at least 12 hours before being backfilled.

Truscon Temperite

Quick set and antifreeze for concrete and cement mortar.

Truscon Temperite is a chemical compound for accelerating and regulating the set of cement mortars, giving protection against frost, and bringing the cement to its point of final strength and hardness in a much shorter time. It also helps retain moisture and thus assists in hydration and lubrication of the mass, giving a denser concrete.

Truscon Temperite is furnished in liquid, or dry concentrated form.

Specifications for Using Temperite

Truscon Temperite, manufactured by THE TRUSCON LABORATORIES, Detroit, Mich., shall be used in concrete or cement mortar as directed below:

If Temperite Liquid—Thin in the proportion of 1 gal. liquid to 10 gal. water. Use this mixture of Temperite and water in place of clear water for gauging the mixture of cement and aggregate.

If Temperite Dry Concentrated—Throw 2 lb. of Temperite Dry Concentrated into the mixer for every bag of cement, turning the mixer over a sufficient number of times to insure a thorough solution and distribution of Temperite.

Truscon Super-Por-Seal Transparent Dampproofing

A transparent coating for protecting and dampproofing exterior masonry walls above grade. May be applied by brush or spray. Super-Por-Seal is also suitable for use on unexposed sides of cut stone to prevent penetration of moisture and resulting discoloration.

Covering Capacity—80 sq. ft. per gal., 2 coats.

StoneTex Concrete Paint

The nationally known lime-resistant masonry coating for protecting and dampproofing exterior brick, stone, stucco or concrete. Furnished in white and 10 standard shades. Applied with a brush or spray. Prevents cold and moisture from filtering through masonry walls and avoids disintegration of concrete. Renovates and beautifies masonry buildings.

Covering capacity: about 100 sq. ft. to gal., 2 coats.

Floor Hardeners

Metallic—Truscon Floor Hardener is a metallic hardener designed for giving floors in factories, warehouses and such places greater resistance to wear. Forms a dense, hard finish. Especially applicable to new cement floors, or to floors which need resurfacing.

Quantity required: 30 lb. to each 100 sq. ft.

Chemical Dry—Agatex Crystals, a chemical hardener for cement floors, furnished in dry form. Dissolved in water and applied with a brush or broom.

Quantity required: about 1 lb. to each 40 sq. ft.

Chemical Liquid—Agatex Liquid, a chemical hardener furnished in highly concentrated form for stopping dusting and crumbling of cement floors. Applied with a brush, broom or similarly convenient instrument.

Quantity required: about 1 gal. to each 100 sq. ft.

Specifications

For complete specifications on Truscon waterproofings and dampproofings, ask for a copy of "Truscon Architects' Specifications Book 'A'."

TOCH BROTHERS

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Inventors and manufacturers of STEEL PROTECTIVE PAINTS; DAMP-PROOFING and WATER-PROOFING PAINTS and COMPOUNDS; CONCRETE FLOOR COATINGS; INSULATING PAINTS; SMOKE-STACK PAINT; ROOFING PAINT; ENAMELS; STONE BACKING; MORTAR, CEMENT and PLASTER COLORS; DECORATIVE PAINTS for all purposes.



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and factory buildings, printing establishments, etc., where protection without decoration is required.

"R.I.W." Cement Floor Enamel (Patented)—For a finishing coat on concrete and wood floors not exposed to the elements. Prevents "cement dusting" and resists wear. Furnished in semi-gloss and high gloss finishes.

"R.I.W." Dustop*—Intended for application to dry concrete floors with a mop, or it may be spilled on the floor and slushed around until absorption ceases, when the excess "R.I.W." Dustop should be removed. Resists abrasion to a limited extent, but its major function is as a dust preventive.

"R.I.W." Flintox*—A chemical solution which reacts with the cement and precipitates zinc silicious materials in the pores of the concrete. Intended primarily as a surface hardener, but because of the reaction and precipitation referred to, the material may be said to function as a binder and dust preventive.

Steel Preservative Paints

"R.I.W." Tockolith (Patented)—The portland cement gray anti-corrosive paint used for priming iron, steel or other metal. A finishing coat must always be applied according to the character of the finished surface required and the nature of the service expected.

No. 1087-A "R.I.W."—A quick drying, acid-proof, alkali-proof and waterproof china wood oil, hydro-carbon paint for application to steel or wood. Unaffected by the alkali in cement mortar and concrete. A good shop coat for steel which is to be incased in concrete where a paint of the character of "R.I.W." Tockolith is not required.

Furnished in black, red, brown and dark green.

No. 110 "R.I.W." Damp-Resisting Paint—A waterproof paint which adheres perfectly to concrete or cement mortar.

Used as a finishing coat on structural grillage work which is to be embedded in masonry, also on railroad bridge floors and column footings, pipes buried in the ground, metal lath and steel work subjected to the fumes of acids or alkalis.

No. 112 "R.I.W." Damp-Resisting Paint—A waterproof paint which has wonderful resistance to the alkalis in cement mortar or concrete. Recommended for finishing coat on structural steel building frames, brine and condenser pipes, etc.

Furnished in black and maroon.

No. 137 "R.I.W."—A bright red paint recommended either for interior or exterior use over a priming coat of "R.I.W." Tockolith, but 2 coats may be used without a primer.

Used on steel structures exposed to the weather; roofs, gutters, gas holders, tanks, etc., and where acid fumes prevail.

No. 49 "R.I.W." Damp-Resisting Paint—A high grade, exterior exposure paint made in black or dark olive green, and usually applied over a priming coat of "R.I.W." Tockolith.

Withstands the action of locomotive gases, acids and other fumes to which railroad bridges and viaducts are subjected. Used on tanks, lined smokestacks, etc.

"R.I.W." Plaster Primer—A liquid coating of semi-opaque character, made in white and light gray, intended for direct application to thoroughly dry and clean plastered walls. It overcomes the alkalinity of unpainted plastered walls and obviates the necessity of using sizing materials: i.e., glue size, sealing varnish or similar preparations.

Enamels

"R.I.W." Hospital and Laboratory Enamel—A waterproof, white, hard usage enamel which resists the action of sulphuretted hydrogen, gases and fumes of acids and other chemicals. Used principally in hospitals, laboratories, bath-rooms, kitchens, milk stations, engine rooms, etc.

"R.I.W." Machinery and Pipe Enamel—This enamel is intended for use on dynamos, transformers, steam and electric stationary engines, compressors, mill and other machinery, guards, rails, etc., not exposed to the elements.

Specialties

"R.I.W." Trimbak—A black, alkali-proof and waterproof, elastic paint for protecting the back of wood trim; underside of wood floors, wood sleepers, etc.

Damp-proofing

No. 232 "R.I.W." Damp-Resisting Paint—A black, elastic, full-bodied, tacky, damp-proofing paint for brush application to the interior surfaces of exterior brick or terra cotta walls to which hard wall plaster is to be directly applied. Prevents the penetration of dampness, and renders the inside of walls vermin-proof and stain-proof.

Not to be used on concrete walls or on ceilings of any kind, nor must concrete or portland cement mortar be applied directly over it.

No. 110 "R.I.W." Damp-Resisting Paint—A black, alkali-proof and waterproof, elastic paint to protect limestone, marble, granite and other cut stone from the chemical action and discoloration due to alkali in cement, and to moisture. Also resistant to mild acids.

"R.I.W." Marine Cement*—A black, damp-proof, thick liquid paint for brush application to the exterior of foundation walls and footings; concrete floor slabs, and wood sleepers laid in concrete. Does not need to be heated.

"R.I.W." Liquid Konkert (Patented)—Priming and finishing cement paints, ready for use, for damp-proofing, beautifying and overcoming the natural porosity of exposed stucco, concrete and masonry walls. In white and colors. Dries with a flat finish. For gloss finish apply "R.I.W." Flex-Sicco Ready Mixed Paint in any color.

"R.I.W." Toxloxpore*—A colorless, damp-proofing liquid, especially adapted for application to brick, concrete, stucco, limestone, and Bedford stone.

When applied to a perfectly dry surface it will prevent the development of efflorescence and the penetration of dampness.

Cement and Mortar Colors

"R.I.W." Cement Colors—For coloring portland cement construction to produce the richest shades in stucco, tile, sidewalks, etc. Usually sold in dry powder form. These mineral colors produce uniformly pleasing and permanent shades.

Furnished in 14 standard shades.

"R.I.W." Edinburgh Mortar Colors—Strong, permanent mineral colors for mortar joints. Not affected by heat or cold.

Usually sold in pulp form because of greater convenience in mixing. Furnished in 7 standard colors.

Waterproofing

"R.I.W." Toxement (Patented)—A gray powder for the integral waterproofing of mass concrete for foundations, floors, walls, bridges, piers, reservoirs, etc.

"R.I.W." Toxement lubricates concrete, increases its workability, plasticity and flowability, renders it non-porous, and eliminates necessity for extreme tamping and vertical chuting.

"R.I.W." Toxement Mortar Paste (Patented)*—For the integral waterproofing of cement mortar joints and stucco by arresting capillarity and perfecting the texture of the mortar or stucco through entirely normal means and in entire accord with the natural functioning of the other ingredients.

Concrete Floor Coatings

"R.I.W." Cement Filler (Patented)—Designed primarily for use as a priming coat on dry concrete floors subjected to ordinary conditions of service. It penetrates the pores, neutralizes the lime inherent in concrete and hardens the surface.

The finishing coat should be "R.I.W." Cement Floor Enamel.

No. 2626 "R.I.W." Cement Filler (Patented)—This material is similar to regular "R.I.W." Cement Filler but contains specially selected gums which yield a harder and glossier surface. Usually used on concrete floors subjected to severe conditions of service and to preserve dry, crumbly floors in loft

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Engineers and Contractors for WATER-PROOFING, making a specialty of CEMENT WATER-PROOFING. We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, etc., guaranteeing a positive and permanent waterproofing of all kinds of masonry construction.

Designers and builders of REINFORCED CONCRETE CONSTRUCTION.



TRADE-MARK
Reg. U. S.
Patent Office

ness, applied in two coats. The floor work shall be 1 in. in thickness and is to serve as a wearing surface as well as a waterproof coating. All waterproofing shall be floated and troweled to a smooth and even finish free from imperfections.

Guarantee—THE WATERPROOFING COMPANY shall furnish written guarantee that all coating placed by them will be waterproof; that during a period of 2 years after completion of the work, they will promptly repair any leaks appearing through their waterproofing which are not due to causes beyond the waterproofer's control.

A Few Important Waterproofing Contracts

New York, N. Y.

Federal Reserve Bank, York & Sawyer
Woolworth Building, Cass Gilbert
Hudson Terminal Buildings, Clinton & Russell
Singer Building, Ernest Flagg
American Telephone & Telegraph Co., Welles Bosworth
Stock Exchange, Trowbridge & Livingston
Equitable Society Building, Starrett & Van Vleck
New York Telephone Co., Washington, Barclay, West and Vesey Sts., McKenzie, Voorhees & Gmelin
Seaman's Church Institute, Warren & Wetmore
Savoy-Plaza Hotel, McKim, Mead & White
New Equitable Trust Building, Trowbridge & Livingston
Allerton Hotels, 38th, 55th and 57th Sts., Murgatroyd & Ogden
Chase National Bank, Graham, Anderson, Probst & White
Columbia-Presbyterian Hospital, James Gamble Rogers
Church of the Heavenly Rest, B. G. Goodhue Associates
Central Savings Bank, York & Sawyer

Boston, Mass.

Federal Reserve Bank, R. Clipson Sturgis
Copley Plaza Hotel, Henry J. Hardenbergh
John Hancock Building, Parker, Thomas & Rice
National Shawmut Bank, Parker, Thomas & Rice
Merchants National Bank, Coolidge & Shattuck
Old Colony Trust Company, Coolidge & Shattuck
Employers Liability Assurance Corp., Ltd., Coolidge, Shepley, Bullfinch & Abbott
Harvard School of Business, McKim, Mead & White
New Elks Club, McLaughlin & Burr
Fogg Memorial Museum, Coolidge, Shepley, Bullfinch & Abbott

Miscellaneous

Mitsui Bank, Tokyo, Japan, Trowbridge & Livingston
Convention Hall, Atlantic City, N. J., Lockwood, Greene & Co., Inc.
Royal Bank of Canada, Montreal, Can., York & Sawyer and S. G. Davenport, Associate
Ohio Bell Telephone Building, Cleveland, Ohio, Hubbell & Benes Co.
Miners Bank Building, Wilkes-Barre, Pa., W. L. Stoddart
Fort Pitt Hotel, Pittsburgh, Pa., Janssen & Abbott
Oliver Office Building, Pittsburgh, D. H. Burnham & Co.
Tunnels, Shawinigan Falls, Can., Northern Aluminum Co.
6 Telephone Buildings in various cities, John T. Windrim
51 Telephone Buildings in various cities, McKinzie, Voorhees & Gmelin

Experience

THE WATERPROOFING COMPANY introduced and perfected cement waterproofing. During the past 23 years this company has successfully completed thousands of difficult contracts in every section of North America, and have gone as far afield as Japan.

Advantages of "Cow Bay" Cement Waterproofing

No extra supporting walls required. Walls are left with a neat finish; no furring and plastering being necessary. Floor coating serves both as waterproof seal and floor finish. "Cow Bay" waterproof coating is as hard as the best portland cement finish; placed beneath grillages and column bases without danger of settlement.

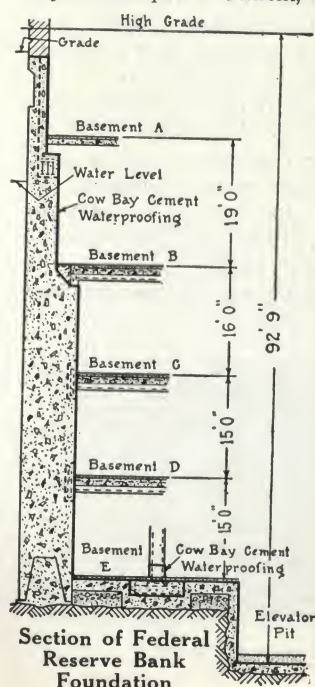
Difficult Waterproofing Job Successfully Handled

The foundations of the Federal Reserve bank building, the deepest in New York, presented a most difficult waterproofing problem. These foundations were successfully waterproofed by us.

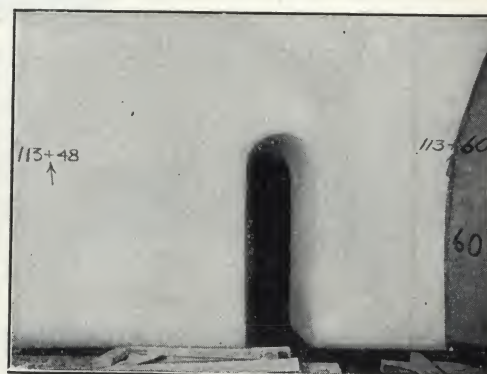
"Cow Bay" Waterproofing Specifications

Material—All interior surfaces of all exterior walls and upper surface of concrete floor slab throughout basement (or subbasement), elevator pits, machinery foundations, trenches, etc., as shown on plans, shall be waterproofed with "Cow Bay" Waterproof Cement, applied by THE WATERPROOF COMPANY.

Workmanship—All surfaces, before application of waterproof coating, shall be thoroughly chipped and cleaned, and coating applied not later than 24 hours after surface has been so prepared. A perfect bond must be secured with underlying masonry. Wall waterproofing shall be $\frac{5}{8}$ -in. thick-



Before Being Waterproofed



After Being Waterproofed

Pennsylvania Tunnels Before and After Being Waterproofed with "Cow Bay" Waterproof Cement

WESTERN WATERPROOFING COMPANY

MISSOURI CORPORATION
ST. LOUIS, MO., Syndicate Trust Building
PHILADELPHIA, PA., Abbott Building
CHARLOTTE, N. C., First National Bank Building

MICHIGAN CORPORATION
DETROIT, MICH., Penobscot Building
CLEVELAND, OHIO, 2341 Carnegie Avenue
COLUMBUS, OHIO, Joyce Realty Building
TORONTO, ONT., 65 Victoria Avenue

NEW YORK CORPORATION
NEW YORK, N. Y., 342 Madison Avenue
BOSTON, MASS., 82 West Dedham Street
BUFFALO, N. Y., 344 Ellicott Square

Services

All work is done exclusively under contract and guaranteed to be and remain watertight. We sell no materials. Each office has a corps of trained mechanics working under the supervision of an engineer.

Contracts are taken for Treating Structures of Concrete, Brick or other Masonry, either old or new. Architects or Engineers are invited to call our Waterproofing Engineers in for consultation to assist them in the solution of problems involving Waterproofing, Dampproofing, Oilproofing, Restoring Distintegrated Concrete, etc.

Method Used

This system involves the use of Ironite Waterproofing, which is a finely pulverized gray iron containing chemicals. Upon brushing this on the walls with the addition of water, the particles are lodged in the surface pores. Due to the chemicals, rapid oxidation of the iron takes place with the resultant expansion of the iron particles. This swelling completely fills the surface pores and seals them against leakage. Sufficient coatings are applied to thoroughly fill all pores. The early coats make a filling or stuffing for the surface pores, and the succeeding coats form a highly oxidized iron filament. This iron oxide surface is extremely dense and impervious, not alone to the action of water, but also to oils, dilute acids, etc.

The treatment is applied on either the pressure side or the side opposite. In the latter case it is impossible to force the waterproofing away from the wall as the particles inside the surface pores have expanded therein and are an integral part of the structure.



Advantages of This Method

Our system is a positive one, requiring no assistance from integral compounds in the concrete. The bond secured between the waterproofing and the structure is so perfect that it will resist any hydrostatic pressure the structure is capable of withstanding. See comparison shown below and note the large saving in construction cost.

Character of Work

Waterproofing—Basement walls, floors, tunnels, powerhouses, subways, pits, swimming pools, reservoirs, dams, retaining walls, viaducts, etc.

Treatment—Fuel oil tanks, gasoline and lighter oil tanks, molasses tanks, pickling vats, unusual oil containers, etc.

Acidproofing—To resist soaps, greases, fats, etc. Treating floors and walls of packing houses, soap factories, tanneries, dairies and other structures, requiring protection against dilute acids.

Resto Crete—A process for restoring distintegrated concrete and preserving it from further disintegration.

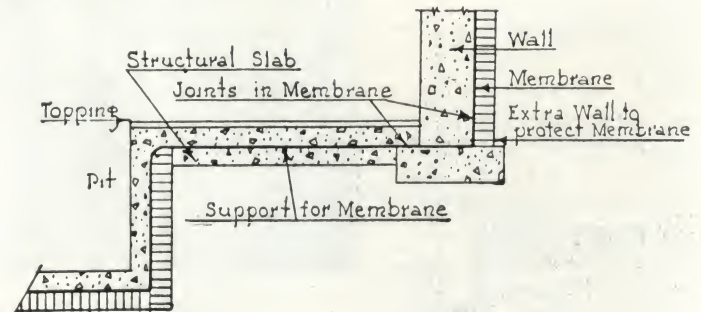
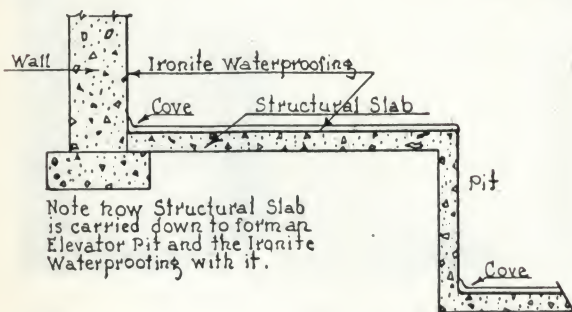
Specifications

It is our preference to write a separate specification for each specific job. As a general specification the following may be used:

Basements, Tunnels, Pits, etc.—All enclosing walls and floors and other surfaces in contact with the earth are to be waterproofed on the inside surfaces by the WESTERN WATERPROOFING COMPANY (fill in here street and town address of nearest office) according to their system of waterproofing (using Ironite), and to be covered by their written guarantee.



Buhl Building, Detroit, Mich.
SMITH, HINCHMAN & GRYLLS, Architects



Comparison Showing Saving in Construction

Representative Contracts

New York Corporation

Connecticut General Life Insurance Building, Hartford, Conn., Marc Eidlitz & Son, Inc., Contractors
 Park Square Building, Boston, Mass., W. A. & H. A. Root, Contractors
 Boston & Albany R. R. Passenger Station, Springfield, Mass., J. Henry Miller Co., Contractors
 Travelers Insurance Printing Plant, Hartford, Conn., Marc Eidlitz & Son, Inc., Contractors
 Providence Biltmore Hotel, Providence, R. I., Thompson-Starrett Company, Contractors
 New University Club, Boston, Mass., W. A. & H. A. Root, Contractors
 Boston Five Cent Savings Bank, Boston, Mass., W. A. & H. A. Root, Contractors
 Rhode Island School of Design, Providence, R. I., Starrett Bros., Inc., Contractors
 Boston Consolidated Gas Co., Office Building, Boston, Mass., W. A. & H. A. Root, Contractors
 D. M. Read Department Store, Bridgeport, Conn., T. J. Pardy Construction Co., Contractors
 Steinway Building, New York, N. Y., Thompson-Starrett Co., Contractors
 Newburgh Savings Bank, Newburgh, N. Y., B. M. Higginson, Inc., Contractors
 N. Y. Evening Post Building, New York, N. Y., Thompson-Starrett Co., Contractors
 Coney Island Hotel, Coney Island, N. Y., Cauldwell Wingate Co., Contractors
 Manger Hotel, New York, N. Y., Bing & Bing, Inc., Contractors
 Westchester Title & Trust Co., White Plains, N. Y., George Watson Co., Contractors
 Western Electric Multi-Story Buildings, Kearny, N. J., Turner Construction Co., Contractors
 L. S. Plaut Store, Newark, N. J., Starrett Bros. Co., Contractors
 Federal Trust Building, Newark, N. J., Public Service Production Co., Contractors
 Princeton University Chapel, Princeton, N. J., Matthews Construction Co., Contractors

Missouri Corporation

Insurance Company of North America, Philadelphia, Pa., The Wark Company, Contractors
 Liberty Trust Co. Building, Philadelphia, Pa., Irwin & Leighton, Contractors
 Bell Telephone Co. Building, Philadelphia, Pa., The Wark Company, Contractors
 Ben Franklin Hotel, Philadelphia, Pa., John N. Gill Co., Contractors
 Scranton Times Building, Scranton, Pa., Dwight P. Robinson, Contractors
 Power Plant—Hunlock Creek, Pa., Stone & Webster, Contractors
 Hecht Store Building, Washington, D. C., The Geo. A. Fuller Co., Contractors
 Randall Junior High School, Washington, D. C., King Lumber Company, Contractors
 Ford Auto Plant, Norfolk, Va., Rust Engineering Co., Contractors
 City College, Baltimore, Md., Chas. L. Stockhausen, Contractor
 10 Schools, Public Improvement Commission, City of Baltimore, Md.
 Federal Reserve Bank, St. Louis, Mo., Westlake Construction Co., Contractors

Missouri Corporation (Continued)

Chase Hotel, St. Louis, Mo., Preston J. Bradshaw, Architect
 Nashville Trust Co., Nashville, Tenn., Foster & Creighton, Contractors
 Redmond Hotel, Birmingham, Ala., Smallman-Brice Construction Company, Contractors
 Atlanta Biltmore Hotel, Atlanta, Ga., Starrett Bros., Contractors
 New York Department Store, Miami, Fla., P. J. Davis Construction Company, Contractors
 Riverside & Springfield Junior High Schools, Jacksonville, Fla., O. P. Woodcock, Contractor
 First National Bank, Tampa, Fla., Southern Ferro Concrete Co., Contractors
 Jefferson Standard Life Building, Greensboro, N. C., Geo. A. Fuller Construction Co., Contractors

Michigan Corporation

J. L. Hudson Co., Department Store Building, Detroit, Mich., Smith, Hinchman & Grylls, Architects and Engineers; Bryant & Detwiler Co., General Builders
 Michigan Bell Telephone Co., Main and other Exchanges; Smith, Hinchman & Grylls, Architects and Engineers, Detroit, Mich.
 Dodge Brothers Plant, Detroit, Mich., Owners and Builders; Smith, Hinchman & Grylls, Architects and Engineers
 Morgan & Wright (United States Tire Co.) Plant, Detroit, Mich., Lockwood-Greene Co., Engineers; Stone & Webster, General Contractors
 First National Bank Building, Albert Kahn, Inc., Architects; Foundation Co., Contractors
 Book Building, Louis Kamper, Architect; Walbridge-Aldinger Co., Contractors
 Cadillac Motor Car Co., Albert Kahn, Inc., Architects; A. A. Albrecht Co., Contractors
 General Motors Building, Powerhouse and Tunnel, Albert Kahn, Inc., Architects; Thompson-Starrett Co., Contractors
 Ford Motor Co., Albert Kahn, Inc., Architects; Bryant & Detwiler Co., Contractors
 Brotherhood of Locomotive Engineers Bank Building, Cleveland, Ohio, Knox & Elliott, Architects; Geo. A. Fuller Co., Contractors
 Keith Theater Building, Cleveland, Ohio, Rapp & Rapp, Architects; Lundoff Bicknell Co., Contractors
 Plain Dealer Publishing Building, Cleveland, Ohio, Hubbell & Benes, Architects; Crowell & Little Construction Co., Contractors
 Van Swerigen Residence, Cleveland, Ohio, Rowley & Small, Architects; W. B. McAllister Co., Contractors
 Grosse Pointe Club, Detroit, Mich., R. O. Derrick, Inc., Architect; Corrick Bros., Builders
 Highland Park Vocational Building, Detroit, Mich., Frank Eurich, Jr., Architect, M. E. Burrowes, Associate; Henry Martens Co., Builders
 H. H. Stambaugh Memorial Building, Youngstown, Ohio, Helme & Corbett, Architects; Hegeman Harris Co., Contractors
 State Theatre Building, Detroit, Mich., C. Howard Crane, Architect, Elmer G. Kiehler, Associate; Longacre Construction Co., Builders
 Dormitory Building, Capital University, Columbus, Ohio, D. Riebel & Son, Architects; G. W. Schneider & Son, Contractors
 Municipal Building, Akron, Ohio, Good & Wagner, Architects; Moran Construction Co., Contractors
 First National Bank, Massillon, Ohio, Walker & Weeks, Architects; A. F. Wendling Co., Contractors



Park Square Building, Boston, Mass.
 DENSMORE & LECLEAR, Architects



National Press Club, Washington, D. C.
 RAPP & RAPP, Architects

NORTH AMERICAN CEMENT CORPORATION

CAL DIVISION
HAGERSTOWN, MD.

CEMENT PLANTS
SECURITY PLANT, SECURITY, MD. HELDERBERG PLANT, HOWE'S CAVE, N. Y. ACME PLANT, CATSKILL, N. Y.
CAL AND LIME PRODUCTS PLANT, BERKELEY, WEST VA.
GENERAL OFFICES
ALBANY, N. Y. BALTIMORE, MD. BOSTON, MASS. WASHINGTON, D. C.
GENERAL SALES OFFICE, 285 Madison Avenue, NEW YORK, N. Y.

Products

CAL, for use in portland cement mixtures to obtain early strength; to improve curing; for densifying; for easy workability; as a hardener; and for placing in cold weather.

Also Acme, Helderberg and Security Portland Cement; Berkeley Hydrated Lime.

What Cal Is

Cal is oxychloride of calcium, a dry white powder which, used as an admixture to portland cement concrete and mortar, has a combination of properties which facilitate and expedite new construction and repairs.

What Cal Does

Cal accelerates the hardening of all portland cement concrete and mortar, bringing them to safe working strength in a fraction of the usual time. Just as it comes from the container, Cal is added at the mixer. From actual tests and job experience covering many years, it has been found that when Cal is used, forms may be removed from all kinds of work in much less than normal time; and that road and street construction can be put into full service in from 48 to 72 hours. Road patching can be accomplished with little interruption to traffic. In addition, Cal cures, fattens, hardens, and densifies all portland cement mixtures, and reduces the cold weather hazard.

Workability

Cal reduces the amount of water necessary in making concrete; it prevents the segregation of the aggregates, and makes a concrete mixture more easily workable and easier flowing.

Cal fattens and stabilizes a concrete mixture so that segregation is reduced to the minimum. This is of special importance in chuting concrete or in transporting from central mixing plants.

CAL

Curing

Cal prevents the too rapid drying out of concrete or stucco in very hot or dry weather, and thus minimizes the danger of surface cracks, checks, crazing and disintegration.

No Danger of Corrosion

Three-year laboratory tests under the most severe conditions have proven that Cal does not cause corrosion of steel reinforcement.

Cold Weather Work

A conservative analysis of the experience of users indicates that Cal makes concreting and masonry work safe at temperatures 10° lower than for plain concrete or mortar and that with proper additional precautions work may proceed at very low temperatures.

Effect on Strength

There are innumerable laboratory tests which show conclusively that Cal increases the early strength of concrete with no ill effect on the ultimate strength.

The report of American Bureau of Inspection and Tests, Chicago, showed 2450 lb. concrete in three days. The mix was 1:1½:2½ and contained 5 lb. of Cal per bag of cement. In the same series of tests 1:1½:3 concrete treated with 5% Cal by weight of cement gave 2220 lb. in three days. Tests were made in compression on 6x12-in. cylinders with commercial aggregates, and air storage.

Compression Tests

The following table is from tests by Duff A. Abrams, eminent authority on concrete testing. It is taken from Bulletin No. 13 Structural Materials Research Laboratory of the Lewis Institute.



**Gulf Island Development Power House
on the Androscoggin River**

MORTON C. TUTTLE CO., Contractors

Cal used for densifying concrete in the scroll cases and for general frostproofing for the Central Maine Power Co.



**Addition to Corcoran Art Gallery,
Washington, D. C.**

JAMES BAIRD CO., Contractors

Cal used for frostproofing the mortar used in laying up the face brick



Harris-Forbes Building, Boston, Mass.

LOCKWOOD, GREEN & CO., Architects
GEORGE A. FULLER CO., Contractors

Cal used for brick mortar and for reinforced concrete roof slabs, without interruption at temperatures as low as 5° F.

The effect of Cal on the tensile strength of mortars is similar to its effect on the compressive strength of concrete.

Compression Tests of 6x12-in. Concrete Cylinders—Mix 1:5:2 by volume (1:2:4). Aggregate: sand and pebbles from Elgin, Ill., graded 0 to 1½ in. Cement: portland cement "A" purchased in Chicago. Relative consistency, 1.00 (flow about 180). Specimens cured in moist room until test, tested damp. Each value is the average of from 4 to 10 tests made on different days unless otherwise noted. Strength ratios are percentages of the strength of concrete at same age without admixture. Admixture expressed as per cent of weight of cement.

Cal, per cent	Compressive strength, lb. per sq. in.	Strength, ratio per cent	Cal, per cent	Compressive strength, lb. per sq. in.	Strength, ratio per cent
2-day Tests			3-mo. Tests		
0	950	100	0	4170	100
2	1120	118	2	4050	97
4	1300	137	4	4390	105
7	1430	151	7	4430	106
10	1410	148	10	4460	107
7-day Tests			1-year Tests		
0	1940	100	0	4320	100
2	2060	106	2	4590	106
4	2280	118	4	5000	116
7	2390	123	7	5190	120
10	2260	117	10	5220	121
28-day Tests			3-year Tests		
0	3310	100	0	5020	100
2	3070	93	2	5140	102
4	3320	100	4	5100	102
7	3550	107	7	5980	119
10	3540	107	10	5750	115

The Cal Book

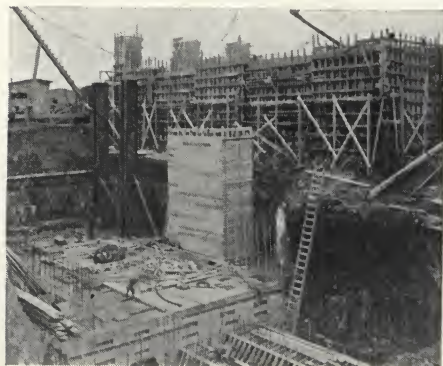
The complete story of Cal is contained in this book which will be sent to any architect on request.

Specifications

All portland cement [concrete] [mortar] [stucco] [finish] shall be treated with Cal, manufactured by the NORTH AMERICAN CEMENT CORPORATION. Cal shall be used in the proportion of lb.* per bag of cement and shall be added dry to the mix, according to directions issued by the manufacturers.

*In normal temperatures, the following quantities should be used:

For stucco	5 lb.	Surface wash	8 lb.
Densifying	4 lb.	Easy chuting	5-8 lb.
Bonding and patching	5 lb.	For maximum acceleration	
Brick mortar	5 lb.	in any portland cement	
Brick mortar	5 lb.	mixture	8-lb.
Floor topping	3 lb.	For impermeability in any	
Concrete products	5 lb.	1:2:4 or richer mix	4 lb.



Potomac Edison Co. Power Plant, Williamsport, Md.

SANDERSON & PORTER, Engineering Contractors
Cal was used at all temperatures—in cold weather primarily for its frostproofing qualities and in mild weather for efficient long chuting—first on the original unit and now, four years later, on the additional unit



St. George's School, Newport, R. I.

CRAM & FERGUSON, Architects
L. D. WILCUTT & SON, Contractors
Cal used during the winter of 1925 for brick mortar on this building



Clark's Ferry Bridge Across the Susquehanna River, Above Harrisburg, Pa.

FRANK M. MASTERS, Engineer
VANG CONSTRUCTION Co., Contractors
By using Cal the number of arch centers required was reduced from 5 to 3 and the curing time from 28 to approximately 14 days, at an enormous saving

For cold weather, the following "Schedule of Safety" should be followed:

SCHEDULE OF SAFETY FOR COLD WEATHER

Nature of work	Temperature	Precautions
Floors, walls, brick mortar, roads and streets, mass concrete	Above 20° F.	Aggregates free from frost; 5 lb. Cal per bag cement
Stucco and thin sections	Above 25° F.	
Floors, walls, brick mortar, mass concrete	15° F. to 20° F.	Heat water and aggregates; 8 lb. Cal per bag cement
Stucco and thin sections	20° F. to 25° F.	Heat water and aggregates; 5 lb. Cal per bag cement; protect all exposed surfaces
Floors, walls, mass concrete	10° F. to 15° F.	Heat water and aggregates; 8 lb. Cal per bag cement; protect all exposed surfaces

Where to Get Cal

Building material dealers in most important cities carry Cal in stock. Orders may be sent to any office of the company, to be filled from nearest dealer's stock. Prices on request.

How Cal Is Packed

Cal is packed in convenient non-returnable 100-lb. heavy paper-lined burlap bags which preserve the material indefinitely when stored in a dry place.

References

Sanderson & Porter, Engineers, New York, N. Y.
George A. Fuller Co., Contractors, New York, N. Y.
Simpson Bros. Corp., Contractors, Boston, Mass.
Vang Construction Co., Pittsburgh, Pa.
F. M. Masters, Engineer, Harrisburg, Pa.
Parker, Thomas & Rice, Architects, Baltimore, Md.
Frailey Bros. & Haighley, Contractors, Baltimore, Md.
Fred Drew Co., Inc., Contractors, Washington, D. C.
Milburn-Heister Co., Architects, Washington, D. C.
Louisville Railways, Louisville, Ky.
Capital Traction Co., Washington, D. C.
Lally Column Co., Chicago, Ill.
Commonwealth Edison Co., Chicago, Ill.
James Baird Co., Contractors, New York, N. Y., and Washington, D. C.
A. Burch Fitz Simons, Architect, Washington, D. C.
Lockwood, Greene & Co., Architects, Boston, Mass.
Commonwealth Edison Co., Engineers, Chicago, Ill.
Clyde N. Friz, Architect, Baltimore, Md.
Wm. P. McDonald Construction Co., Contractors, New York, N. Y.
Bland Engineering Co., Minneapolis, Minn.
Morton C. Tuttle Co., Contractors, Boston, Mass.
Additional references furnished on request.

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street
NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS.
CINCINNATI, OHIO

SYRACUSE, N. Y.
PITTSBURGH, PA.

CHICAGO, ILL.
ST. LOUIS, MO.

DETROIT, MICH.
ATLANTA, GA.

CLEVELAND, OHIO
KANSAS CITY, MO.

INDIANAPOLIS, IND.
PHILADELPHIA, PA.

Solvay Calcium Chloride for Accelerating the Setting and Densifying of Concrete

A white, dry, flaky chemical which when added to the mixing water accelerates the initial hardening of concrete without affecting the final set; at the same time densifies the concrete, making it more waterproof; reduces the freezing point of water, thereby aiding the green concrete to resist freezing in low temperatures. Calcium Chloride is extremely hygroscopic and dissolves almost instantly in water. It can be used with any brand of Portland cement, although results may vary slightly.

Results Proven by Authoritative Tests—Thorough and extensive tests made by U. S. Bureau of Standards, American Society for Testing Materials, Portland Cement Association, U. S. Engineers, Lewis Institute and our own engineers have definitely established that Calcium Chloride is beneficial to concrete.

At an investigation, carried on by the Bureau of Standards, co-operating with U. S. Engineers at Memphis, Tenn., with many materials, Calcium Chloride showed highest. In the standard mortar test with 3:1 Ottawa sand, it was found that 2 to 4%, by weight of water, of commercial Calcium Chloride increased tensile strength from 155 to 230% at the end of 24 hours; and from 173 to 190% at the end of 48 hours without adverse effect on the final set.

Comparative Strength Ratios between Treated and Untreated Concrete—After testing 7500 compression specimens, Prof. Duff A. Abrams; then in charge of Structural Material Research Laboratory of the Lewis Institute, Chicago, Ill., concludes:

"In the use of Calcium Chloride no advantage was gained for percentages of the commercial product greater than 2 or 3 per cent, corresponding to a chloride content of 1 to 1½ per cent. This amount when used in mixes of about 1:5 and in consistencies suitable for building construction, showed an increase in strength of from 100 to 200 pounds per square inch. For richer and drier consistencies the strength increase was greater and for leaner mixes and wetter concretes it was less."

Accelerating Properties—As shown by tests, concrete gauged with Solvay Calcium Chloride, at the end of 48 hours has the same strength as concrete gauged with plain water has at the end of 7 days. The early strength given to fresh concrete prevents collapse of the cell structure during the drying out period. It increases the crushing, tensile and abrasive strengths.

With Solvay, floor finishing is possible within a short time after pouring; concrete can be poured late in afternoon and finished, saving overtime charges.

Hardens and Densifies—The chemical action of Calcium Chloride densifies and hardens concrete and at the same time increases its resistance to dusting and absorption of water. This decreased porosity makes the surface more resistant to wear and less affected by acids and alkalies. All these qualities are highly desirable in construction of concrete sidewalks, as well as concrete floors in factories, garages, etc.

Advantage of Use in Cold Weather—The qualities of quick initial setting, hardening, densifying and reducing of the freezing point of the mixing water make it possible to progress with concrete work in continued cold weather. The usual precautions against cold weather must be taken, but the factor of safety is very materially increased by the use of Solvay Calcium Chloride.

Efficient solutions for use in freezing weather, using 6 gal. of water per bag of cement, are at 28° F., 2 lbs. to 6 gal. of water; 20° F., 3 lbs.; 15° F., 4 lbs.

Waterproofing Qualities—The integral method of waterproofing concrete has been found best by many engineers and architects. The same qualities of hardening, densifying and quick initial setting brought about by Solvay Calcium Chloride tend to make treated concrete more waterproof. An additional aid to the waterproofing is the plastic or "fatty" condition of the mix which makes easier troweling and produces a better finish.

Directions for Using Solvay—For the best results, use not less than 1 lb. nor more than 4 lb. to a bag of cement except in freezing weather when up to 6 lb. may be used. Solvay should be dissolved in the water before water is added to dry mix.

Estimate of amount to be used is approximately 2 lb. per bag of cement—conditions of temperature, location, mix, etc., will vary this amount.

Cost—Solvay Calcium Chloride, east of the Mississippi, costs, approximately, two cents per pound—in the far West cost is slightly higher.

Shipment—Solvay is shipped in 375 lb. net, metal drums or 100 lb. net, paper lined burlap bags; in bags it must be given the same care as given cement. Stock is carried in 75 cities in the United States. Special arrangement for handling by carload lots.

Where Used

Solvay Calcium Chloride has been specified by many of America's leading architects, engineers and contractors. A few of the buildings in which it has been used for the purposes described are:

Chicago Tribune, Chicago, Ill.
American Furniture Mart, Chicago, Ill.
Atlantic National Bank Building, Boston, Mass.
Central High School, Johnstown, Pa.
Hotel Kenmore, Boston, Mass.

Technical Service

THE SOLVAY PROCESS COMPANY maintains a Technical Service Department whose services are gladly given without charge to engineers and architects.

Literature

Copies of Prof. Abrams' report and booklet describing use of Solvay Calcium Chloride with concrete, together with Architects Specification sheet, sent free on request.

LIVING-STONE COMPANY

Living-Stone Concrete Bond and Lithotex Concrete Hardener

4 East Lee Street
BALTIMORE, MD.

Living-Stone Concrete Bond

Living-Stone is a non-acid method of bonding cement, concrete hardener, and granolithic top finish to concrete floors. It bonds new concrete to that which has already been placed, and is the tested method of building a perfect monolithic concrete structure. It overcomes the well-known disadvantages of ordinary grouting, as Living-Stone will not only firmly unite brick, stone or unglazed tiles to each other, but also effect *perfect cohesion with concrete that has "set."*

Acids are destructive to the lime in cement, and should never be used on concrete. Corroding acids will seep through porous concrete and start oxidation in steel reinforcing members. The use of muriatic or sulphuric acid, for bonding new and old concrete, has often been resorted to by many contractors, but a porous, spongy surface of no strength is produced. Living-Stone contains *no acids whatever*, and effects a positive and an impermeable bond.

For the following reasons, top finish should not be placed immediately after concrete base is poured: The finish can not be placed until the concrete is hard enough to walk on, and this concrete, being soft and uneven in composition, will settle and leave low places in the top finish. If the finish coat is placed too soon, it is necessary to protect it from the work which follows, and spaces occupied by scaffolding must be patched in afterward.

But with the use of Living-Stone, a perfect bond may be had between new top finish and the old base, after building is closed in. Concrete base can then be tested for specified floor loads. Sufficient time has elapsed and any imperfect concrete in base can be replaced. Floor level is fixed and can be depended on to remain as found.

Uses of Living-Stone

Among the many uses for which Living-Stone is adapted, the following might be mentioned:

Floor Finish—For bonding granolithic or concrete hardener top finish or tile to concrete floors.

Exterior Finish—Under stippling.

Repairs and Weatherproofing—For grouting, filling those joints and cracks caused by expansion and contraction.

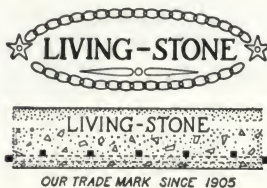
Bridges, Dams and Chimneys—For producing absolute monolithic work.

Concrete Blocks—Affording means of refacing concrete block buildings that show signs of disintegration.

Reservoirs and Swimming Pools—Making impermeable joints.

Cost of Living-Stone

The expense of using Living-Stone is negligible in any work; 1 gal. is ample for an area of 250 to 300 sq. ft., making the cost about 1¢ per sq. ft. Full instructions for use are sent and they must be strictly followed.



Living-Stone is put up in 1 and 5-gal. cans and 50-gal. barrels. It will keep indefinitely, if kept sealed. For quantities of 5 gal. or less, cash must be sent with orders. If ordered in 1-gal. cans, 1-gal. price will be charged regardless of quantity ordered.

Always state whether shipments are to be made by express or freight. Orders of 10 gal. and less will be shipped by express unless specific instructions are received to ship by freight. State name of railroad by which shipments are preferred.

WEIGHTS AND PRICES

Container	Weight, lb.	*Price per gal.
1-gal. cans	14	\$3.00
5-gal. cans	60	2.75
50-gal. barrels	565	2.50

*F. o. b. cars, Baltimore, Md. Terms, net cash.

Specification for Bonding Top Finish to Concrete Floors

Living-Stone concrete bond shall be brought to building in original container, and applied in accordance with manufacturers' directions. Contractor, before proceeding with laying of cement, granolithic, concrete hardener top finish, or tiles, shall first thoroughly clean surface of dirt, dust, oil, paint or grease. Soak surface well with clean water and then apply a bond coat of Living-Stone $\frac{1}{4}$ in. thick, and immediately follow with top finish or new work.

Living-Stone does not require expert workmen to prepare it, as any ordinary laborer can attend to the mixing. Take a clean barrel, fill it with hot water to a height of 20 or 40 gal., mark barrel at each of these heights as a gauge for the mixer. Living-Stone is then poured into the barrel in the proportion of 1 gal. of Living-Stone to 20 gal. of hot water, and this solution is mixed with any brand of tested portland cement; mortar thus obtained should be of the consistency to flow sloppy from the trowel, and is spread, on the surface to be bonded, to the thickness of $\frac{1}{4}$ in., and the new work must follow immediately.

Do not spread more mortar than can be immediately covered while it is soft.

Lithotex Concrete Hardener

A colorless, liquid chemical compound which prevents and stops disintegration of concrete floors.

Lithotex changes a soft, porous wearing surface to one of flintlike hardness. It is inexpensive to apply, 1 gal. covering 100 sq. ft., 3 coats, at a total cost of 2¢ per sq. ft.

Specification—Lithotex shall be brought to the building in original containers and applied according to manufacturer's directions.

Wash the floor thoroughly with clean water, scrubbing with a stiff broom or scrubbing brush, removing all dirt and loose particles, and allow the surface to dry.

Dissolve 1 gal. of Lithotex in 3 or 4 gal. of clean water, depending on porosity and condition of top finish. Stir the mixture thoroughly and apply it with a brush. A long-handled whitewash brush will be found satisfactory. After applying mixture allow the surface thus treated to dry, and as soon as dry, wash off with clean water, using a mop. Make two more applications 24 hours apart, allowing the surface to dry between each application, and mop off as before.

Three applications will be all that is necessary. After the last application any of the Lithotex that remains on the surface can be readily washed off, and the pores in the concrete will be found to have been filled up, leaving a hard flintlike surface.

Weight and Prices—1 gal. cans, 15 lb., \$2.00 per gal.; 5 gal. cans, 65 lb., \$1.75 per gal.; 50 gal. bbl., 700 lb., \$1.50 per gal. Net cash, f. o. b. cars, Baltimore, Md.

GENERAL CHEMICAL COMPANY

Chemical Treatments for Hardening, Dustproofing, Waterproofing and Preserving Concrete Surfaces

40 Rector Street, NEW YORK, N. Y.

BRANCH OFFICES OR REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Products

HARD-N-TYTE SURFACE HARDENER.
HARD-N-TYTE DECORATIVE COATINGS.
HARD-N-TYTE LIQUID WALL PRIMER.
HARD-N-TYTE COLORLESS WATERPROOFING.
KONAX INTEGRAL WATERPROOFING.
HARD-N-TYTE POWDERED IRON.



Hard-n-tyte Engineering Service

Surfaces are treated wherever possible under the supervision of the Hard-n-tyte Engineering Service. Our representatives are specialists in concrete construction, well qualified to study floor and waterproofing problems and, in the light of past experience and laboratory research, to recommend the correct materials and proper treatment for hardening, waterproofing, oil-proofing, acidproofing, densifying and protecting concrete and similar surfaces.

Our representatives will co-operate with architects, engineers, contractors or owners on problems relating to concrete, masonry, stucco and plaster. They are available at all times for inspecting and studying any specific job.

Hard-n-tyte Surface Hardener

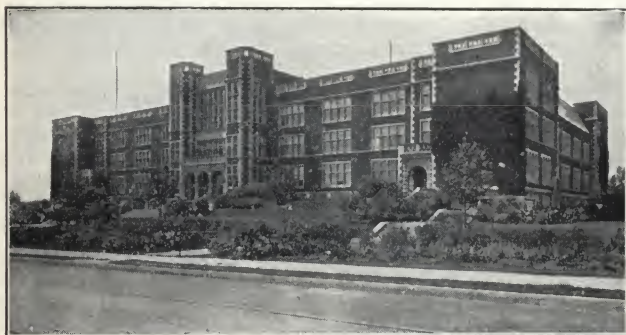
Concrete floors, to give maximum service, should first be constructed according to the right specification and then treated with a reliable and standardized hardener.

Hard-n-tyte Surface Hardener is a combination of chemicals which, when mixed with water, forms a colorless solution. When applied to cement surfaces it penetrates and hardens them, eliminating the usual concrete dusting and making them flint hard, more dense and more resistant to wear and the elements.

The effect of its application to concrete, portland cement stucco, or other surfaces containing lime is a chemical reaction which deposits finely divided silica in the pores and voids and forms stable compounds. In addition to binding the particles of concrete more firmly together, the hard, agatelike substances which are formed by the chemical reaction resist abrasion and weathering.

When applied by our trained service organization, the results are guaranteed.

Specification—All exposed concrete wearing surfaces shall be treated with Hard-n-tyte Surface Hardener of strength specified by the manufacturer, GENERAL CHEMICAL COMPANY, and applied under the direction of an authorized sales engineer of said company.



Central High School, Minneapolis, Minn.

WM. B. ITTNER, Architect

Floors treated with Hard-n-tyte Surface Hardener withstand heavy traffic

Hard-n-tyte Decorative Coatings

Are supplied in gray, linoleum brown and olive green. They are not ordinary concrete floor paints, and should not be so considered.

In offices, public buildings and factories where an absolutely dustless surface is imperative, Hard-n-tyte Decorative Coatings harden the surface, produce a dustless finish at once, and at the same time give a uniform color and highly decorative gloss enamel finish. Surfaces treated in this manner are resilient and noiseless.

These coatings are easily maintained and withstand constant cleaning with strong soaps and washing powders remarkably well. The value of floor space thus treated is greatly enhanced and renting is made easier.

Specification—All exposed concrete wearing surfaces shall be treated with Hard-n-tyte Decorative Coating (specify gray, olive green or linoleum brown) in accordance with the directions of the manufacturer, GENERAL CHEMICAL COMPANY.

Note: The number of applications necessary depends entirely on the texture of the concrete, so that we prefer to have an outline of existing conditions before making recommendations.

Hard-n-tyte Liquid Wall Primer

New plaster and concrete surfaces contain a considerable quantity of active lime. When paint is applied to such surfaces the oil combines with the lime, causing disintegration. The bond between the paint and surface is either destroyed, causing peeling and blistering, or the paint becomes soluble and is easily washed off.

It is a liquid material for application to new plaster and concrete that seals the pores, hardens the surface, neutralizes the lime and stops the alkali action which discolors subsequent decorating. It saves time and reduces labor cost allowing the actual work of decorating to proceed more quickly than is ordinarily the case.

Specification—All plaster or concrete surfaces to be decorated shall be allowed to dry for at least ten days or until dry to touch, and then treated with Hard-n-tyte Liquid Wall Primer, strictly in accordance with the directions of the manufacturer, GENERAL CHEMICAL COMPANY.

Hard-n-tyte Colorless Waterproofing

This material meets the demand for a colorless penetrative surface treatment for concrete, stucco and masonry. It combines a special penetrative solvent with a large percentage of water-repellant, solid material. The solvent carries the water-repellant material far into



Bloomfield Public Library, Bloomfield, N. J.

JOHN F. CAHEN, Architect

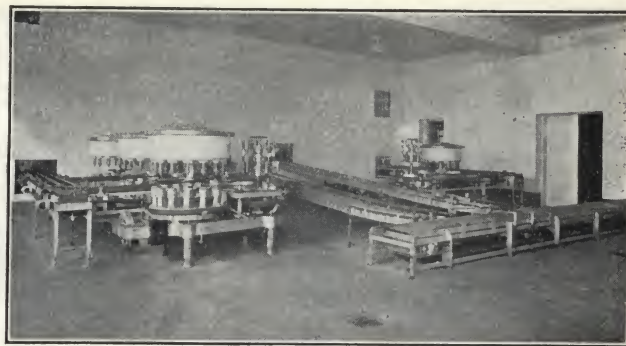
Hard-n-tyte Liquid Wall Primer applied to new plaster before decorating



Pennsylvania Building, New York, N. Y.

SCHWARTZ & GROSS, Architects

Hard-n-tyte Decorative Coating obviates the need for more expensive floor covering



Borden Farm Products Co., Chicago, Ill.

E. E. ROBERTS, Architect

Hard-n-tyte treatment prevents disintegration from lactic acid

the pores and then evaporates, leaving the surface coated and impregnated to a considerable depth with a sealing, water-resistive compound.

Being colorless, no film is formed to discolor the surface or change its texture.

Specification—All exposed masonry shall be treated in place when dry, with two applications of Hard-n-tyte Colorless Waterproofing, manufactured by the GENERAL CHEMICAL COMPANY, giving the surface a thorough saturation at each application.

Konax Integral Waterproofing

A liquid waterproofing compound added to the gauging water while the concrete is being mixed. When combined with portland cement, Konax acts as a lubricator, causing the aggregate to flow more easily into the forms and also lessens the amount of water required, thereby densifying the mass. It hastens the hardening of the cement so that greater initial strength is developed in less time, which makes possible earlier removal of the forms, saving time and expense.

Konax is recommended as a waterproofing and densifying agent in concrete—basement walls, cellar floors, swimming pools, cisterns and wherever impervious water resistant concrete is desired. It is used in cement topping as it produces a fatty condition of the cement that makes it easier to trowel, and brings about a smooth, dense, hard surface.

Masons also find this compound a valuable addition to brick mortar because of the same fatty result and its densifying action reduces the possibility of penetration of water through the mortar joints.



Cuddell Tower, Cleveland, Ohio

DERCUM & BEER, Architects
Artificial stone work protected by Hard-n-tyte Colorless Waterproofing

Specification—Wherever waterproof concrete or mortar is indicated, 1 qt. of Konax, manufactured by the GENERAL CHEMICAL COMPANY, shall be added to the mixing water for each sack of portland cement used.

Hard-n-tyte Powdered Iron

This material is furnished in two grades: 20-30 mesh for use as a metallic floor hardener and 80-100 mesh for bonding purposes and subgrade waterproofing.

Special Materials and Applications

Combined Hard-n-tyte treatments embodying a special Filler and our regular Hard-n-tyte Surface Hardener are employed to protect concrete wearing surfaces against the disintegrating action of oils, weak acids and alkali.

Various protective coatings and damp-proofings are also furnished for special conditions.

Guarantee

When Hard-n-tyte treatments are applied under the supervision of Hard-n-tyte distributors, results are guaranteed.

Typical Jobs

There are typical jobs in all sections of the country which demonstrate the successful results obtained from the use of various Hard-n-tyte Products. A few are illustrated herewith.

Information in regard to the uses of Hard-n-tyte materials will be supplied gladly and the opportunity to co-operate with architects and builders welcomed.



E. J. Brach & Sons' Factory, Chicago, Ill.

A. S. ALSCHULER, Architect

Floors preserved with Hard-n-tyte Acidproofing Treatment



Toledo Art Museum, Toledo, Ohio

EDWARD B. GREEN, Architect

All concrete floors treated with Hard-n-tyte Decorative Coating

THE MASTER BUILDERS COMPANY

Specialists in Masterbuilt Concrete Floors

CLEVELAND, OHIO

SALES OFFICES

NEW YORK, N. Y.
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MILWAUKEE, WIS.
BUFFALO, N. Y.

LOS ANGELES, CAL.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.

Products

MASTER BUILDERS METALLIC CONCRETE HARDNER, dry mix integral hardener, water-proofer and dustproofer in standard gray and seven other colors, for use in either topping type method or Master Builders Monolithic Method.

MASTER MIX, liquid integral concrete hardener, waterproofer and dustproofer, colorless—functions completely at all low temperatures down to 15° F.

COLORMIX, integral concrete waterproofer and hardener, paste form, in nine basic colors.

"STAINPROOF", jellylike coating applied 36 hours after troweling, which dries to a tough impenetrable film, to protect surfaces of new floors and promote proper curing. Removed after curing period.

COLORWAX, for finishing Colormix floors.

DYCROME, colored "after treatment" hardener and dustproofer, in several unusual colors and tints.

DYCROME WAX, special wax for finishing Dycrome processed floors.

DYCROME STAINLESS OIL, special oil for finishing Dycrome floors exposed to weather or staining.

SANISEAL, colorless "after treatment" hardener and dustproofer.

MASTER BUILDERS WATERPROOFINGS, including:

Integral: Liquid (Concentrated); Powder; Paste; and Master Mix (for cold weather waterproofing).

Surface: Masterseal, colorless surface waterproofing; Mastertex, colored surface waterproofing in 10 colors; Metallic, to resist pressure.

MASTER BUILDERS DAMPPROOFINGS, including: Plaster Bond, an interior dampproofing; Foundation Coating, for exterior of masonry below grade.

Also manufacturers of Colorseal; Concrete Floor Enamel; Kilfreez, concrete freezeproofing; Speedit, concrete accelerator, and Master Builders Exterior Concrete Coating.

Description and Advantages of Masterbuilt Floors

In 1911 THE MASTER BUILDERS COMPANY instituted the principle of hardening concrete and produced the first concrete hardener. Since that time THE MASTER BUILDERS COMPANY has been supplying hardeners for concrete floors in practically every type of building—to serve under every sort of industrial or commercial process, to resist the wear of every kind of traffic or use.

Masterbuilt Floors are constructed according to definite, standardized principles, employing Master Builders Hardners of three general types:

Type 1—Metallic finish for new floors, using Master Builders Metallic Hardner, a water-absorbent, pure metallic granular element which is troweled into the surface of the new floor as it takes its set, producing a



Masterbuilt Floors
HARDENED CONCRETE

surface half iron, half cement. This type hardener is made in dark gray, red, buff, green, blue, brown, battleship gray and black.

Type 2—Integral method for new floors, using Master Mix, a liquid chemical which, added to the gauging water, is introduced into the mortar when it is being mixed, and that in one operation produces three qualities; increased resistance to abrasion, a non-dusting, and a waterproof floor. An adaptation of Type 2 is Colormix, the integral hardener, and waterproofer for producing concrete floors in various colors.

Type 3—Surface hardener (after treatment) for floors already installed, using Saniseal, a powerful chemical combination which is washed over the set surface of a finished floor. By the ensuing chemical reaction the surface is made dustproof and wear-resisting. A development of Type 3 is Dycrome, a colored liquid hardener which, applied to the surfaces of plain cement floors, both hardens and colors them through chemical reaction.

It is the policy of THE MASTER BUILDERS COMPANY to supply all three types or methods, basing their recommendation in each instance on the knowledge of what each type of hardener will do under the kinds of traffic under consideration. The soundness of this policy is evidenced by the general tendency of architects, engineers and builders today to provide the specific hardener or type of hardened floor required by the usage the floor will get. See table on next page.

Masterbuilt Floors, constructed by the integral topping method or the integral monolithic method, possess hard wearing, permanent, non-absorbent surfaces of maximum density to withstand conditions of extraordinary wear and tear.

THE MASTER BUILDERS COMPANY does not recommend that the surface or "after treatment" method be specified for new floor construction where it is possible or practicable to use integral hardeners.

Master Builders Metallic Concrete Hardner

This perfectly graded metallic aggregate is especially manufactured for mixture with the sand and cement used in production of concrete floors. As it replaces its own volume of brittle sand, it imparts to the aggregate its own metallic qualities: ductility, toughness, strength, permanence. Master Builders Metallic Concrete Hardner consists of water-absorbent, scientifically graded, rough, jagged particles that lock securely in the mixture. It is absolutely free of impurities and exactly uniform in every respect at all times.

Master Builders Metallic Concrete Hardner gives concrete a ductility, or elasticity which plain concrete does not have. This characteristic gives the Masterbuilt Floor a "give and take" that greatly lengthens its life under even the most severe service.

TABLE OF RECOMMENDATIONS FOR MASTER BUILDERS CONCRETE FLOOR HARDNERS

Showing which types of Masterbuilt hardened concrete floors should be provided to serve various kinds of traffic or use. These recommendations based on 15 years' experience with all types of hardeners on floors in practically all kinds of buildings.

These are general recommendations, subject to revision under special conditions, and are to be considered as final only after confirmation by our representatives who have investigated the job.

Explanatory Key to table:

1. Metallic hardened floor—topping type.
2. Metallic hardened floor—monolithic.
3. Master Mix hardened floor.
4. Colormix or Dycrome hardened floor.
6. Saniseal hardened floor.

3 and 6. Use Master Mix integrally, followed by Saniseal surface treatment.

Various Kinds of Buildings and Industries Having Particular Floor Needs	The Various Floor Areas Common to Practically all Types of Buildings	All General Areas	Boiler Rooms	Basements (ordinary)	Cafeterias or Lunch Rooms	Driveways & Sidewalks	Locker Rooms	Lobbies & Corridors	Machine Shops Carpenter Shops	Office Quarters	Paint Shops	Porches & Terraces	Rest Rooms	Exposed Floors on Roofs	Shipping Rooms & Platforms	Stairways & Landings	Storage Rooms	Trucking Aisles Ramps	Wash Rooms & Toilets
Abattoirs & Packing Houses	3&6	1	3	4	3	4	4	4	1	4	3&6	—	4	3	1	3&6	3&6	1	3&6
Acid Plants (making or using)	3&6	1	3	—	3	4	4	4	1	4	3&6	—	4	3	1	3&6	3&6	3&6	3&6
Apartments	4	1	3	4	3	4	4	—	4	—	4	4	4	1	4	3or4	—	4	4
Bakeries	1	1	3	4	3	4	4	—	4	—	—	4	3	1	4	3	1	4	4
Beverage & Bottling Plants	3	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Canning Factories	3&6	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Confectionary Mfg.	3&6	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Chemicals Manufacturing	3&6	1	3	4	3	4	3	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Churches	4	1	4	4	3	4	4	—	4	—	4	4	4	—	4	3	—	4	4
Cleaning & Dyeing	3&6	1	3	4	3	4	4	1	4	—	—	4	3	1	3&6	3	1	4	4
Clothing Manufacturers	1or3	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Clubs & Hotels	4	1	3	4	3	4	4	—	4	—	4	4	4	1	4	3	—	4	4
Docks & Wharves	1	1	—	—	1	1	1	1	4	—	—	3	3	1	3&6	1	1	1	1
Drug Manufacturers	1	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Enameling Plants	3&6	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Filtration Plants	1	1	3	4	3	4	3	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Fire Stations	3or4	1	3	4	3	4	4	1	4	—	4	—	3	—	4	3	—	4	4
Forges & Foundries	1	1	—	4	3	1	1	1	4	—	—	1	3	1	3&6	1	1	1	1
Fruit & Veg.—handling & storage	3&6	1	3	4	3	4	4	—	4	—	—	4	3	1	3&6	3	1	3&6	3&6
Galvanizing Works	1	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Garages	3	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	3	3&6	3&6
Gas Mfg. Plants	1	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
GENERAL MANUFACTURING	1	1	2	4	3	4	4	1	4	3&6	4	4	3	1	3&6	1or3	1	4	4
Glass Factories	1	1	2	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	3&6	3&6
Grain Elevators	1	1	3	4	3	4	3	1	4	—	—	4	3	1	3&6	3	1	3&6	3&6
Hospitals	4	1	4	4	3	4	4	—	4	—	4	4	4	1	4	3	1	4	4
Incinerating Plants	3&6	1	3	4	3	4	4	1	4	3	—	4	3	1	3&6	3	1	3&6	3&6
Laundries	3&6	1	3	4	3	4	4	1	4	—	—	4	3	1	3&6	3	1	3&6	3&6
Leather & Shoes	3	1	3	4	3	4	4	1	4	3	—	4	3	1	3&6	3	1	3&6	3&6
Loft Buildings	3or6	1	3	4	3	4	4	1	4	—	—	4	3	1	4	3or6	1	4	4
Milk & Milk Products	3&6	1	3	4	3	4	4	1	4	—	—	4	3	3&6	3&6	3&6	3&6	3&6	3&6
Mill Supplies & Hardware Stores	1	1	2	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	4	4
Office Bldgs. Banks	3or4	1	3	4	3	4	4	1	3or4	3&6	4	4	3or4	1	4	3	—	4	4
Paper Mills	1	1	2	4	3	4	1	1	4	3	—	4	3	1	3&6	1	1	4	4
Power Plants	4	1	3	4	3	4	4	1	4	3&6	—	4	3or4	1	3or4	3	1	4	4
Public Buildings	4	1	3	4	3	4	4	1	4	3&6	4	4	3or4	1	3or4	3	1	4	4
Pumping Stations	4	1	3	4	3	4	4	1	4	3&6	4	4	3	1	3or4	3	1	4	4
R. R. Stations—Freight	1	1	2	4	2	1	1	—	4	3&6	—	4	3	1	3&6	1	1	4	4
R. R. Stations—Passenger	3or4	1	3	4	3	4	4	—	4	3&6	4	4	3	1	4	3	1	4	4
Refineries	3	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	4	4
Rubber Plants	1	1	2	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	4	4
Schools	4	1	3	4	3	4	4	1	4	3&6	4	4	3	1	4	3	1	4	4
Spinning Mills	1	1	2	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	4	4
Stables	3&6	1	3	4	3	4	4	—	4	3&6	—	4	3	1	3&6	3	1	4	4
Steel Mills	1	1	2	4	2	1	1	1	4	3&6	—	1	3	1	3&6	1	1	1	1
Stores & Shops	4	1	3	4	3	4	4	—	4	3&6	4	4	3	1	4	3	1	4	4
Sugar Refineries	3&6	1	3	4	3	4	4	1	4	3&6	—	4	3	1	3&6	3	1	4	4
Theatres	4	1	3	4	3	4	4	—	4	3&6	4	4	3	1	4	3	1	4	4
Warehouses	1	1	2	4	3	4	1	1	4	3&6	—	4	3	1	3&6	1	1	4	4
Wholesale Groceries	1	1	2	4	3	4	4	—	4	3&6	—	4	3	1	3&6	1	1	4	4

Compressive Strength Tests—How the introduction of metallic hardener greatly increases the strength of the floor is demonstrated by tests made by the Robert W. Hunt Company's Pittsburgh Testing Laboratories.

SUMMARY OF RESULTS OF COMPRESSIVE STRENGTH TESTS

Age of concrete	Plain concrete*	Metallic hardened concrete*	Percentage of increase
3 days	3274	6927	111%
7 days	3626	8695	139%
28 days	6129	13245	116%
90 days	6583	14302	117%

*Pounds per square inch.

Master Builders Metallic Concrete Hardner is especially recommended for heavy duty floors; boiler rooms, trucking aisles, shipping platforms, loading docks and elevator approaches in all buildings; and for all floors in such structures as warehouses, railroad stations, forge shops, foundries, machine shops and industrial buildings generally.

Specifications for Master Builders Metallic Concrete Hardner

Topping Type Method of Floor Finishing

Preparation of Topping—Wherever practicable, topping to be laid before base is set. Topping (not less than full $\frac{3}{4}$ -in. thickness) shall consist of following proportions by volume: 1 part tested portland cement to 2 parts coarse, gritty, clean sand. Or, for rock or grit, specify as follows: 1 part tested portland cement; 1 part crushed rock or grit (not exceeding $\frac{3}{8}$ in. size) free of dust; 1 part clean, coarse, gritty sand.

Mixing—Sand and cement shall be thoroughly mixed dry until uniform in color, showing no streaks or patches of the constituents. If mixed by hand the mass shall be turned over dry at least three times. Sufficient water to saturate the mixture shall be added and the mix turned over once again. Special care shall be taken to avoid a sloppy consistency.

Application of Topping—The topping shall be laid and straightedged to a true and even surface, well floated to close all voids and hollows.

Application of Metallic Hardner—After the surface has been floated, but before steel troweling, a dry mixture of 1 part of Master Builders Metallic Concrete Hardner, to 1 part tested portland cement (by weight), mixed to an even color, shall be sprinkled evenly over the surface, using a sieve to get uniform distribution. Not less than 30 lbs. of Master Builders Metallic Concrete Hardner and 30 lbs. of tested portland cement shall be distributed in this manner over each 100 sq. ft. of surface. This shall be floated in thoroughly and troweled; a second steel troweling shall be given the surface when it has set sufficiently to finish hard and smooth. Under no circumstances shall the mixture of hardener and cement be applied when there is any surplus water on the floated surface.

Expansion Joints—Are recommended at regular intervals in all topping floors. Joints to be cut through the full thickness of the topping with narrow tool and edges to be hard finished.

Safeguarding the Floor—The green floor surface shall not be wet until it is 48 hours old. After the surface has set up 48 hours, the contractor shall cover it with a uniform layer of soft-wood sawdust, shavings or other suitable covering. This covering must not be applied until experiment shows sur-

face hard enough to prevent the covering from scratching or injuring the finish. Surface shall then be kept wet for not less than 5 days. Floors, when prepared as above, will be ready for light traffic in about a week, and for heavy traffic in about 3 weeks under favorable weather conditions.

Exceptions—The use of 30 lbs. of Master Builders Metallic Concrete Hardner to every 100 sq. ft. of surface provides a wearproof finish sufficient to withstand any normal usage.

For floors of factories, garages, loading platforms, etc., specify 35 lbs. of Master Builders Metallic Concrete Hardner to every 100 sq. ft.

For floors of railway repair shops, forge shops, piers, etc. specify 40 lbs. of Hardner per 100 sq. ft.

Master Builders Monolithic Method

The term "monolithic" is interpreted in various ways—and these various interpretations produce various results. Master Builders Monolithic Method is the proven method, by which the floor slab is poured, straightedged, finished and troweled in one operation.

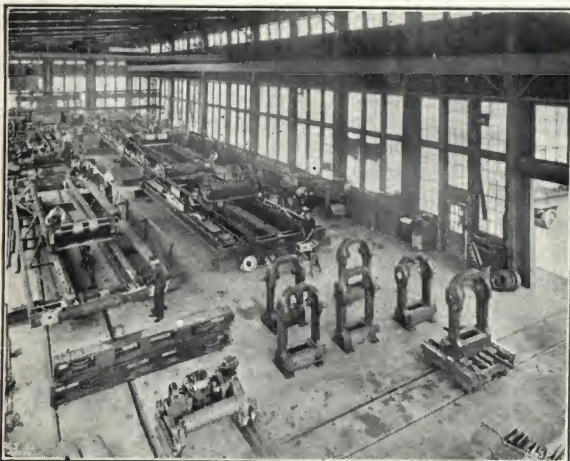
Master Builders Monolithic Method should be definitely specified to secure a Masterbuilt Floor with the following definite results: (a) base and topping are one, with no danger of loose bond, cracking or breaking under service; (b) time, labor and material for extra topping saved; (c) dead weight of topping and necessity for expansion joints eliminated; (d) surface hardened with Master Builders Metallic Hardner resulting in the same great increase in wearing strength as in the topping type method.

Mixing and Placing Slab—The slab shall consist of a mixture of: 1 part tested portland cement, 2 parts coarse, gritty, clean sand, and 4 parts crushed rock (or 1: 2½: 5, when gravel is used). All aggregate to pass 1-in. screen. These materials must be thoroughly mixed; then deposited between screeds to the finished floor level (on heavy slab, exceeding 6 in. in thickness, $\frac{1}{8}$ in. allowance must be made for shrinkage). Thoroughly tamp and screed with straightedge, taking special care to leave no hollows, pits or pockets on the surface.

First Application Metallic Hardner—Shall immediately follow leveling off of concrete slab. A dry mixture containing 1 bag 100 lb. Master Builders Metallic Concrete Hardner, 2 bags standard portland cement, and 3 bags clean, coarse sand shall be thoroughly (dry) mixed and then distributed evenly (using a sieve) over approximately each 1000 sq. ft. of surface. This preliminary finish will immediately become saturated with the surplus water remaining on the surface; it must then be thoroughly floated into the concrete with heavy wooden floats.

Final Application Metallic Hardner—Immediately following the floating in of the preliminary finish, a dry mixture consisting of 1 bag (100 lb.) Master Builders Metallic Concrete Hardner and 1 bag (100 lb.) of standard portland cement, thoroughly mixed to a uniform color, shall be evenly distributed (using a sieve) over each 500 sq. ft. of the floated surface. This final finish must be floated in with wooden floats and immediately steel troweled, with a second steel troweling after surplus water has disappeared. Finished surface must be free from depressions or defects of any kind, presenting a smooth and even texture.

Curing and Protecting Floor—Sawdust or curing sand without grit shall be evenly distributed over the surface to a depth of not less than 2 in., as soon as the concrete has sufficiently hardened. This covering shall be kept moist for not less than 8 days. Contractor to provide sufficient canvas or other covering and heat, before work starts, to protect surface from damage in event of rain, frost, etc.



Left
Typical Metallic Hardened Floor Under Heavy Foundry Service at Chesapeake Iron Works, Baltimore, Md.

Right
Typical Mastermix Hardened Floor in Trapp Dairy Co. Plant at Milwaukee, Wis., Showing Resistance to Lactic Acid and Constant Traffic



Master Mix

Master Builders Master Mix is a colorless liquid chemical admixture which is added to the gauging water to permanently increase the strength of concrete floors throughout the entire wearing course or topping.

The important characteristics of Master Mix are that it improves the workability and increases the density of mortar, introduces a hardening element and a waterproofing element, functioning regardless of temperature down to 15°. Specially recommended for winter construction of floors, brickwork and masonry.

Master Mix accelerates the final set of cement from 2 to 4 hours; increases the tensile strength 71% in the first 24 hours and from 10 to 20% permanently; increases the ultimate compressive strength from 10 to 13%. Master Mix has been in use for over ten years to produce Masterbuilt Floors that are wear-resisting, non-absorbent, dustproof and acid-resisting.

Compressive Strength Tests—How the introduction of Master Mix greatly increases the strength of the floor is demonstrated by tests made by the Robert W. Hunt Company's Pittsburgh Testing Laboratories.

SUMMARY OF RESULTS OF COMPRESSIVE STRENGTH TESTS

Age of concrete	*Plain concrete	*Master Mix concrete	Percentage of increase
3 days	2950	4051	37.3
7 days	3670	4066	10
28 days	4261	4806	12.7
90 days	6265	7046	12.6

*Pounds per square inch.

Master Mix Specifications

For Hardening Concrete Floors—1-in. topping shall be installed, proportioned 1 part fresh, tested, portland cement and 2 parts clean, coarse, sharp sand. Mix thoroughly, dry. Add Master Mix to gauging water, gradually, in proportion of 1 qt. Master Mix for every bag of cement used. Pour float and trowel cement in usual manner. A second troweling shall be given when surface is sufficiently set to produce a hard smooth finish. Protect surface from injury with not less than 2 in. soft wood sawdust or curing sand, and keep it wet until surface is hard.

See second page following for specifications covering use of Master Mix for waterproofing mass concrete and brick mortar.

Colormix

Colormix is an integral colored hardener for producing wearproof, dustproof, waterproof concrete floors in permanent colors, for use where decorative, hard type floors are desired and where money limitations prohibit the use of expensive materials such as tile, terrazzo, etc. Dissolved in the gauging water, Colormix dyes every particle of sand and cement in the entire topping a deep, uniform, permanent color.

Whereas ordinary coloring agents seriously weaken concrete, Colormix contains hardening elements which maintain the full tensile and compressive strength.

Colormix is made in the following colors: Tile Red, Linoleum Brown, Nile Green, White, Buff, French Gray, Black, Battleship Gray and Blue.

Uniformity, purity and permanence characterize Colormix, the color permanence of which has been tested and reported satisfactory by the Portland Cement Association.

Stainproof, used to protect the fresh surface from staining and marring and promote proper curing, insuring perfect finished results, is a new and invaluable feature available only with Colormix.

Specifications for Use of Colormix

Colormix Top Finish—A top finish of not less than 1½-in.

Master Mix
CONTROLS CONCRETE



Typical Gray Colormix Floors in John Wanamaker's New York Store Help to Attract Crowds of Shoppers and Withstand the Heavy Traffic

thickness shall be used on a set slab and not less than ¾-in. thickness shall be used on a green slab, topping to be composed of 1 part cement to 2 parts clean sharp sand.

Colormix can be used in the entire thickness of the top finish, but from the standpoint of cost, it is advisable to run the top finish in two layers, using Colormix in the top layer only. If two layers are run, it is simply necessary to scratch a layer of ordinary 1:2 top finish over the slab, leaving it ¾ in. below finished surface line. This must be followed immediately by the Colormix top finish.

To Mix Colormix Top Finish—If mixed by machine, first place a small quantity of water in the mixer and then throw in a shovelful or two of sand; then add the right proportion of Colormix as specified below. The above should be agitated by the mixer 10 to 20 revolutions, which dissolves the Colormix. Then add the balance of the batch into the mixer. Allow this total mix to be thoroughly mixed so as to assure a uniform and even color. Care should be taken that mortar is not mixed too sloppy.

If mixed in mortar box by hand, proceed as follows: procure a 1-gal. open top paint pail and a small spring scale. Dissolve the proper amount of Colormix for each batch in the pail first. Use this solution as the gauging water to hydrate the 1:2 sand and cement mixture in the mortar box. If additional water is required to get proper mortar consistency, add slowly and sparingly, making sure that a perfect and complete mix is secured.

Proportions of Colormix to Be Used—As each color of Colormix weighs differently per unit of volume, one color must not be confused with any other color. Colormix must be proportioned exactly to each bag of cement per the following schedule:

Color	Per bag cement	Color	Per bag cement
Tile Red	Use 12 lb.	White	Use 14 lb.
Linoleum Brown	Use 12 lb.	French Gray	Use 10 lb.
Battleship Gray	Use 5 lb.	Black	Use 10 lb.
Nile Green	Use 17 lb.	Blue	Use 17 lb.
Buff	Use 17 lb.		

Laying the Top Finish—Apply the Colormix Top Finish to the floor and straightedge, float and trowel in the usual manner. Hard trowel the surface a second time, when it begins to set hard, to a glossy smoothness.

Expansion Joints—Shall be cut through the full thickness of the topping, at intervals of not exceeding 6 ft.

Protecting the Finished Surface—Master Builders Stainproof, a specially prepared compound for protecting new floors, shall be applied to the surface wherever possible, 24 hours after final troweling is completed, without the previous use of water for curing the concrete surface.

However, where the absorbent nature of the base or fill causes quick drying out of the topping, the surface shall be kept wet with clear water for 3 days. On the fourth day, when surface moisture has disappeared, a heavy paintlike film of Stainproof shall be applied direct from the container over the entire surface.

This stainproof film shall be left to dry for 36 hours and shall not be removed until just before the floor is to be turned over for use.

Removing Stainproof Film—After the plastering, painting, labor, and other trades have finished and are out of the building, and just before the floors are to be made available for use, the Stainproof film shall be removed. *First*—cover a limited portion of surface with water (hot preferred) and let stand for 15 minutes. *Second*—remove by brushing or scraping any area of film spotted with plaster or paint droppings. *Third*—with brushes or squeegees remove balance of film on area moistened.

Proceed with a second limited area in same manner. When all debris is removed, the surface shall be mopped thoroughly with clear water, allowed to dry, and then polished, preferably with machine polisher.

Color Waxing the Floor—After the Stainproof film has been removed and the floor is again dry, the surface shall be given an application of Master Builders Colorwax of the same color as the floor.

Note to Architect: Include this paragraph in specifications where high gloss finish is desired.

Master Builders Dycrome

Dycrome is a chemical compound which, applied to concrete surfaces, produces by chemical reaction with the cement a variety of permanent, attractive tints and colors. At the same time, Dycrome hardens and renders the surface wear-resisting and dustproof. Unusual color results are obtained as the degree of chemical reaction between Dycrome and cement varies on different parts of the floor, giving a cloudlike effect that lends interest and distinctive character to the floor.

The colors include Flemish Oak, Weathered Bronze, Cordovan, Palmetto Green, Jade, and Nile Green, and various combinations of these colors in duo-tone effects.

Merits and Advantages—Dycrome can be applied to any unmarred plain cement floor that is clean, free from oils, greases and other foreign substances. This treatment is recommended for surfaces that were left as "plain cement" in the original specification, but which are later found to require a decorative finish. This is of material advantage to those erecting buildings to be occupied by tenants with varying requirements which cannot be incorporated in the original specifications, but must be provided before the tenants move in.

Complete Application Service—The Dycrome treatment may be applied by any capable contractor or workman, or on important jobs is made by or under the direction of Master Builders Service, Inc., a corps of experts specializing in Dycrome applications.

Specifications for Floors to Be Treated with Dycrome

All cement floor toppings to be treated with Dycrome shall be of proportions 1 part standard portland cement and 2 parts clean, sharp sand. Before the cement is added there shall be mixed thoroughly into the sand 2 lb. of hydrated lime for every bag of cement used. Cement shall then be added and mixed dry, then tempered with just sufficient clear water to make a workable mortar. No integral or surface hardeners or water-proofer, other than Dycrome, shall be used.

All surfaces shall be given 2 hard steel trowelings and shall be left uniformly smooth and free from trowel marks. Joints shall be cut throughout the full thickness of the topping, where and as indicated on plans, and shall be kept clean and unmarred by troweling. All special jointing or marking as indicated on plans shall be exactly followed. Under no circumstances shall retempering of surface be done by sprinkling water, nor shall any cement be dusted on surface.

Curing of Cement Surface—All cement floors to be treated with Dycrome shall be cured by spraying once or twice a day with water for 4 days. If this is not possible, floors shall be covered 48 hours after final troweling with 2-in. layer of clean sand which shall be kept thoroughly wet for a period of a week. No building paper, sawdust, earth or shavings shall be used to cover floor.



Protection of Cement Floor During Curing Period—Traffic shall be kept off floors for a period of not less than 4 days, and no heavy traffic shall be permitted until the Dycrome Process is fully completed. Drop cloths shall be used to protect surface from staining by paint, putty, oils, solder paste, marking by wire insulation, or any other damage that may result from other crafts working over the floors.

These floors to be treated with Dycrome shall be turned over to MASTER BUILDERS SERVICE, INC., or the Dycrome contractor, free from paint, grease, oil, scratches, mars, stains or other disfigurements which will in any way interfere with the Dycrome Processing or injure the final results.

The general contractor shall arrange to keep these areas free from interruption or trespassing during the application of the Dycrome treatment, and any surfaces that are injured by other crafts either before or after treatment shall be replaced or reconditioned at the expense of the craft responsible for the damage.

Special Finishes—Dycrome Wax—Interior areas are finished with Dycrome Wax, a special wax manufactured by THE MASTER BUILDERS COMPANY, to emphasize the color values of Dycrome Floors and give the floors a smooth, soft feel under foot like that of linoleum.

Dycrome Stainless Oil—Exterior areas or floors subject to moisture or staining are finished with Dycrome Stainless Oil, which will not stain nor turn white when wet, an exclusive advantage with Dycrome treatments.



Weathered Bronze and Cordovan Dycrome Floor, in the Studio of F. R. Walker of the Firm of Walker & Weeks, Architects, Cleveland, Ohio

Master Builders Saniseal

Saniseal is a corrective for concrete floors which have started to dust, crumble and disintegrate. Also a preventive of these conditions on new floors.

It is a liquid chemical preparation which combines with the lime in the cement, forming a new crystal that is exceedingly hard and wear-resisting. It changes the soft, porous surface to a flintlike hardness.

Saniseal is easy to use. No complicated dilutions or applications are necessary. Except where a floor is particularly porous, 1 gal. of Saniseal will cover approximately 100 sq. ft.

It does the work overnight in most cases, thus preventing delays.

Supplementary Literature and Samples

All products described in greater detail, in either concise data manuals suited for the architect, or more descriptive catalogues for the layman, all 8½x11 in., indexed and tabbed for A. I. A. filing. These booklets, as well as specimen blocks of concrete treated by each Master Builders Method and mounted on file-size boards, are sent without charge upon request.

SANISEAL

Master Builders Waterproofings and Dampproofings

Master Builders Waterproofing Liquid (Concentrated)—Added to the gauging water. Waterproofs by depositing insoluble, water-repellent coating. Increases colloid formation. Requires less water to complete hydration. Produces high initial strength.

Because its use is so simple and easy—the workmen merely adding it to the gauging water, which carries it to every part of the mix—complete, efficient results are insured. No extra labor needed for weighing out, dissolving or mixing; hence, nothing can be neglected to the detriment of the job.

Specifications—Master Builders Waterproofing Liquid, Concentrated, shall be added to the gauging water in the proportions of $\frac{2}{3}$ qt. of Waterproofing Liquid to each bag of cement in the mixture to be gauged. This requires 1 gal. per cu. yd. for 1:2:4 concrete.

Concrete shall be poured as dry as consistent with good practice, shall be placed in one continuous operation, and shall be thoroughly spaded to procure uniform density.

Special care shall be taken to clean and roughen the surfaces of previous pourings that have been set before placing additional concrete.

Master Builders Waterproofing Powder—An insoluble, water-repellent powder which coats cement particles, preventing seepage. Permanent insolubility insures permanent watertightness. Prevents the early evaporation of moisture, thereby increasing the colloid formation.

Specifications—Master Builders Waterproofing Powder shall be mixed dry with the portland cement in the proportions of 8 lb. of Waterproofing Powder to each barrel of cement 400 lb. used. This mixture shall be thoroughly stirred so that a complete and uniform mixture is assured.

This mixture of Waterproofing Powder and cement shall then be added to the other aggregates. The whole volume shall then be thoroughly mixed until a uniform color and mixture is obtained, before adding the tempering water.

Master Builders Waterproofing Paste—A white, concentrated paste which is dissolved readily in the gauging water and is carried to every part of the mass. Produces a stable, water-insoluble, water-repellent crystal, which coats cement particles, nullifying the capillary action.

In complicated formwork it is sometimes considered necessary to use an excessive amount of water to obtain proper flowability of the mixture; with Master Builders Waterproofing Paste less gauging water is required to give complete hydration and proper flowability. Increases colloid development, colloid swells to fill the voids thus giving double protection against percolation of water.

Specifications for Waterproofing Mass Concrete—To 6 lb. or three qts. of Master Builders Waterproofing Paste add 1 gal. of water, and stir to a smooth mixture.

Use this mixture, together with sufficient clear water (about 33 gal. additional) to hydrate 1 barrel (400 lb.) of cement and its corresponding sand and stone, which shall be in the proportions of 1 part cement, 2 parts sand, 4 parts stone.

Special care shall be taken to clean and roughen the surface of previous pourings that have become set before placing additional concrete.

Specifications for Waterproofing Cement Mortar—To 6 lb. or 3 qt. of Waterproofing Paste add 1 gal. of water and stir to a smooth mixture.

Use this mixture, together with sufficient clear water (about 16 gal. additional) to hydrate 1 barrel of cement (400 lb.) and its corresponding sand, which shall be in the proportions of 1 part cement, and 2 parts sand.

Master Mix—A colorless liquid chemical admixture, a combination concrete hardener and waterproofer, which is added to the gauging water. Refer to page A99, for description and functions of this product.

Specially recommended for winter construction of brickwork and masonry, as it improves the workability and increases the density of cement mortar, hardening and waterproofing the joint, doing so uniformly regardless of temperature down to 15° F.

Specifications for Waterproofing Brick Masonry—Mortar in which bricks are laid shall be 1 part cement and 2 parts sand. Mortar shall be tempered with water to which has been added 1 gal. Master Mix to each 10 gal. of water. Carefully grout each course of brick, taking care that all joints are filled with mortar.

Specifications for Waterproofing Mass Concrete—Master Builders Master Mix shall be added to the gauging water for mass concrete in the proportions of 1½ gal. of Master Mix per cubic yard of concrete.

Surface Waterproofings

Masterseal—A specially prepared transparent colorless liquid for waterproofing the exposed surfaces of brick, stucco, stone or concrete walls, where it is necessary or desirable to retain the original appearance.

Masterseal is a permanent treatment that renders the surface, including the mortar joints, waterproof by introducing a highly water-repellent element into the surface pores. The penetration is greater than that of the usual surface treatment. The treatment prevents dirt, grime, soot, etc., from becoming embedded in the pores and, as a result, makes cleaning of the surface easy.

Masterseal is manufactured from a solid hydrocarbon base which is acidproof and alkaliproof and insures permanency.

Applied in two coats. Specifications on request.

Mastertex—A waterproof cement-base coating that both decorates and waterproofs concrete, brick, stucco, and other masonry surfaces. Colors are White, Brick Red, Blue, Light Green, Cream Ivory, Light Gray, French Gray, Dark Gray, Brown and Pink.

Applied with equal success on exterior or interior surfaces. It can be applied to wet surfaces, such as moist basement walls, fresh stucco, fresh reinforced concrete or surfaces of tanks, vats, pools, etc.

Mastertex takes a set like that of concrete, forming an insoluble, non-porous, crystalline coating which, unlike oil paints, is not affected by extreme weather conditions nor by any of the elements in the concrete. Does not dry out to a chalky, dusty coating; does not wash or rub off. An ideal white coating for common brick houses.

By excluding air and moisture from reinforced concrete both Mastertex and Masterseal prevent cracking or spalling due to the corrosion of reinforcing metal and overcome this common form of disintegration which is both difficult and expensive to repair.

Specifications—Master Builders Mastertex shall be applied in 2 coats to all surfaces as indicated, and shall be mixed and applied exactly in accordance with the manufacturers' directions.

Metallic Waterproofing—A perfectly graded uniform metallic powder used on outside or inside face of concrete or other masonry surfaces to make them impervious to water, even under pressure. Its use varies with the conditions to be remedied.

Specifications and Data—On request.

Dampproofings

Master Builders Plaster Bond—For application to the inside of exterior walls. Prevents dampness from passing through exterior walls into the atmosphere of the rooms and prevents staining and discoloration. Forms a perfect bond between surface and plaster coat.

Foundation Coating—For coating exterior walls below grade. Semipliable, yielding to expansion and contraction without breaking, checking or peeling.

Specifications for the Use of Plaster Bond and Foundation Coating—Master Builders Plaster Bond [Foundation Coating] shall be applied to all surfaces indicated, strictly in accordance with the manufacturers' directions.

THE WHITE COMPANY

Manufacturers of Floor Hardeners, Waterproofings and Technical Paints

GENERAL OFFICES

E. Biddle Street Extended
BALTIMORE, MD.

FACTORY, ORANGEVILLE, MD.

Products

WHYTEX, a Liquid Concrete Hardener for making concrete floors as hard as granite, eliminating dusting, sanding and wearing.

XLERATOR, a Liquid Chemical to hasten set of concrete, to prevent freezing of concrete, stucco and mortar at low temperatures.

HYDROLOX No. 267 DAMPPROOFING COMPOUND for foundations, walls and footings.

HYDROLOX No. 230 PLASTER BOND for dampproofing inner surfaces of exposed walls.

HYDROLOX No. 279 COLORLESS, a transparent liquid waterproofing.

HYDROLOX INTEGRAL PASTE for waterproofing mass concrete.

HYDROLOX POWDER.

WHYTOL, a Preservative for prolonging the life of wooden floors against dry rot, splintering and decay.

WHYTECOTE, a Mill White Coating made in gloss, flat and eggshell finishes for all surfaces.

Also Technical and Industrial Finishes for all purposes.

Service

For engineers, contractors and owners we maintain a staff of waterproofing engineers. They will be glad to co-operate with you, and furnish you with any information without obligation.

Whytex

For concrete floor hardening and dustproofing. A liquid chemical which penetrates deeply into the concrete floors, and through its chemical action, hardens, dustproofs and oilproofs floors. Concrete floors treated with Whytex resist wear and disintegration.

Covering Capacity—1 gal. of Whytex covers between 70 and 100 sq. ft., depending on texture of floors.

Whytex Specifications—All concrete floors to be hardened and dustproofed with Whytex as manufactured by THE WHITE COMPANY, Baltimore, Md., in accordance with directions of manufacturer.

Xlerator

For accelerating the set of concrete and to prevent the freezing of concrete and mortar. Xlerator is a colorless chemical which is added to gauging water. It gradually raises the temperature of water and secures a more complete crystallization, thus making a better and denser concrete. When added to floor topping, it produces a smooth, easy working mass, much denser than ordinary concrete. Valuable time can be saved in the setting of concrete by using Xlerator.



WHYTEX
TRADE MARK

XLERATOR
TRADE MARK

Hydrolox Dampproofing and Waterproofing Compounds

Hydrolox Integral Waterproofing is made in liquid, paste and powder forms, as follows:

Hydrolox Integral Paste—For waterproofing mass concrete in swimming pools, boiler pits, etc.

For mass concrete 1:2:4 or 1:2½:5, mix 1 gal. Hydrolox Paste to every 34 gal. water.

For cement floors, mortar or stucco 1:2 or 1:2½, mix 1 gal. Hydrolox Paste to 17 gal. water.

Hydrolox Powder—Especially adapted for cast stone, cement blocks and work where minimum water is required.

For all work mix dry 2 lb. powder with each bag cement or 8 lb. per barrel.

Hydrolox No. 267 Dampproofing Paint—For waterproofing and dampproofing, foundation work, footings, pits, etc. Apply cold with brush.

Covering capacity, 90 sq. ft. per gal.

Hydrolox No. 230 Plaster Bond—This product serves the purpose of plaster bonding and dampproofing the inner surface of outside vertical walls. Apply cold with brush.

Covering capacity, 90 sq. ft. per gal.

Hydrolox No. 279 Colorless—A transparent, pore-sealing liquid for waterproofing exposed brick, concrete or stucco walls without affecting or changing color. Eliminates moisture and dampness. Apply with brush or spray gun.

Covering capacity, 250 sq. ft. per gal.

HYDROLOX
TRADE MARK

Whytol

Whytol Wooden Floor Preservative prevents dry rot, splintering and decaying. Resists wear on new hard or soft wood floors, and prolongs the life of old floors. Gives an eggshell gloss finish and lasts for years. One coat is sufficient for new floors; 2 coats for old floors.

Covering capacity, 350 sq. ft. per gal.

WHYTOL
TRADE MARK

Whytecote

Whytecote Mill White Coating in gloss, flat or eggshell finish is especially adapted for industrial plants to withstand hard usage and give long service. Can be applied to any surface. Makes a nonporous film which can be washed with soap and water without any effect to the coating. Reflects all the light. Makes industrial plants more sanitary and efficient.

WHYTECOTE
TRADE MARK

Catalogue and Specifications

Literature covering complete uses, and specifications for T. W. C. Waterproofings and Paint Products will be furnished, without obligation, upon request.

BUILDING CHEMICALS CORPORATION

Manufacturers of BriXope

51 East 42nd Street
NEW YORK, N. Y.

BriXope

BriXope is a liquid that cleans, removes efflorescence and waterproofs brick surfaces *in one hanging of the scaffold*. It is a balanced formula containing no acid; is slightly alkaline. It is clean, colorless in appearance and effect, and leaves no impurities within or without the brick or mortar joint. Shipped in 55-gal. drums and 5-gal. cans.

Removing Efflorescence—BriXope removes the actively efflorescing salts on the surface of the masonry. BriXope forms an insoluble waterproof film on the *inside* of the surface of the brick, breaking the capillary force and preventing ingress of rain water to form further stain.

Cleansing—BriXope removes any ordinary stain occurring on the masonwork. The moisture remains in the brick for several days. It dries thoroughly, and the full tone of the texture of the masonry appears, clean and free of dirt.

Waterproofing—BriXope fills crevices that form at the mortar joints. If these are too small to point, the BriXope should be allowed to run into the crevices, and it will waterproof thin hairline cracks.

BriXope versus Acid Cleaning

In using acids for cleaning brick surfaces, the destructive action of the acid must be considered. It acts on the lime of the joint (making the surface more porous), and stains surrounding surfaces, such as limestone, marble, etc., and causes corrosion of copper flashing.

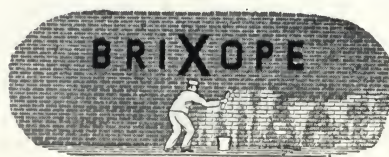
BriXope, on the contrary, is slightly alkaline and will not injure limestone, marble (and other building stone) or copper flashings. It has no destructive effect on building materials—in fact, it deposits a protecting film on the inside surface.

Application

With hammer and a dry fiber brush remove, without wetting, as much as possible of the salt stain, mortar lumps and other dirt.

Scrub the surface of the brick and the mortar joints with the ordinary scrubbing brush and BriXope, *going over each spot twice*, until the BriXope is absorbed and runs white into the joints. Soak well under parapets and sills, under projecting courses of brick, and in any other places where there are moisture pockets. Scrub well spots showing marked efflorescence or stain, and continue scrubbing until all discoloration disappears.

BriXope is best applied when the wall is dry and warm. The greatest absorption of material and the best results are then obtained. It is unnecessary to wash with water after application.



Covering Capacity; Cost

On hard-burned best grade brick, cast stone or best grade cement brick, 1 gal. of BriXope will average 125 sq. ft. of surface. Do not take out the openings. For common brick, textured face brick, etc.,

estimate 100 sq. ft. per gallon.

BriXope does not raise the cost of cleaning a wall 10%. It is easy to apply properly, enhances the beauty of the wall, and preserves the surface. The cost is about 1¢ per sq. ft.

Specifications

Clean down face brick and other masonry with BriXope as manufactured by BUILDING CHEMICALS CORPORATION, 51 East 42nd Street, New York, N. Y.

Scrub over and wet each spot at least twice in accordance with manufacturer's instructions.

Efflorescence

The chemical composition of common forms of efflorescence is usually calcium and magnesium sulphate, with potassium and sodium sulphate also often appearing. Of this group calcium sulphate (plaster of paris) is almost insoluble and is usually the discoloration that appears on the older buildings long after the more soluble salts have been weathered off by continuous rains. The salts commonly found in the bricks themselves are sodium and potassium chlorides.

Metallic pyrites, when present in the clay, separate under the heat into sulphur and metallic combinations. The sulphurous gases generated in the art of brickmaking form ferric and aluminum sulphates.

Nearly all portland cements contain sulphuric anhydride in quantity between 1% and 2%, by volume.

The liquid from the wet mortar (concentrated mixed salt solution) is absorbed largely into the dryer brick.

Alternate drying and wetting, heat and cold, bring the salts to the surface in order of their solubility.

Service and Guarantee



Cleaning a Brick Wall
The left side shows the finished surface

Where tests are to be made for efflorescence, the architect submits for our analysis a sample of the brick, cement, sand, lime and all other ingredients that go to make the wall surface; integral waterproofing or admixtures of any kind must be included. We require at least three weeks to test these samples for salts and sulphates. No guarantees are authorized unless samples are tested in our laboratories.

CONCRETE SURFACE CORPORATION

"Surfacing Concrete for Bond or Appearance"

342 Madison Avenue
NEW YORK, N. Y.

FACTORY AT CLEVELAND, OHIO
REPRESENTATIVES IN PRINCIPAL CITIES

What Con-Text Does

Con-Text makes possible the sure and economical removal of the surface layer of cement and sand and so gives to concrete a surface of cleanly exposed coarse aggregate for either appearance or bond.



What Con-Text Is

Con-Text is a quick-drying liquid applied either to forms or to the surface of fresh concrete. During the hardening of the concrete it keeps from setting the surface layer of sand and cement to a predetermined depth. This unset material is readily removed by wire brushing either when the forms are stripped or in the case of horizontal surfaces in from 24 to 36 hours after placing.

Con-Text neutralizes and renders non-setting a surface film of cement only. The action stops entirely at the predetermined depth and there is no partially unset material.

Con-Text has no action on concrete that has already hardened.

Types of Con-Text

There are three types of Con-Text and these have different strengths.

(1) **Standard or Form Con-Text**—Applied to wood, metal or other types of forms. This is manufactured in four grades—Light, Medium, Heavy and Bonding.

(2) **Top Surface Con-Text**—Applied directly to the surface of freshly placed concrete. This is also manufactured in four grades—Light, Medium, Heavy and Bonding.

(3) **Stucco Con-Text**—Applied to the surface of freshly troweled stucco to reveal the aggregate.

How Con-Text Is Used On the Job

Standard or Form Con-Text—This is applied with brushes in a single uniform coat to the forms. It dries quickly and need only be protected against severe weather conditions. On stripping the forms the unset material is readily removed by brushing.

Top Surface Con-Text—This material is applied directly to the surface of the concrete before it has taken its final set. In small areas it can be brushed on, and in larger operations applied with hand or power sprayers.

At from 24 to 36 hours the unset material is brushed off with brooms.

Stucco Con-Text—For revealing the aggregate in exposed aggregate stucco. Before the stucco has taken its final set the Con-Text is applied with brushes or sprays. At from 24 to 36 hours the unset material is removed by brushing.

Uses for Con-Text

Standard or Form Con-Text—(1) For exposing the aggregate for appearance on such work as complete

exteriors; bridges; spandrels; basement walls; belt courses; retaining walls; parapet walls; coping sills; lintels; fences; decorative walls; precast walls, etc.

(2) For bonding surfaces to secure a cleanly exposed stone surface for the application of stucco, plaster, tile, brick, cork or

other materials.

For the bonding of all types of applied waterproofing.

Top Surface Con-Text—(1) To expose the aggregate in pavements, sidewalks, roadways, etc., to improve the appearance and prevent slipping.

(2) For exposing the aggregate to provide permanent bond for cement, bituminous or other top coatings and new to old concrete.



Ceiling at Garden City High School Prepared for Plaster Bond with Con-Text

STARRETT & VAN VLECK, Architects
STATEN ISLAND CONSTRUCTION CO., Contractor

Specifications for the Use of Con-Text

All concrete surfaces indicated on the plans shall have the aggregate exposed for bond (or appearance) by the use of Con-Text as manufactured by the CONCRETE SURFACE CORPORATION, New York, N. Y. Form Con-Text of the proper grade shall be used on surfaces in contact with forms and Top Surface Con-Text of the proper grade for direct application to concrete surfaces.

At the proper time, the unset material shall be removed by brushing and the surface cleaned by flushing with water.

Con-Text shall be applied and used in strict accordance with the manufacturer's instructions.

THE CONCRETE SURFACING MACHINERY CO.

Pioneers in Concrete Surfacing Machines

4669-71 Spring Grove Avenue
CINCINNATI, OHIO

Products

BERG CONCRETE SURFACER AND FINISHER (Portable) Regular, Universal and Air Driven Models.

Also, Berg Electric Air Cushion Hammer (Portable).

Berg Heavy Duty Non-portable Concrete Surfer and Finisher.

Berg Concrete Highway Surfer.

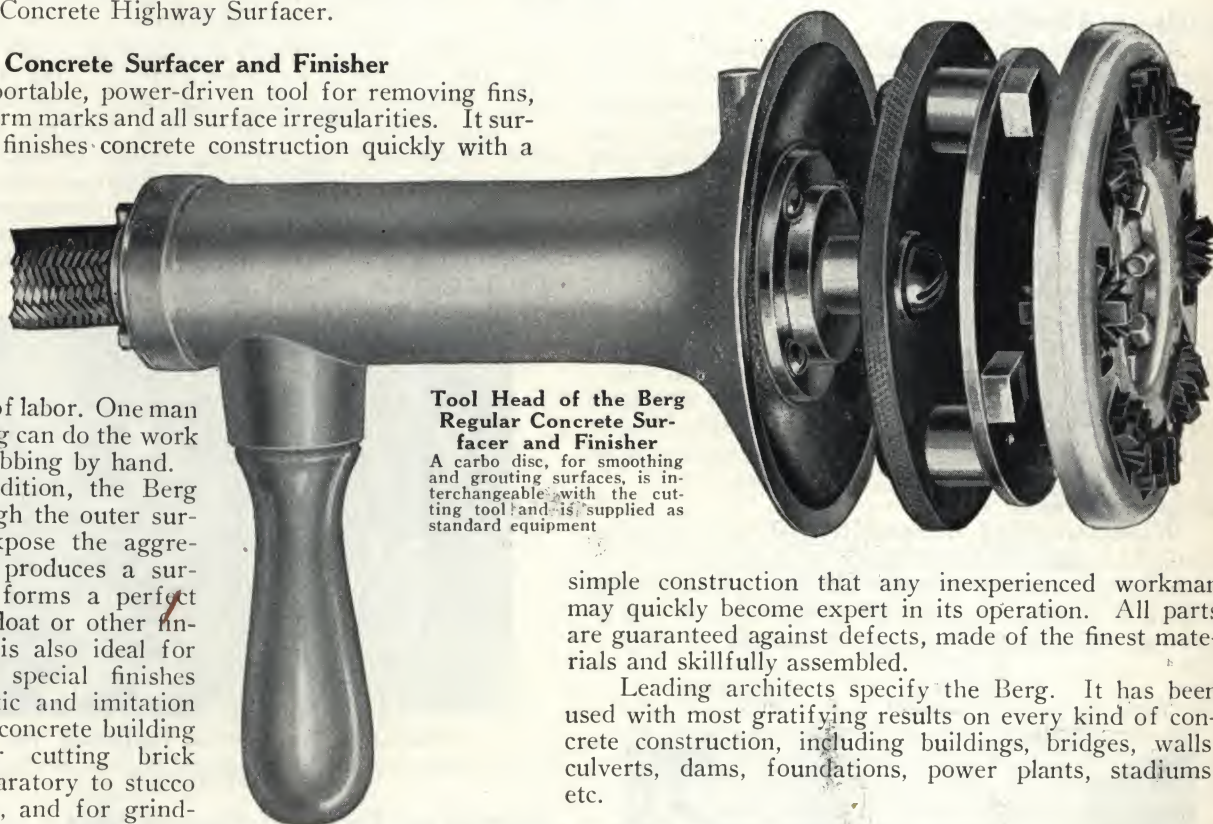
BERG CONCRETE SURFACER AND FINISHER

The cutting tool is a forged aluminum disc in which twenty-four crucible steel, specially hardened, toothed cutter wheels are mounted. These roll on the surface, dressing and finishing the concrete by a cutting action.

The machine is ball bearing throughout, and of such

The Berg Concrete Surfer and Finisher

Is a portable, power-driven tool for removing fins, board or form marks and all surface irregularities. It surfaces and finishes concrete construction quickly with a



**Tool Head of the Berg
Regular Concrete Sur-
facer and Finisher**

A carbide disc, for smoothing and grouting surfaces, is interchangeable with the cutting tool and is supplied as standard equipment

minimum of labor. One man with a Berg can do the work of four rubbing by hand.

In addition, the Berg cuts through the outer surface to expose the aggregate, and produces a surface that forms a perfect bond for float or other finishes. It is also ideal for producing special finishes on synthetic and imitation stone and concrete building block, for cutting brick walls preparatory to stucco application, and for grinding paint from bricks.

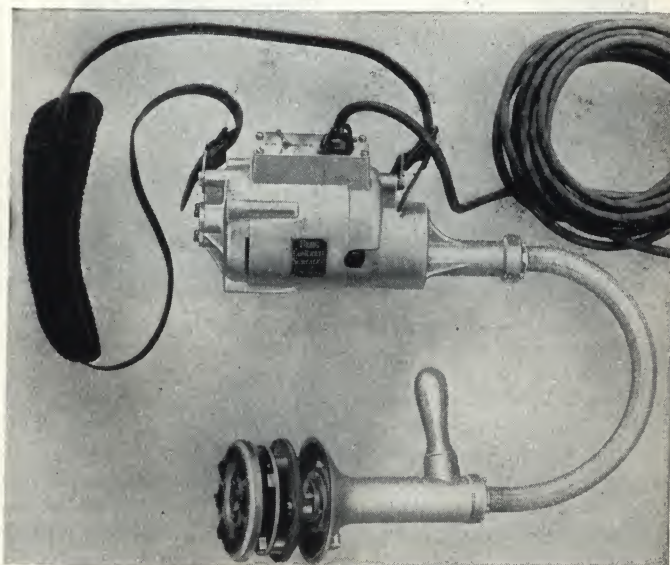
simple construction that any inexperienced workman may quickly become expert in its operation. All parts are guaranteed against defects, made of the finest materials and skillfully assembled.

Leading architects specify the Berg. It has been used with most gratifying results on every kind of concrete construction, including buildings, bridges, walls, culverts, dams, foundations, power plants, stadiums, etc.



Wilshire Boulevard Christian Church, Los Angeles, Cal.

A beautiful example of poured concrete construction. Entire structure surfaced by the Berg. An unusual and fine finish was produced without applying any other material



The Berg Regular Concrete Surfer and Finisher

Furnished for either 110 or 220 volts. $\frac{1}{4}$ hp., General Electric, Universal motor. Speed, 3200-3500 r.p.m. Total weight, 23 lb.

HUGH J. BAKER & COMPANY

Removable Wood Joist Forms, Reinforcing Materials and Accessories
INDIANAPOLIS, IND.

BRANCH OFFICES

ATLANTA, GA., 624-5 Candler Building
CINCINNATI, OHIO, Union Trust Building

DECATUR, ILL., Citizens Bank Building
CHICAGO, ILL., 53 W. Jackson Boulevard
FORT WAYNE, IND., First National Bank Building

DAYTON, OHIO, Dayton Savings & Trust Bldg.
EVANSVILLE, IND., 41 Kerth Avenue

Products

BAKER REMOVABLE WOOD JOIST FORMS.
Also Reinforcing Steel Bars; Spiral Column Reinforcement; Bar Spacers; Electric Welded Fabric; Metal Lath; Cold Rolled Channels.



Facilities and Service

An engineering organization, established in 1910, places seventeen years' experience in concrete design and forming at your disposal. A competent force of field engineers is backed by a large engineering department in our main office, to aid in solving your problems in design and forming.

Our bids include the complete forming (erection and removal) of the ribbed slab (concrete joist) construction, including slabs, joist sides, soffits, and shores, complete from beam to beam. The work handled by our men is indicated by the shaded portions of the details on the following page. If preferred, we also include column, beam, and miscellaneous forming in our bid.

A booklet with half-tones of a hundred structures of a wide range of types, erected with the aid of Baker Removable Wood Joist-Forms, will be sent upon request.

Special Features

Wide Range of Adaptability—Every condition, from light loads of hotels to heavy loads of special warehouse design, can be economically met—joist spacing, width and depth of joists, end conditions—all can be varied at will. These forms have been used in many:

Clubs	Garages	Factories
Hotels	Residences	Theaters
Apartments	Warehouses	Office buildings



Forming the Guaranty Building, Indianapolis, Ind.

Note the tonnage stored directly on our forms—possible only with a solid unyielding pan of wood

Solid Working Areas—The unyielding surface of these forms permits the trades to work without fear of crushing or displacing; shows a saving in the cost of placing steel, pouring concrete, attaching inserts, etc. Being of wood, this forming allows easy placing of outlet boxes, sleeves, etc., with the assurance that they will be found where they were placed when the forms are stripped.

Minimum Wastage of Concrete—The cost of leakage through most types of forming is considerable.

Not only the cement and labor cost, but also cost of pointing the resulting honeycombed joists, removing leakage from the floor below by chipping or scraping, etc., are items of real expense to the contractor. The design of our forms reduces the leakage to a minimum and practically eliminates honeycombing.

The Time Element—A specialized service organized for speed will work to your progress schedule. *We have yet to delay our first job.* We co-operate with and keep ahead of our customer's organization.

Low Cost—These advantages, together with patented features of our forming system, produce a lower cost than can probably be equalled by any other ribbed slab-forming materials, either of the permanent or removable type, where floors are reasonably typical. We do not show so large a percentage of saving where there is little duplication in the forming.



Hollywood Beach Hotel, Hollywood, Fla.

Interior showing excellent results obtained in decorated exposed concrete joists

Exposed and Decorated Concrete Joists

The joists are left exposed in buildings of many kinds, but always for one of two purposes—to save the cost of ceiling construction or for the architectural effect. In either case, clean lines and smooth surfaces are essential to good appearance.

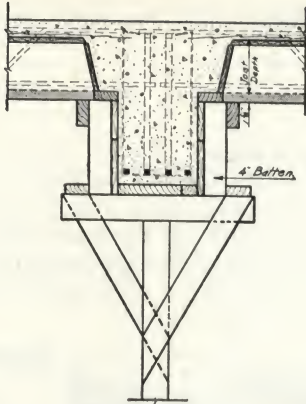
Wavy and irregular soffits or joist sides; projecting humps of concrete on the underside of joist or slabs; ridges, indicating where pans were lapped or butted; all such deformities are objectionable in factory or garage—they are positively impossible in hotels, theaters, apartments, and residences where the exposed joist is used for decorative effect.

Crooked joist lines are eliminated and smooth finished concrete soffits are easily available to the designer who uses Baker Removable Wood Joist Forms. One of our patents covers use of mouldings forming the poured concrete at angle of joist and underside of slab.

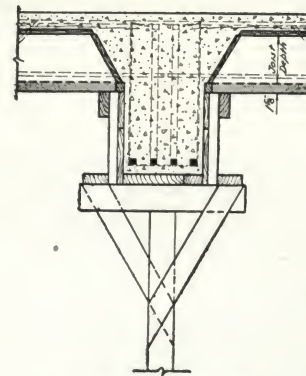
To Specify

The forms for the ribbed slabs shall be Baker Removable Wood Joist Forms. They shall be oiled with a light paraffin oil before being used. Before pouring concrete the forms shall be thoroughly wet down with water. Forms shall be so constructed that they can be removed without disturbing shoring.

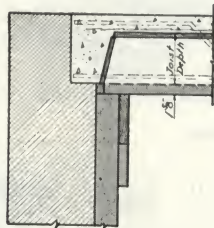
Note: For more detailed information, call at our nearest office. An engineer will respond promptly.



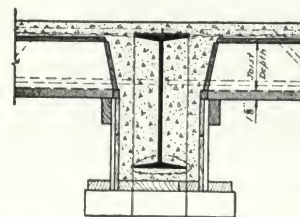
WIDE TEE HEAD



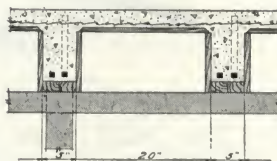
NARROW TEE HEAD



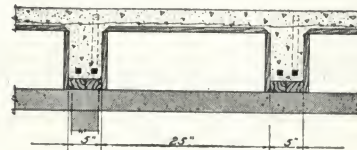
FORMING AT WALLS



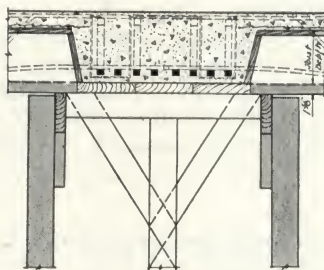
ENCASED STRUCTURAL STEEL



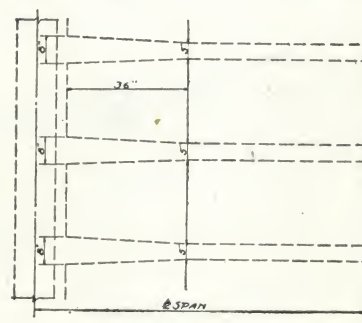
20' FORMS—JOISTS 25' ON CENTER



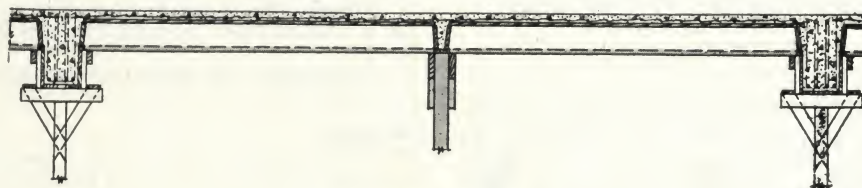
25' FORMS—JOISTS 30' ON CENTER.



FORMING FOR FLAT BEAMS



SPREAD END JOISTS



BRIDGING DETAIL

STANDARD FORMING DETAILS

SHADED FORM—WORK IN THESE DETAILS
INDICATES MATERIAL AND LABOR
INCLUDED BY US

THE BERGER MANUFACTURING CO.

Berloy Steel Floor Cores

CANTON, OHIO

For Branches, see page A559

Products

BERLOY FLOOR CORES, FLOOR CORE END CAPS.

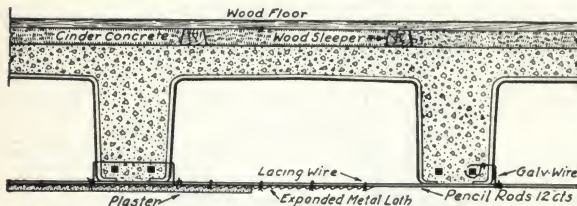
For Metal Ceilings, see page A559; for Metal Building Material, see pages B1286-1289; for Lockers and Shelving, see pages B2096-2097.

Use and Design

Berloy floor cores are metal forms for the construction of continuous slab T-beam concrete floors in steel or concrete framed buildings. They are made in such wide range of styles, sizes and weights that the construction can be adapted to any detail of design. End caps are made for use with all sizes and styles of floor cores.

Permanent Floor Cores

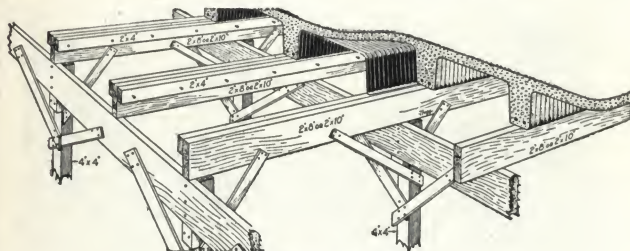
Berloy floor cores of the permanent type are usually made of No. 26 gauge metal and remain as a permanent part of the construction. Where this type is used, Berloy $\frac{3}{8}$ -in. Ribplex for the ceiling is first laid on the temporary shoring, and the forms on the Ribplex.



Attachment of Lath with Removable or Permanent Cores by Means of Wires Placed Before Concrete Is Poured

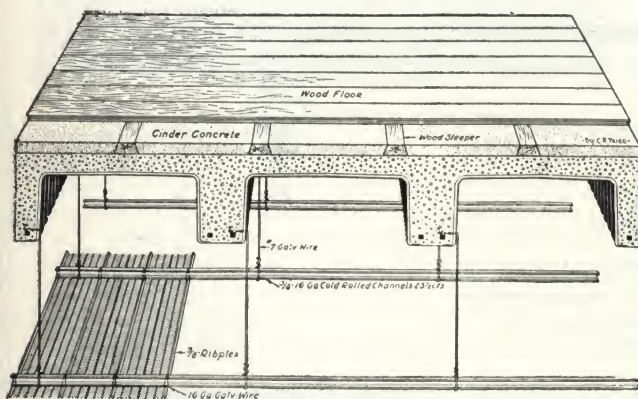
Removable Floor Cores

These are made of No. 22, 20 or 18 gauge material and can be removed and reused several times.



Method of Shoring

This method of shoring permits the removal of the cores for further use as soon as the concrete has taken its initial set

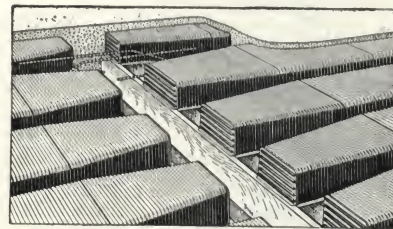


Suspended Ceilings

Details for either permanent or removable floor cores

Special Floor Cores

Concrete joists formed by floor core construction are normally designed to be from 4 to 6 in. wide. To meet special conditions of load and shear Berloy single and double taper floor cores are provided in both permanent and removable types. The special width floor cores also meet special requirements.

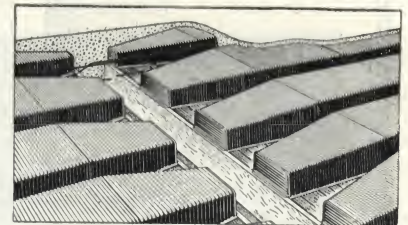


Single Taper Floor Cores

These taper down from the normal width of 20 to 16 in. This increases the width of the joist 4 in. where it enters the concrete beam.

Double Taper Floor Cores

These taper in width from 20 to 16 in. and also 2 in. in height providing an additional 2 in. of thickness of slab at the top where it enters the beam.



Narrow Width Floor Cores

To complete a floor width where standard 20-in. width floor cores are not an exact multiple, standard depth floor cores, either permanent or removable, are made in several narrower widths, with end caps to fit.

25-inch Floor Cores

Wider spacing between joists sometimes provides a more economical design than is offered by the standard 20-in. cores; for such cases special cores 25 in. wide can be supplied. These will produce joists 29 to 30½ in. on centers instead of the standard 24 and 25½ in. on centers.

Sizes, Styles, etc.

Width—20 in. between sides at bottom is standard, 25, 16 and 12 are special. Single and double taper cores are 20 in. wide at one end and 16 in. at the other.

Length—36, 24 and 12 in. covering lengths are standard for Berloy floor cores. Tapered cores are made only in 36-in. length.

Depth—4, 6, 8, 10, 12, 14 and 16 in. are standard. Double tapered cores taper from standard height at one end to 2 in. lower at the other.

Gauge—No. 26 gauge steel is standard material for all permanent cores, Nos. 22, 20 and 18 gauge for removable cores.

Weight

The weights of the floor cores vary from 1¾ lb. per lin. ft. for permanent floor cores 4 in. high, to 6 lb. per lin. ft. for 14-in. removable floor cores. The floor cores are shipped nested, which simplifies shipping and storage problems.

Engineering Service

Berloy Engineers experienced in designing this type of construction are at the service of architects ready to assist with layouts, suggestions and estimates. An illustrated bulletin A.I.A. Form No. 4d3 with complete load tables and illustrations of erection data will be sent promptly on request.

THE GOLDSMITH METAL LATH CO.

Manufacturers of the Shurebond Unit System of Metal Tile for Reinforced Concrete Slab Construction

GENERAL OFFICE AND FACTORY
CINCINNATI, OHIO

Products

THE SHUREBOND UNIT SYSTEM of METAL TILE.

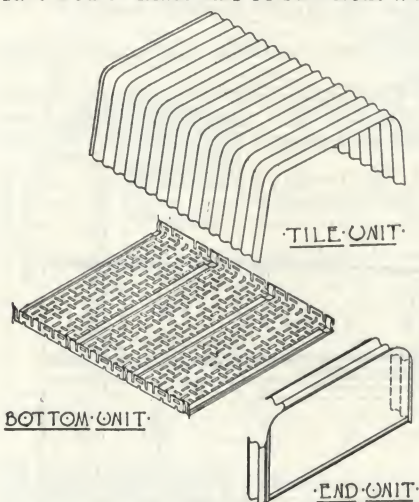
For Metal Lath, Inserts, Furring Channels, etc., see page B1298.

Services

Catalogues, specifications, dead loads, concrete quantities, instructions for placing and installing, and other information on request.

The Shurebond Unit System (Patented)

A system of concrete rib or joist construction, combining quality with economy of construction. Manufactured of materials of sufficient weight properly treated to produce not only lasting construction, but also sufficient strength to stand up without distortion while being installed and concreted. Particularly adapted to long spans. The type of slab construction to use for hotels, office and commercial buildings, loft buildings, school and institutional buildings, apartment buildings, garages, etc. A strictly reinforced concrete system that can be designed and figured.



Shurebond Tile, End and Lath Bottom Units

Shurebond bottom units are tacked to the forms.
Shurebond tile units are placed in lath bottom units—no nailing.
Shurebond end units wedge on tile units—no nailing.

Advantages of the Shurebond Unit System

Less dead load to carry a given live load—saves reinforcing, concrete, and forming, reducing size of columns, girders and foundations.

Speed of construction—reduces contractor's overhead, carrying charges on the investment, and produces quicker revenue from the building.

Simplest type of forming necessary—open or skeleton forming.

Ease of erection—can be placed by one man, no stripping of metal pans, domes or forms, no wire hangers, no furring required.

Maximum strength and rigidity—special analysis heat treated steel used for tile units, eliminating sags and bends without planking while under construction.

Flat, level ceilings that are integral with the concrete—when stripping forms, can not pull down, thus eliminating refurring. Sufficient weight of lath bottom units to insure rigidity and long life. As easy to plaster as wood lath.

No nails to clip before plastering.

Perfect alignment—assuring concrete joists of uniform width throughout entire length, as tile can not shift or spread while concreting.

A hard dense concrete—no concrete leakage, absorption or honeycombing.

No breakage—less storage, hauling and handling.

Simplicity of conduit installation.

Savings Effectuated by the Shurebond Unit System

Maximum concrete displacement.

Reduced cost of wood forming.

Lower cost of installation.

Reduced cost of plastering.

Shurebond Unit System Sizes

Standard width 20 in. at base.

Standard length 2 ft. and 1 ft. covering surface.

Standard depth 4 to 16 in., inclusive, varying 1 in. Beveled or tapered tile or both in 2-ft. lengths to any degree of bevel or taper within reasonable limits.

Flanged tile furnished where lath bottoms are not required.

Fill-in tile the same as above, but 12 in. wide at base.

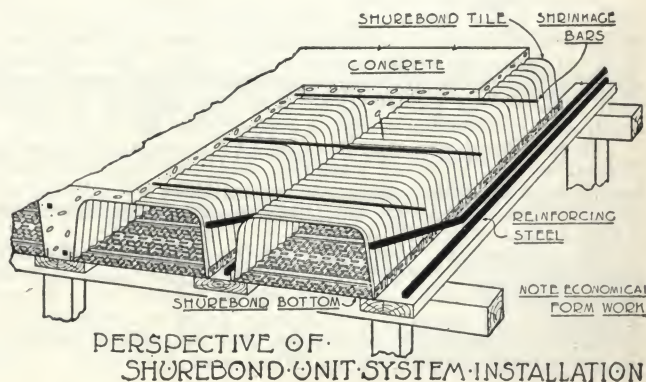
Standard end units of sizes to fit various tile units.

While our standard width is 20 in., we make any width or depth of the Shurebond Unit System to meet any special proposition or any layout that an architect or engineer may consider economical.



The American Furniture Mart, Chicago

The largest building in the world. Shurebond Patented Unit System used throughout—completed and ready for plastering at the rate of one floor per week



CONCRETE ENGINEERING COMPANY

Meyer Steelforms, Ceco Reinforcing Bars and Fireproofing Materials

GENERAL OFFICE

1141 North 11th Street, OMAHA, NEB.

OFFICES AND WAREHOUSES

CHICAGO, ILL., First National Bank Building
CHICAGO, ILL., 1926 South 52nd Avenue
MILWAUKEE, WIS., Bartlett Building
KANSAS CITY, MO., Walsix Building
MINNEAPOLIS, MINN., Builders Exchange Building

LOS ANGELES, CAL., 1450 Mirasol Street

HOUSTON, TEX., 2814 Pease Avenue
ST. LOUIS, MO., Planters Building
DETROIT, MICH., Guarantee Trust Building
DES MOINES, IOWA, Hubbell Building
DALLAS, TEX., Construction Industries Building

Products

CECO REINFORCING BARS; MEYER REMOVABLE FLANGE TYPE and ADJUSTABLE STEELFORMS, for Concrete Joist Floor Construction; CECO EXPANDED METAL LATH; CECONOMY RIB LATH; CECO HOOK HANGERS.

Also manufacturers of Ceco Round Column Forms, Column Spirals, Bar Chairs and Spacers, Triangle Mesh Reinforcement, Electrically Welded Fabric, Road Strip, Furring Channels, Corner Beads, Base Beads, All-steel Shores and Column Clamps.

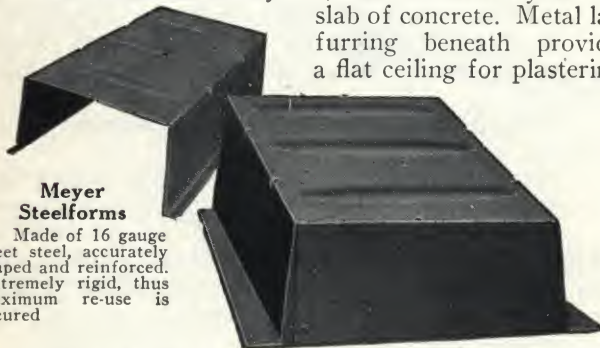


Ceco Reinforcing Bars

Rolled only from new billet steel. The deformations or lugs are placed at right angles to the axis of the bar, thus assuring greater bonding value. Tested and approved by the Robert W. Hunt Company.

Description of Meyer Steelforms

Meyer Steelform Construction is a standard system that represents the highest type of concrete joist floor construction in present day use. It consists of rows of heavy gauge removable steel forms, separated by reinforced concrete joists, and covered by a thin slab of concrete. Metal lath furring beneath provides a flat ceiling for plastering.



Meyer Steelforms

Made of 16 gauge sheet steel, accurately shaped and reinforced. Extremely rigid, thus maximum re-use is secured.

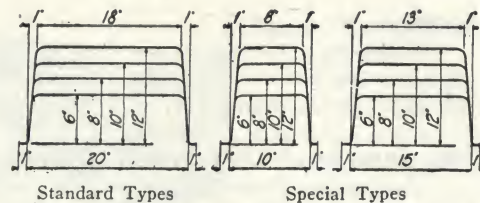
Meyer Steelform Construction is most economical for buildings, with lighter loads and longer spans such as apartments and hotels, residences, schools, hospitals, office buildings, garages, light manufacturing buildings, etc. In this class of structure, dead weight of construction is a considerable factor in the total load, so that the saving in dead load effected by Meyer Steelform Construction affords a considerable saving in cost.

Meyer Steelforms are handled on a rental basis only. Ordinarily, the labor of installing and removing the steelforms by our skilled workmen is included with the rental charge. The economy in the re-use of Meyer Steelforms, on a rental basis, is readily apparent.

In building the formwork for the concrete joist floor, Meyer Steelforms are used as a mould for the joists and the intervening slabs; the load being carried by the joists in one direction to the supports. Continuous joists are produced by lapping the Intermediate Steelforms, and the ends of the rows of Intermediate Steelforms are closed with Endforms.

Ceco
AND
MEYER
PRODUCTS TRADEMARKS

Meyer 20 in. Wide Flange Type Steelforms

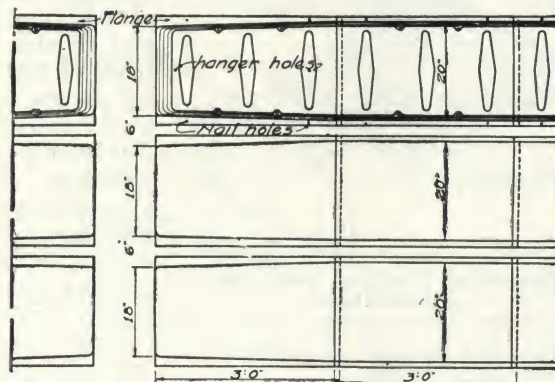


Meyer Standard Intermediate Steelforms furnished in 1, 2 and 3-ft. lengths. Meyer Special Intermediate Steelforms furnished only in 3-ft. lengths.

Meyer Straight Endforms furnished only in 5-ft. lengths, 10, 15 and 20 in. wide.

Single Tapered Endforms—Furnished in 3-ft. lengths, 6, 8, 10, 12 and 14 in. high and 20 in. wide at open end. Forms taper from 20-in. width at open end to 18-in. width at closed end. (See detail.)

Double Tapered Endforms—Furnished same sizes as single tapered except there is a reduction in depth of steelform of 3 in. from open end to closed end to form "T" on beam.



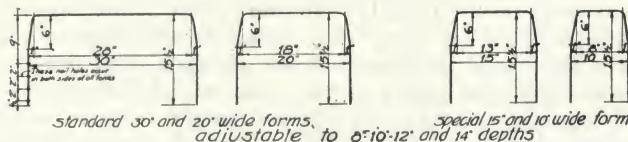
Plan Showing Application of Tapered Flange Type Endforms

Meyer 30 in. Wide Adjustable Type Steelforms

Meyer Adjustable Steelforms are made 30 in. wide and 16 in. in total height. There are no horizontal nailing flanges and the Steelforms are nailed to the sides of the wood joists soffits instead of on top of same.

Of 14 gauge metal, and without stiffening impressions of any kind, Meyer Adjustable Steelforms are rendered absolutely unyielding and rigid by the use of small angles riveted to the underside of the form. Thus joists neat and cleancut in appearance and of uniform width are produced.

Meyer Adjustable Steelforms are particularly recommended for open ceiling work. The neat and cleancut appearance of the joists, their uniform width and alignment, the spacing of the joists at about 3 ft. on centers, are all pleasing to the eye and produce a workmanlike job.

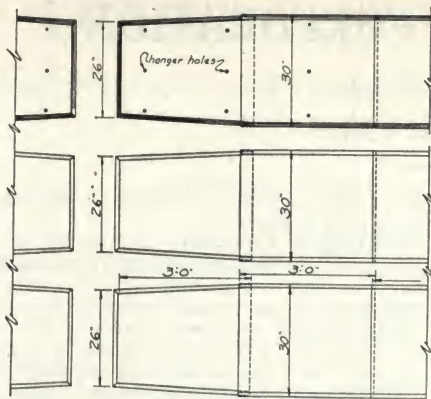


Plan Showing Application of Meyer 30-in. Wide Adjustable Steelforms

Sizes of Meyer 30 in. Wide Adjustable Steelforms—

Standard Intermediates are furnished 30 in. wide and 1, 2 and 3-ft. lengths. Special intermediates are furnished 20, 15 and 10 in. wide.

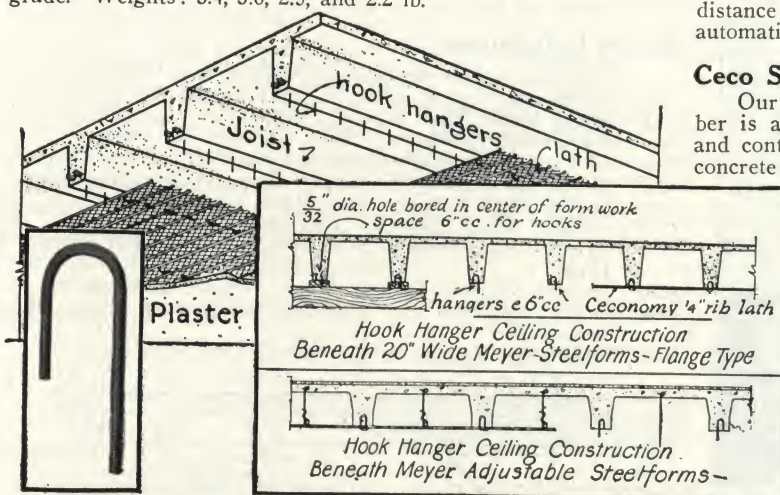
Straight End-forms are 1 ft. long. Tapered End-forms are 3 ft. long.



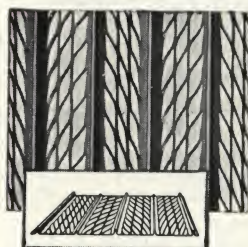
Plan Showing Application of 30-in. Wide Adjustable Steelforms

Ceco Self-furring Metal Lath

Furnished in black iron, corrugated, galvanized, cut from galvanized sheets; also in copper iron alloy grade and in pure iron grade. Weights: 3.4, 3.0, 2.5, and 2.2 lb.



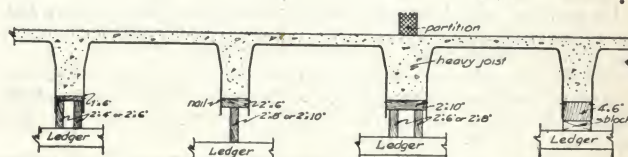
Detail Showing Hook Hanger Ceiling Construction, Using Meyer Steelforms, Ceconomy $\frac{1}{4}$ -in. Rib Lath and Ceco Hook Hangers



Ceconomy $\frac{1}{4}$ -in. Rib Lath

Ceconomy $\frac{1}{4}$ -in. Rib Lath

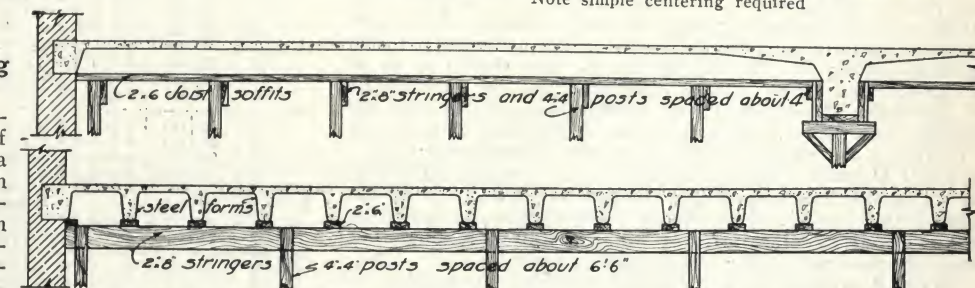
This metal lath requires 20% less plaster than ordinary metal lath. It was designed as a result of the demand for a metal plastering base and a reinforcement; Ceconomy (1) prevents plaster cracks, (2) is fire resisting, (3) requires less plaster than other metal lath and (4) is absolutely rigid. Ribs $\frac{1}{4}$ in. deep spaced 1.2 in. on centers.



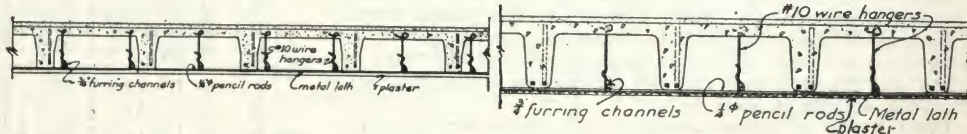
Formwork Detail for Meyer Adjustable Steelforms
Note simple centering required

Ceco Hook Hanger Ceiling Construction

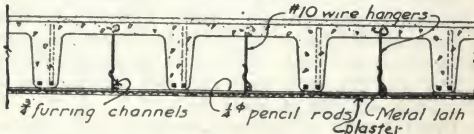
Hook hanger ceiling construction (above) involves the use of special Ceco Hook Hangers and a rib lath when used in connection with 20 in. wide Steelform Construction. When used in connection with 30 in. wide Steelform Construction the use of 10 gauge galvanized wire hangers and $\frac{3}{4}$ -in. furring channels is also necessary to assure maximum rigidity. This construction provides a most economical lath ceiling, is strong and rigid, but must be brought up tight against the bottom of the joists. The elimination of channels, hangers, and pencil rods effects an economy in material and labor.



Meyer Flange Type Steelforms in Place on Open Wood Centering



Attached Ceiling Construction with Meyer Adjustable Steelforms



Attached Ceiling Construction with Meyer Flange Type Steelforms

Ceco Hook Hangers are made of No. 10 gauge galvanized wire. Bent to form hook $3\frac{1}{2}$ in. long with 2-in. hook. Parallel sides 1 in. apart.

Ceco $\frac{3}{8}$ -in. Rib Lath

Cut from open hearth steel; furnished painted. Also from pure iron or copper bearing steel. Ribs are $\frac{3}{8}$ in. high and spaced 4 in. on centers. Erected with lath side out. No channels or rods necessary. Packed 9 sheets to bundle, nested and shipped uncrated.

Attached Ceilings

Our standard attached ceiling constructions used in connection with 20 in. wide and 30 in. wide Steelform Construction involves the use of galvanized wire hangers, steel furring channels, $\frac{1}{4}$ -in. round steel pencil rods and metal lath.

Note: The use of $\frac{3}{4}$ -in. Ceconomy Rib Lath spanning 24 in. on centers between the furring channels instead of the $\frac{1}{4}$ -in. round pencil rods and flat lath is equally recommended.

This construction may be brought tight up against the bottom of the joists or suspended as much as 6 in. The ceiling is erected after the removal of the Steelforms, and can be leveled up, straight and true, despite any variation in the level of the floor construction without filling out with plaster afterwards. The concrete and plaster do not come in contact.

This type of ceiling construction may be dropped a short distance below the bottom of the joists in order to conceal automatic sprinkler pipes or other conduits.

Ceco Service

Our Sales Department is technically trained, and each member is always ready to assist consulting engineers, architects and contractors with layouts and estimates for the reinforced concrete portion of building work.

Shipping Facilities

Complete stocks of all our products are maintained at all our warehouses listed on the preceding page. Meyer Steelforms are available at these points only. Prompt attention given every order large or small.

Handbooks

Handbooks describing all our products and their uses will be mailed on request. Much valuable information is contained in our latest edition, write for it. Please address our Omaha office.

GRID FLAT SLAB CORPORATION

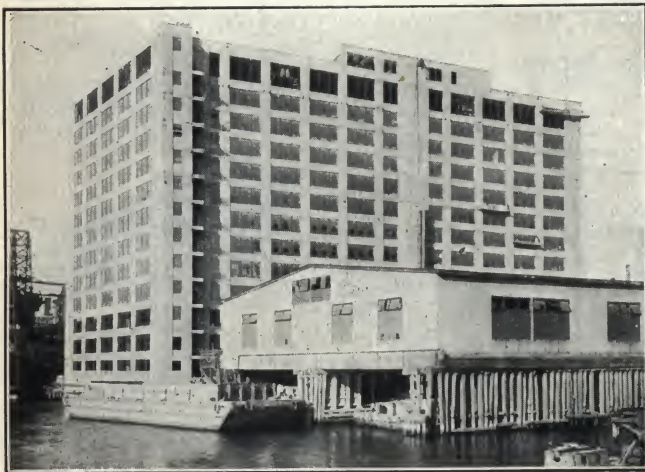
761 Dudley Street
BOSTON, MASS.

Grid Flat Slab System

New and economical flat slab form of construction for floors and roofs, made upon removable steel domes. This method is a two-way rib section of reinforced concrete acting to support a lighter floor slab. By cutting out all useless concrete between the ribs there is considerable reinforcing steel and concrete saved. This saving of steel and concrete cuts the dead weight very materially and allows for wider spans and column spacings—bays have been constructed up to 32 ft. square.

The Grid Flat Slab System is designed under the same rules as the usual two-way flat slab of reinforced concrete floors.

Formwork costs are cut considerably by the use of steel domes and their necessity of only one-way support. When the steel domes are removed, after the setting of the concrete, the hollow squares left present a very pleasing and attractive appearance.



Harbor Building, Boston, Mass.
BLACKALL, CLAPP & WHITTEMORE, Architects
350,000 sq. ft.; 81 working days

Calculations of Grid Flat Slab—The calculations for the Grid Flat Slab are identical with those of the usual two-way flat slab. Standard specifications for concrete and reinforced concrete for flat slabs apply to Grid Flat Slabs.

These formulas are recommended for use where there are no definite building laws. Where architects or engineers design without set codes, the method taken with usual two-way flat slab designs can be taken with Grid Flat Slab.

Thickness of Slab and Depth of Dome to Be Used—The thickness of the Grid Flat Slab and the depth of the dome required for any structure is determined by the weight to be carried and the span or spacing of the columns. The same method of determining the thickness of the ordinary flat slab should be employed. The rule is that the slab should be $\frac{1}{2}$ of the column span. The depth of the dome plus the thickness of the slab above should usually be at least 1 in. greater than the usual flat slab. The slab should never be less than 2 in. on top of the dome the depth depending on the concentrated load.

Steel Domes—The steel domes are 2 ft. square from outside to outside of flange. The flanges are $2\frac{1}{2}$ in. wide cut square. The dome is 19 in. square. The flanges are butted on the wood understructure forming 5-in. rib, both directions. The domes are fastened to the wood forms by nails.

Wood Forms—Double stringers supported on uprights, by removable blocks, carry single stringers on 2-ft. centers. Lumber required approximately 2 ft. b.m. per sq. ft. of floor. Nearly all lumber is dimensioned timber and can be used many times.

Placing Reinforcing Steel—Reinforcing steel can not be misplaced or left out. The steel is placed, one or two bars in the ribs and the steel man can not misplace it or leave it out, by mistake, without it being noticed.

Inserts and Electric Conduit—All inserts and conduits can be placed in the Grid Flat Slab the same as regular slab. Outlet boxes in ribs, large junction boxes in slab. Inserts can be placed as desired and held firmly in place with a small

device. Floor drainers, if large, by leaving out a dome—extra concrete will support it.

Pouring of Concrete—The domes are No. 16 gauge steel. The tops are flat and stiff enough to support a runway to wheel concrete to point of placing. Screeds can be placed on domes to assure correct and equal thickness of concrete in placing.

Availability of Steel Domes—The steel domes for the Grid Flat Slab System are available in quantities large enough for any job and can be supplied on short notice.

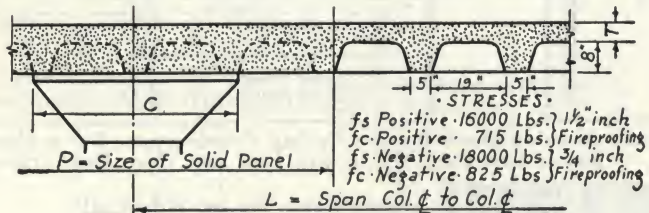
Domes and System Patented—The steel domes for the Grid Flat Slab System as well as the type of construction are patented and the patents owned by the GRID FLAT SLAB CORPORATION.

Service

The engineers of GRID FLAT SLAB CORPORATION will advise, design, make all plans for use of Grid Flat Slab as well as contract to erect the system.

Recent Installations

Building and location with architect or engineer.
Harbor Building, Boston, Mass., Blackall, Clapp & Whittemore
Park Square Motor Mart, Boston, Mass., J. R. Worcester & Co.
St. Ann's Church, Wollaston, Mass., William B. Colleary
Stratfield Hotel Garage, Bridgeport, Conn., Monks & Johnson
Sts. Peter & Paul School, Waterbury, Conn., O'Connell & Shaw
Lynn English High School, Lynn, Mass., George Cornet
Boston Trade School, Boston, Mass., McLaughlin & Burr
Warehouse for Bass-Heuter Co., San Francisco, Calif., Barrett & Hilp
Paige Detroit Building, Boston, Mass., Wm. A. Dykeman
Remington Typewriter Co. Building, Bridgeport, Conn., J. Stewart & Co.
John Baptist High School, Bangor, Me., O'Connell & Shaw



GRID SYSTEM FLOORS
Concrete Sizes and Reinforcement per Square Foot for Square Interior Panels

L	Live load, lb.	Dead load, lb.	Live load plus dead load, lb.	C ft. in.	T ft. in.	P ft. in.	Steel in lb. per sq. ft.	L	Live load, lb.	Dead load, lb.	Live load plus dead load, lb.	C ft. in.	P ft. in.	T ft. in.	Steel in lb. per sq. ft.
18-0	46	66	112	4-0	2	8-5	1.00	26-0	46	66	112	6-0	12-5	2	2.07
	56	66	122	4-0	2	8-5	1.09		56	78	134	6-0	12-5	3	2.20
	75	66	141	4-0	2	8-5	1.25		75	78	153	6-0	12-5	3	2.50
	94	72	166	4-0	2½	8-5	1.38		94	78	172	6-0	12-5	3	2.79
	112.5	78	190.5	4-0	3	8-5	1.50		112.5	90	202.5	6-0	12-5	4	2.95
	125	78	203	4-0	3	8-5	1.59		125	90	215	6-0	12-5	4	3.13
20-0	187.5	78	265.5	4-0	3	8-5	2.14	28-0	187.5	90	277.5	6-0	14-5	4	4.02
	250	78	328	4-0	3	8-5	2.55		250	90	340	6-0	14-5	4	4.90
	46	66	112	4-6	2	8-5	1.23		46	78	124	6-6	12-5	3	2.37
	56	66	122	4-6	2	8-5	1.34		56	78	134	6-6	12-5	3	2.55
22-0	75	66	141	4-6	2	8-5	1.54	30-0	75	78	153	6-6	12-5	3	2.90
	94	78	172	4-6	3	8-5	1.67		94	90	184	6-6	12-5	4	3.13
	112.5	78	190.5	4-6	3	8-5	1.84		112.5	90	202.5	6-6	12-5	4	3.43
	125	90	215	4-6	4	8-5	1.86		125	90	215	6-6	12-5	4	3.64
	187.5	90	277.5	4-6	4	8-5	2.40		187.5	90	277.5	6-6	14-5	4	4.67
	250	90	340	4-6	4	10-5	2.92		32-0	46	78	124	7-0	12-5	3	2.70
46	66	112	5-0	2	10-5	1.49	56	90		146	7-0	12-5	4	2.85	
56	66	122	5-0	2	10-5	1.62	75	90		165	7-0	12-5	4	3.20	
75	78	153	5-0	3	10-5	1.80	94	90		184	7-0	12-5	4	3.56	
94	78	172	5-0	3	10-5	2.01	112.5	90		202.5	7-0	14-5	4	3.90	
112.5	78	190.5	5-0	3	10-5	2.22	125	90		215	7-0	14-5	4	4.14	
24-0	125	90	215	5-0	4	10-5	2.25	32-0	46	78	124	7-6	14-5	3	3.07
	187.5	90	277.5	5-0	4	10-5	2.89		56	90	146	7-6	14-5	4	3.24
	250	90	340	5-0	4	10-5	3.53		75	90	165	7-6	14-5	4	3.65
	46	66	112	5-6	2	10-5	1.77		94	102	196	7-6	14-5	5	3.93
	56	78	134	5-6	3	10-5	1.88		112.5	102	214.5	7-6	14-5	5	4.29
	75	78	153	5-6	3	10-5	2.13		Note: Point of contraflexure assumed as ¼ of clear span between column heads for heavy band, and ¼ of span between column centers for light band.						
94	78	172	5-6	3	10-5	2.39									
112.5	78	190.5	5-6	3	10-5	2.64									
24-0	125	90	215	5-6	4	10-5	2.68								
	187.5	90	277.5	5-6	4	10-5	3.43								

ESTABLISHED 1899

EDWARD A. TUCKER COMPANY

Contracting Engineers for Fireproof Floor Systems and Concrete Reinforcement;
Removable Metal Forms

Converse Building, 101 Milk Street
BOSTON, MASS.

REPRESENTATIVES IN HARTFORD and NEW HAVEN, CONN., ALBANY and UTICA, N. Y.

Products

DIAMOND DEFORMED BARS; SPIRALS.

FLOOR SYSTEMS: Metal Rib Long Span, Akme Flat Slab, Combination Tile.

Also, Marks System Gypsum Roof, Metal Frame Stirrup Units, Clips, Spacers, Chairs, Removable Metal Forms.

Services

This company offers, in connection with the sale of its floor systems, complete structural designs and plans; and the fact that the company is regularly retained as engineers by architects and contractors is a guarantee that the designs offered in the sales propositions will be conservative and reliable.

We lease our metal forms either with or without engineering services or sale of reinforcing material. Complete information showing application to any particular building furnished on request.

Reinforcement

Diamond bars—standard deformed bars rolled for us by the Jones & Laughlin Steel Corp., from new billet stock to standard specifications for reinforcing bars.

Shipments

Direct from the mill.

Mill Warehouse—from the most modern and completely equipped fabricating plant in the United States.

Boston Stock—warehouse at East Cambridge fully equipped with power machines for fabrication of all kinds, large stock, shipments at one day's notice.

Metal Rib Floors

Consist of reinforced concrete joists and slab, formed by removable metal pans or domes. This sys-

tem reduces the waste of form material to the lowest point, saves on the amount of concrete and reinforcement, and is adapted to all classes of work. For garages, manufacturing plants and unfinished buildings, open joist construction is used. For schoolhouses, hospitals, etc., a metal lath ceiling is attached to the ribs, giving a level ceiling. Note this feature—lath is put up after all concrete work is done, thus avoiding the wavy ceiling effect, the rusting and breaking of lath through long exposure and the uncertainty of the quality of concrete obtained.

We supply forms in 31 and 20-in. widths.

For exposed ceilings, the 31-in. forms increase the diffusion of light and give a much more pleasing ceiling effect than the 20-in. spacing.

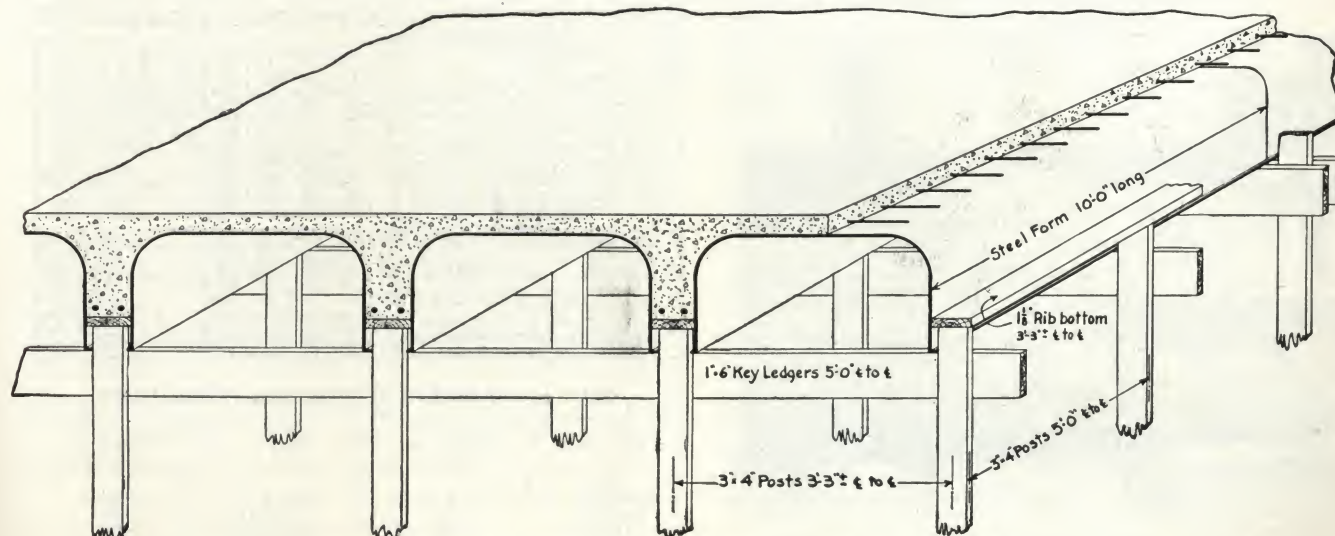
Metal forms are of No. 12 gauge ($\frac{1}{8}$ in. thick) and because of this thickness a form as rigid as wood centering is provided, giving also true alignment of the ribs. The standard lengths of 6, 8 and 10 ft., will support the loads with shores only at the ends, thus reducing requirements for shores to one for every 25 to 30 sq. ft.

The long lengths also mean few laps, reducing to one-third this labor item if joints are specified to be smoothed up.

Lumber for false work in Metal Rib construction, including waste, is reduced to one and one-quarter board feet per square foot, or a saving of three-quarters to one board feet as compared with usual pan systems; the number of pieces in the lumber for false work is one-half that of other systems.

The quality of the work and the speed and economy of the construction depend on using a heavy gauge form.

Architects are requested to refer to us in specifications to provide definitely for bids on Metal Rib System.



Metal Rib Floor Construction Showing Slab and Forms in Position

UNITED STATES GYPSUM COMPANY

Floor Voids (Filler Tile)

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see page B1359

Products

PYROBAR VOIDS (FILLER TILE).

For Acoustical Plaster, see page A19; for Structolite Cement, see pages A44-45; for Reinforced Roof Tile and Monolithic Floors and Roofs, see pages A166-170; for Dry Fill Insulation, see page A200; for Partition and Furring Tile, Beam and Column Covering, see pages A382-383; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Architectural Service

Our Fireproofing Department is organized to co-operate with architects and engineers in designing floor systems.

Send in floor plans and our engineers will submit designs for a Pyrobar floor system together with specific information, showing the advantages and economies obtained with the use of Pyrobar floor voids.

Pyrobar Floor Voids (Filler Tile)

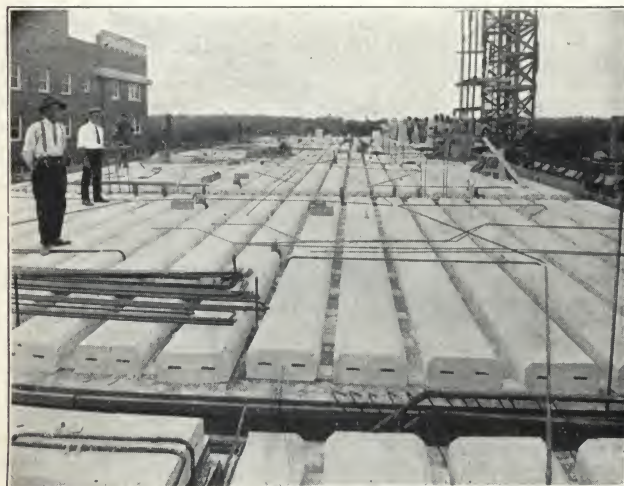
Description—Made of "Structolite," a dense, specially prepared gypsum, in sizes 12 in. wide by 30 in. long, in thicknesses 3, 4, 5 and 6 in.; also, in sizes 19 in. wide by 18 in. long, in thicknesses of 6, 8, 10 and 12 in. The 19x18-in. voids are cast with one end integral thus providing a seal for each row at girders. Of this latter type, standard and fractional lengths with both ends closed, are furnished when required, at a small additional cost. Heavy deck type can be supplied when it is desirable to omit customary 2-in. topping of concrete.

Advantages—Easily handled. Rapidly and economically installed. No nailing required to hold in place on forms.

A saving in reinforcing steel and concrete is assured when this void is used because its light weight reduces materially the dead load carried by joists and girders.

Form work is reduced to a minimum, as 12-in. tile are placed 16 in. on centers with 4-in. joists and 19-in. units are placed 24 in. on centers, with 5-in. joists.

Spans up to 30 ft. are possible with this system where light floor loads are involved, such as in school buildings, hospitals, hotels, and similar construction. Tests show that concrete poured adjacent to this void is actually increased in strength. No waste of concrete by leakage.



Pyrobar Voids Line Up Readily and Stay Put without Fastening

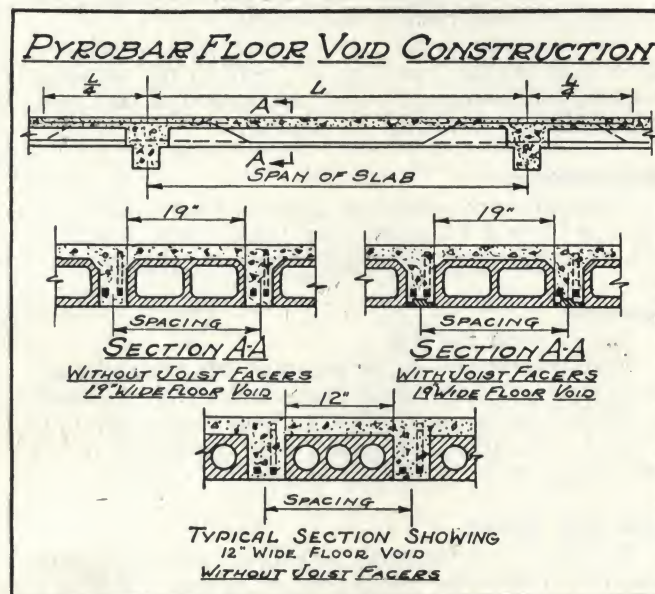
Pyrobar floor voids act as a very efficient sound deadener, making them especially desirable for use in hospitals and schools. Used in roof construction, high insulating value tends to prevent condensation. By using joist facers between voids, a uniform plastering base is obtained.

Specifications for Pyrobar Floor Voids (Filler Tile)

The floor (and roofs) shall consist of the Pyrobar Floor Void System of reinforced concrete construction, as shown on the accompanying plans and all material and workmanship shall be in strict accordance with these plans and specifications.

The voids for the floor and roof construction shall be Pyrobar Floor Voids manufactured by the UNITED STATES GYPSUM COMPANY and shall be of sizes indicated on the drawings. The floor voids shall be accurately spaced to secure the exact joist widths shown. Pyrobar Joist Facers (if required) shall be laid directly on the forms between the rows of tile. Care must be taken to see that the exact length of joists as determined by the width of beam tee is maintained. In case this length is in odd feet and inches, the floor voids shall be sawed to fit.

Note: Joist facers may be omitted if desired.



		19" WIDE FLOOR TILE						12" WIDE FLOOR TILE					
		JOISTS WITHOUT FACERS											
Concrete To	Joists	Depth of Tile	6"	8"	10"	12"	12"	3"	4"	5"	6"	6"	6"
		Width	5"	5"	5"	5"	5"	4"	4"	4"	4"	4"	4"
		Spacing C to C	24"	24"	24"	24"	25"	16"	16"	16"	16"	16"	16"
2"	Wt of Conc & Tile per Sq Ft of Floor Area	54"	60"	68"	76"	80"	80"	43"	48"	55"	62"	62"	62"
	Cu Ft of Conc per Sq Ft of Floor Area	0.28	0.32	0.35	0.39	0.42	0.23	0.25	0.27	0.29	0.29	0.29	0.29
	Sq Ft of Floor Area for One Yd of Conc	46	86	77	70	65	117	108	100	93	93	93	93
	Core Area in percent of Section	58	62	65	67	64	45	50	54	56	56	56	56
3"	Wt of Conc & Tile per Sq Ft of Floor Area	66"	72"	80"	88"	92"	92"	68	74	81	88	88	88
	Cu Ft of Conc per Sq Ft of Floor Area	0.36	0.40	0.43	0.47	0.51	0.23	0.25	0.27	0.29	0.29	0.29	0.29
	Sq Ft of Floor Area for One Yd of Conc	74	68	62	58	53	117	108	100	93	93	93	93
	Core Area in percent of Section	51	56	60	62	60	47	50	54	56	56	56	56
		JOISTS WITH FACERS											
2"	Wt of Conc & Tile per Sq Ft of Floor Area	52"	59"	67"	75"	78"	78"	53"	60"	67"	75"	75"	75"
	Cu Ft of Conc per Sq Ft of Floor Area	0.26	0.30	0.33	0.37	0.40	0.23	0.25	0.27	0.29	0.29	0.29	0.29
	Sq Ft of Floor Area for One Yd of Conc	102	91	81	74	68	108	100	93	86	81	77	74
	Core Area in percent of Section	60	64	67	68	66	57	59	62	64	66	67	67
3"	Wt of Conc & Tile per Sq Ft of Floor Area	64"	71"	79"	87"	90"	90"	66"	72"	79"	87"	87"	87"
	Cu Ft of Conc per Sq Ft of Floor Area	0.35	0.38	0.42	0.45	0.49	0.23	0.25	0.27	0.29	0.29	0.29	0.29
	Sq Ft of Floor Area for One Yd of Conc	78	71	65	60	55	117	108	100	93	86	81	77
	Core Area in percent of Section	54	58	61	64	62	50	53	56	59	62	64	64

SIZES AND WEIGHTS OF PYROBAR FLOOR VOIDS

Size, in.	Weight, lb.	Size, in.	Weight, lb.
3x12x30	11	6x19x18	26
4x12x30	15	8x19x18	29
5x12x30	20	10x19x18	35
6x12x30	23	12x19x18	41

THE WHITACRE ENGINEERING COMPANY

Schuster Hollow Tile Floors

706 Union Building
CLEVELAND, OHIO

228 North La Salle Street
CHICAGO, ILL.

PRINCIPAL AGENCIES

NEW YORK, N. Y., JOHN T. MCCOY, INC., 551 Fifth Avenue
BALTIMORE, MD., VAN R. P. SAXE, Knickerbocker Building
KANSAS CITY, MO., A. I. BURNIE, 1012 Baltimore Avenue

DAVENPORT, IOWA, JOHN BENEDICT CO.

ROCHESTER, N. Y., AMERICAN CLAY & CEMENT CORP., 1175 Main Street, East
DALLAS, TEX., FRASER BRICK CO.
JOHN BENEDICT CO.

Product

SCHUSTER HOLLOW TILE FLOORS.

Description

Schuster hollow tile floor construction is a combination of hollow tile and concrete reinforced in two directions.

The tile are 12x12 special design clay blocks, capable of resisting shearing and compressive stresses. They are an integral part of the slab and are held securely in position by the key of concrete which is forced into the cells.

Each concrete joist between the rows of tile in each direction is reinforced with a straight bar, resisting positive moment; and, where continuity exists, with a short straight bar over the support, resisting negative moment.

No temperature bars are required. No concrete is required on top of the tile.

Structural Feature and Economy

Small dead loads permit the use of small beams, columns and footings. This effects a saving in concrete and reinforcement in these members as compared with other types of construction.

Tile used in shear and compression provides sufficient shearing area at the ends of each joist, and eliminates the top concrete required by other floor systems as compressive area to develop the reinforcement. The tile is not a mere filler adding useless dead weight but is a structural member of the slab.

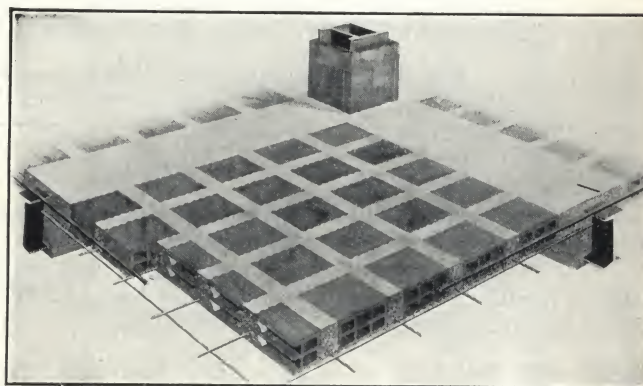
Load distribution equal to that obtained with flat slab construction is secured. Heavy concentrated loads distribute themselves over two or more joists in each direction. This means that substantially there is no such thing as a concentrated load with Schuster hollow tile floors.

Slab thickness from 3 to 7 inches less in depth than that required by a one-way type of construction permits a total saving often amounting to an entire story height of the building. This means a material saving in masonry, pipes, conduits, stairs, etc.

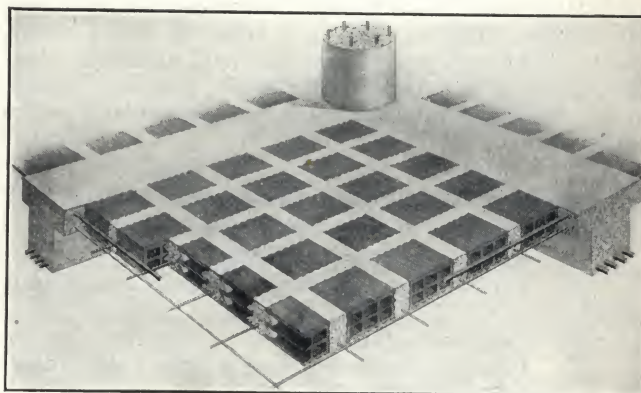
Openings in the slab are easily handled. In many cases, special framing is unnecessary.

Plaster applied directly on the tile requires 2 coats,

whereas plaster on mesh requires 3 coats. If an all-tile ceiling is desired, soffit tile are used.



Schuster Hollow Tile Floors with Structural Steel Beams and Columns



Schuster Hollow Tile Floors with Concrete Beams and Columns

Service

To aid architects and engineers in the design of Schuster hollow tile floors, an engineer will be sent to your office on request. He will be prepared to furnish complete design data, information regarding tests, and previous use of the system without any obligation being incurred on your part, and without expense to you.

Schuster hollow tile floors are a patented type of construction. We control the sale and use of the floors and our service to the architect and engineer consists in furnishing them with complete information necessary for the design, and furnishing the tile for the floors.

AMERICAN STEEL & WIRE COMPANY

Triangle Mesh and Electrically Welded Wire Fabric for Concrete Reinforcement

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EXPORT REPRESENTATIVES, UNITED STATES STEEL PRODUCTS COMPANY, 30 Church Street, New York

Products

TRIANGLE MESH and ELECTRICALLY WELDED WIRE FABRICS for CONCRETE REINFORCEMENT.

For Triangle Mesh, for Stucco Base, see page B1273; for Electrical Wires and Cables, see pages C2908-2919; for Wire Rope, see pages C3416-3420.

Uses

Triangle Mesh and Electrically Welded Wire Fabrics are used for the reinforcing of concrete floor and roof slabs, concrete walls and chimneys, arch construction, beams, columns, dams and retaining walls, water, sewer and culvert pipe, pavements and roadways, river revetment, silos, fireproofing steel framing, bridge floors, reservoirs, monolithic concrete sewers and stucco work.

Advantages of Wire Fabric Reinforcement

- (1) Provides even distribution of steel.
- (2) Reinforces in every direction.
- (3) Tension or carrying members accurately spaced.
- (4) Low cost of inspection.
- (5) Properly distributes over a large area stresses due to concentrated load.
- (6) Due to cold drawing, higher elastic limits and ultimate strengths with same quality of steel.
- (7) Continuous action from one end of the structure to the other.
- (8) Impossible to leave out or otherwise reduce the necessary steel if specific style number of fabric or area of steel is specified.
- (9) Perfect mechanical bond.
- (10) Easily handled and stored on the work.
- (11) Minimum cost of installation.

Grade of Steel

A reduction of the required sectional area of steel is safely accomplished, within limits, by the use of a higher tensile strength steel. This high tensile strength

may be secured by increasing the carbon content or by cold drawing of mild steel.

Cold drawing of mild steel produces a high ultimate strength and yield point, and the proportion of the yield point to the ultimate strength is increased to from 70 to 90%. Since the strength of a reinforced concrete structure, in so far as the reinforcement is concerned, depends on the yield point of the steel, the high yield point of cold drawn wire is of great importance.

Galvanizing

Triangle Mesh Reinforcement is furnished plain on orders unless otherwise specified.

American Electrically Welded Fabric is furnished plain or galvanized as ordered.

In general, the additional cost for galvanized fabric is not justified except in special cases where the steel will be inadequately protected, as in very thin slabs, etc.

Triangle Mesh Woven Wire Concrete Reinforcement

Triangle Mesh fabric is made from cold drawn mild steel having an ultimate strength of 70,000 to 85,000 lb. per sq. in. The longitudinal members are

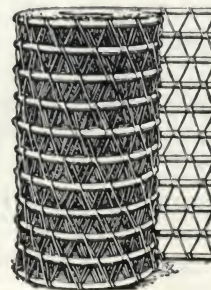


Fig. 1. Triangle Mesh Wire Fabric Reinforcement

spaced 4 in., the diagonal cross wires either 2, 4, or 8 in. It is the only design of wire fabric having cross wires that assist the longitudinals in carrying the load.

*UNITED STATES STEEL PRODUCTS COMPANY.

For the light styles of fabric, the longitudinals consist of 1 wire; for the medium styles, 2 wires laid parallel; and for the heavy styles, 3 wires stranded. The sizes of the wires and the number per longitudinal are varied to obtain the desired cross-sectional area of steel per foot of width. Stranded longitudinals are used to reduce the stiffness of the finished product without affecting the tensile strength.

TRIANGLE MESH WOVEN WIRE CONCRETE REINFORCEMENT

Style No.	Number and gauge of wires each, longitudinal, A. S. & W. Co.'s steel wire gauge	Sectional area longitudinal, sq. in. per ft. width	Effective sect. areas, sq. in. per ft. of fabric		Approx. weight, lb. per 100 sq. ft.
			Trans.	Longit.	

Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 4 in.

032	1—No. 12 gauge	.026	.022	.032	22
040	1—No. 11 gauge	.034	.022	.040	25
049	1—No. 10 gauge	.043	.022	.049	28
058	1—No. 9 gauge	.052	.022	.058	32
068	1—No. 8 gauge	.062	.022	.068	35
080	1—No. 7 gauge	.074	.022	.080	40
093	1—No. 6 gauge	.087	.022	.093	45
107	1—No. 5 gauge	.101	.022	.107	50
126	1—No. 4 gauge	.120	.022	.126	57
146	1—No. 3 gauge	.140	.022	.146	65
153	1— $\frac{1}{2}$ in.	.147	.022	.153	68
168	1—No. 2 gauge	.162	.022	.168	74
180	2—No. 6 gauge	.174	.022	.180	78
208	2—No. 5 gauge	.202	.022	.208	89
245	2—No. 4 gauge	.239	.022	.245	103
267	3—No. 6 gauge	.261	.022	.267	111
287	3—No. 5 $\frac{1}{2}$ gauge	.281	.022	.287	119
309	3—No. 5 gauge	.303	.022	.309	128
336	3—No. 4 $\frac{1}{2}$ gauge	.330	.022	.336	138
365	3—No. 4 gauge	.359	.022	.365	149
395	3—No. 3 $\frac{1}{2}$ gauge	.389	.022	.395	160

Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 8 in.

036P	1—No. 12 gauge	.026	.009	.036	17
044P	1—No. 11 gauge	.034	.009	.044	20
053P	1—No. 10 gauge	.043	.009	.053	24
062P	1—No. 9 gauge	.052	.009	.062	27
072P	1—No. 8 gauge	.062	.009	.072	31
084P	1—No. 7 gauge	.074	.009	.084	35
097P	1—No. 6 gauge	.087	.009	.097	40

Longitudinals Spaced 4 in. Cross Wires No. 12 $\frac{1}{2}$ Gauge, Spaced 8 in.

041R	1—No. 12 gauge	.026	.014	.041	21
049R	1—No. 11 gauge	.034	.014	.049	24
058R	1—No. 10 gauge	.043	.014	.058	28
067R	1—No. 9 gauge	.052	.014	.067	31
077R	1—No. 8 gauge	.062	.014	.077	35
089R	1—No. 7 gauge	.074	.014	.089	40
102R	1—No. 6 gauge	.087	.014	.102	44

Longitudinals Spaced 4 in. Cross Wires Nos. 14 and 12 $\frac{1}{2}$ Gauge, Spaced 2 in.

(This material is used principally for cement gun work)

Style No.	Number of wires each, longitudinal	Gauge of wires each, longitudinal	Gauge of cross wires	Approx. weight, lb. per 100 sq. ft.
7A	1	12	14	31
6A	1	10	14	37
5A	1	8	14	44
4A	1	6	14	53
29A	1	12	12 $\frac{1}{2}$	42
28A	1	10	12 $\frac{1}{2}$	48
27A	1	8	12 $\frac{1}{2}$	55
26A	1	6	12 $\frac{1}{2}$	64

Rolls: Standard lengths 150, 200 and 300 ft.

Widths: Approximately 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 and 56 in.

Finish: Plain or galvanized.

Tensile strength: Standard, 70,000 to 85,000 lb. per sq. in.

When embedded in concrete, this mesh yields the maximum of its steel strength.

AMERICAN ELECTRICALLY WELDED FABRIC

Spacing of wires, in.		Gauge number		Sect. area, sq. in. per ft.		Weight per 100 sq. ft., lb.
Longit.	Trans.	Longit.	Trans.	Longit.	Trans.	
2	16	1	7	.377	.018	138.9
2	16	2	8	.325	.015	119.4
2	16	3	8	.280	.015	103.6
2	16	4	9	.239	.013	88.5
2	16	5	10	.202	.011	74.6
2	16	6	10	.174	.011	64.7
2	16	7	11	.148	.009	54.8
3	16	1	7	.252	.018	96.2
3	16	2	8	.216	.015	82.6
3	16	3	8	.187	.015	72.0
3	16	4	9	.159	.013	61.4
3	16	5	10	.135	.011	51.8
3	16	6	10	.116	.011	45.1
3	16	7	11	.098	.009	38.1
3	16	8	12	.082	.007	31.7
4	16	3	8	.140	.015	56.1
4	16	4	9	.120	.013	47.9
4	16	5	10	.101	.011	40.4
4	16	6	10	.087	.011	35.2
4	16	7	11	.074	.009	29.7
4	12	8	12	.062	.009	25.5
4	12	9	12	.052	.009	21.8
4	12	10	12	.043	.009	18.6
4	12	12	12	.026	.009	12.6
4	12	5	5	.101	.034	48.4
4	12	6	6	.087	.029	41.6
4	12	7	7	.074	.025	35.4
4	12	8	8	.062	.021	29.6
6	12	0	6	.148	.029	65.3
6	12	2	2	.108	.054	59.4
6	12	3	3	.093	.047	51.2
6	12	4	4	.080	.040	43.8
6	12	5	5	.067	.034	37.0
6	12	6	6	.058	.029	31.8
6	12	7	7	.049	.025	27.0
6	8	12	12	.017	.013	11.1
6	6	0	0	.148	.148	106.9
6	6	1	1	.126	.126	91.1
6	6	2	2	.108	.108	78.4
6	6	3	3	.093	.093	67.6
6	6	4	4	.080	.080	57.8
6	6	5	5	.067	.067	48.8
6	6	6	6	.058	.058	42.0
6	6	7	7	.049	.049	35.7
6	6	8	8	.041	.041	29.9
6	6	9	9	.035	.035	25.0
6	6	10	10	.029	.029	20.7
6	6	12	12	.017	.017	12.7
4	4	4	4	.120	.120	85.3
4	4	6	6	.087	.087	61.9
4	4	8	8	.062	.062	44.1
4	4	10	10	.043	.043	30.6
4	4	12	12	.026	.026	18.7
4	4	14	14	.015	.015	10.8
3	3	10	10	.057	.057	40.5
3	3	12	12	.035	.035	24.7
3	3	14	14	.020	.020	14.2
2	2	10	10	.086	.086	60.3
2	2	12	12	.052	.052	36.8
2	2	13	13	.039	.039	27.7
2	2	14	14	.030	.030	21.2
2	4	12	12	.052	.026	27.6
2	4	14	14	.030	.015	15.9

Other styles can be furnished on application.

Rolls: Standard lengths 150, 200 and 300 ft. For No. 2 gauge wires and larger, flat sheets only.

Widths: Multiples of the spacing of longitudinal wires up to a maximum width which varies with the size and spacing of the longitudinals. Approximate maximums 56 to 72 in. for 2-in. spacing, 84 to 96 in. for 3 or 4-in. spacing, and 96 to 120 in. for 6-in. spacing. All widths measured center to center of selva longitudinal wires.

Extra charge made for widths narrower than 40 in.

Finish: Plain or galvanized.

Tensile Strength: Standard, 60,000 to 70,000 lb. per sq. in.; 70,000 to 80,000 lb. furnished when ordered.

Weights—All above weights are based on a width of 60 in. measured from center to center of the outside or selva longitudinal wires.

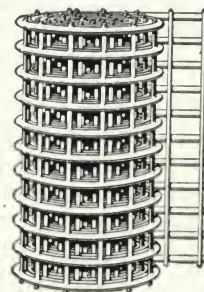


Fig. 2. Electrically Welded Wire Fabric Reinforcement

Electrically Welded Wire Fabric Reinforcement

A square or rectangular mesh made from cold drawn steel wire electrically welded at the intersections of the transverse and longitudinal wires. Various combinations of spacings and sizes of wires can be furnished.

This material combines the same high quality of material and service that has given Triangle Mesh reinforcement its enviable reputation.

AREA OF STEEL AND THICKNESS OF SLAB REQUIRED FOR GIVEN SPANS AND LOADS

Bending moment= $WL^2 \div 12$. Center of steel $\frac{3}{4}$ in. above bottom of slab.

Reinforcement in each case is sufficient for the live load shown plus the weight of the concrete slab. Any dead load of the floor exclusive of the concrete slab should be considered as part of the live load shown here.

Maximum stresses: Steel=18,000 lb., Concrete=700 lb.

Note: If not restricted by building code to a stress in the steel of 18,000 lb., a stress of 20,000 lb. can safely be used for wire mesh reinforcement. For a steel stress of 20,000 lb. reduce the areas of steel shown in the table by 10%.

After hundreds of tests of actual slabs made by the Testing Laboratory of Columbia University, the City of New York prepared a code covering slabs having spans of 8 ft. or less and decided on the use of an empirical formula that is equivalent to assuming a working stress in the steel in the standard formula for reinforced concrete design of approximately 32,000 lb. per sq. in. Millions of square feet of reinforced concrete floors have been built in accordance with this New York code.

Live load per sq. ft. lb.	Span of slab, center to center of supports, ft.-in.															
	4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0	9-6	10-0	10-6	11-0	11-6
Floor slab thickness and area of steel in sq. in. per foot width of slab required for spans and loads indicated																
30	3" .027	3" .035	3" .043	3" .053	3" .064	3" .075	3" .086	3" .100	3" .116	3" .132	3" .148	3" .166	3½" .183	3½" .198	3½" .218	4" .235
40	3" .032	3" .040	3" .050	3" .061	3" .074	3" .087	3" .101	3" .117	3" .135	3" .153	3" .172	3½" .188	3½" .206	4" .224	4" .245	4½" .266
50	4" .028	4" .035	4" .044	4" .054	4" .064	4" .076	4" .089	4" .102	4" .117	4" .133	4" .150	4" .168	4" .187	4" .208	4½" .229	5" .250
60	4" .030	4" .039	4" .049	4" .059	4" .071	4" .083	4" .098	4" .113	4" .130	4" .148	4" .166	4" .186	4" .207	4" .229	4½" .251	5" .273
80	4" .037	4" .047	4" .059	4" .071	4" .085	4" .100	4" .117	4" .135	4" .155	4" .176	4" .198	4" .223	4½" .248	4½" .272	5" .297	5½" .324
100	4" .042	4" .054	4" .068	4" .083	4" .099	4" .117	4" .137	4" .158	4" .180	4" .205	4" .231	4½" .259	4½" .285	5" .313	5" .343	5½" .373
125	4" .050	4" .064	4" .080	4" .097	4" .116	4" .137	4" .160	4" .185	4" .213	4½" .242	4½" .270	5" .302	5" .330	5½" .365	6" .399	
150	4" .058	4" .073	4" .092	4" .112	4" .135	4" .159	4" .185	4" .214	4½" .246	4½" .277	5" .310	5" .344	5½" .379	6" .417		
175	4" .066	4" .083	4" .104	4" .127	4" .152	4" .180	4" .210	4½" .243	4½" .278	5" .314	5" .352	6" .391				
200	4" .073	4" .093	4" .116	4" .141	4" .170	4" .200	4½" .234	4½" .272	5" .312	5½" .352	6" .394					
250	4" .088	4" .112	4" .140	4" .172	4" .205	4½" .243	4½" .288	5" .333	5½" .379	6" .436						
300	4" .103	4" .132	4" .165	4" .202	4" .242	4½" .289	4½" .343	5" .399	5½" .456	6" .513						

See tables on preceding page for styles of Triangle Mesh and American Electrically Welded Fabric that will give required areas.

Wire Fabric Reinforced Slabs

Supporting the Mesh Reinforcement—The correct location of the reinforcing mesh in the top portion of slabs over concrete beams can be easily and cheaply obtained by means of precast concrete blocks as shown in Fig. 3.

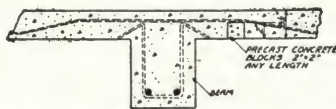


Fig. 3. Inexpensive Method of Supporting Wire Mesh Reinforcement Over Concrete Beams

Blocks should have a height about $1\frac{1}{4}$ or $1\frac{1}{2}$ in. less than the full thickness of the slab. The length may be any convenient amount such as 1 or 2 ft. or such lengths as are readily formed by breaking long strips of the blocks. The mesh should be supported for at least one-third of its width. These blocks will stay in approximately correct position without any means of attachment to the reinforcing mesh or to the forms.

For short spans (about 8 ft. or less) these blocks will be required on one side only of the beams. For spans greater than 8 ft., use blocks on both sides.

Detailing Widths of Mesh—For estimating purposes where accuracy is unnecessary, provided the estimate is on the safe side, it is permissible to assume that the mesh required will equal in square feet the actual

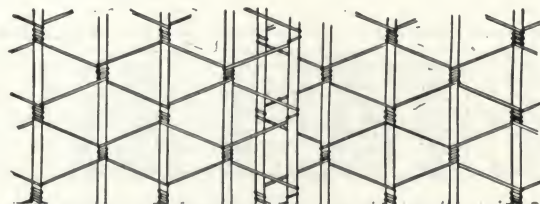


Fig. 4. Triangle Mesh Reinforcement As It Actually Appears with a Side Lap of 2 in.

area of the floor slab. As a matter of fact, the amount of mesh needed will be less than that, and at the same time a more efficient and more economical layout is possible. In the first place, a 2-in. lap along the sides of the sheets of wire mesh reinforcement is sufficient to develop the full strength of the reinforcement; more

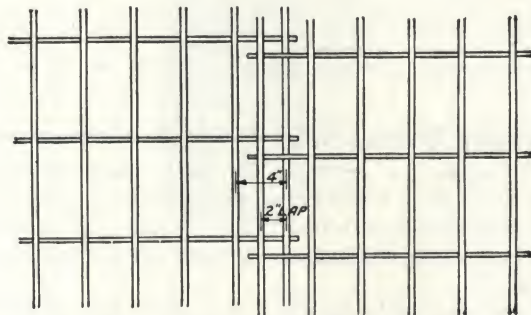


Fig. 5. Electrically Welded Fabric As It Actually Appears with a Side Lap of 2 in.

than that is a waste of material. This 2-in. lap means a lap of the outside (or selvage) longitudinal wires and should not be assumed for those forms of mesh having a zigzag selvage edge.

A suggested detail for the amount and location of wire mesh reinforcement is shown in Fig. 6. Providing a short strip of light weight fabric is placed near the top of the slab over the girders with the main longitudinal wires at right angles to the direction of the girders, it is not only unnecessary but a waste of material to require that the main reinforcement of the slabs entirely cover the space between and over the girders. The distance between the center line of the girder and the edge of the reinforcing fabric can be any amount up to about 20 in. without reducing the strength of the structure.

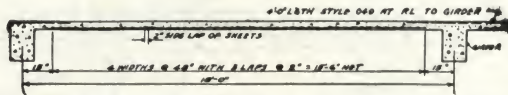


Fig. 6. Detailing Widths of Mesh and Showing Extra Strip of Mesh Over the Girders

Other Uses of Wire Mesh Reinforcement

Concrete Joist Floors—Fig. 7 shows a typical section of such a floor. Here is a 2 or 3-in. slab having a clear span between the supporting ribs of 23 in., that must not only act as part of the compression portion of the beams and resist temperature stresses, but in addition act as a support of the loads that may come upon the floor.

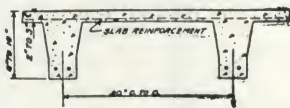


Fig. 7. Typical Section of Concrete Joist Floor

The most efficient type of reinforcement to take care of these various stresses is a fabricated mesh made from cold drawn high elastic limit wire with comparatively close spacing of members.

Top Layer of Concrete Finished Floors—It is often desirable for construction reasons to leave the $\frac{3}{4}$ or 1-in. top dressing until after the main part of the slab is completely hardened. In this case the slab should be thoroughly cleaned before applying the final course, and this course should be reinforced with wire mesh reinforcement to prevent destructive cracks.

Specify Style 032 Triangle Mesh or 4x4-in. mesh No. 12 by No. 12 gauge wires Electrically Welded wire fabric.

Basement and Other Floors that Rest Upon the Ground—As conditions vary with each job, it is impossible to make any definite suggestions regarding the proper weight of fabric to use, but millions of square feet of Style 049 Triangle Mesh have been successfully used for this purpose. Where heavy loads and questionable fill-foundations occur, it will be economy to use heavier mesh, such, for instance, as Style 153 Triangle

Mesh or an equivalent weight of Electrically Welded wire fabric having spacings of wires that do not exceed 6 in.

Flat Slab Beamless Floors—Wire fabric reinforcement has been successfully used for this type of construction. It can be furnished in rolls or flat sheets.

This material is most desirable and it is highly recommended.

Cement Gun Work—Gunitite (trade-name) is concrete applied by the cement gun process, which produces probably the densest and, therefore, the most waterproof concrete available by present known methods.

Gunitite reinforced with wire fabric reinforcement has repaired successfully old crumbling bridge piers, tunnel linings and sea walls; old steel bridges, tanks and trusses; leaky reservoirs and irrigation ditches; even wooden structures that have been damaged by fire have been restored to usefulness by this method. And repair work is by no means the most important class of work produced. All kinds of new construction, especially those requiring waterproof qualities with light resulting weight, can be successfully executed.

Fireproofing of Steel Framing—Wrap all steel columns, girders and beams with Triangle Mesh, Style 032, or Electrically Welded fabric, 4x4-in. mesh, all No. 12 gauge wires.

Concrete Chimneys—Style 153 Triangle Mesh is standard for the circumferential reinforcement.

Stucco Reinforcement—See page B1273.

Concrete Sewers—The close spacing of members of Triangle Mesh is largely responsible for the successful results obtained with precast sewer pipe. The weight of fabric varies with the diameter of pipe, thickness of shell and depth of fill.

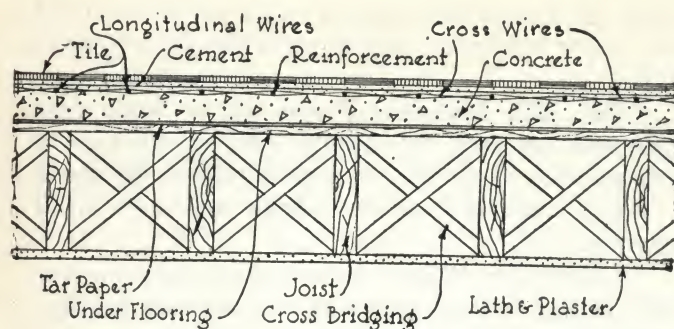
Concrete Driveways, Streets and Highways—Wire fabric reinforcement is essential to prevent destructive cracks. The purpose of the reinforcement is to increase the structural strength of the concrete slab and also to bind it together as a unit. The high tensile strength and the close spacing of members of a wire fabric show decided advantages for these purposes. The weight of wire fabric used in pavement has varied on account of varying conditions, but the average practice calls for 35 to 50 lb. per 100 cu. ft.

Suggested Specifications for Pavements—Reinforcement shall consist of steel wire fabric manufactured from cold drawn wire, finished members of which shall develop an ultimate tensile strength of at least 70,000 lb. per sq. in. and which shall bend cold 180° around a pin the diameter of which is equal to diameter of wire specimen without cracking on outside of bent portion.

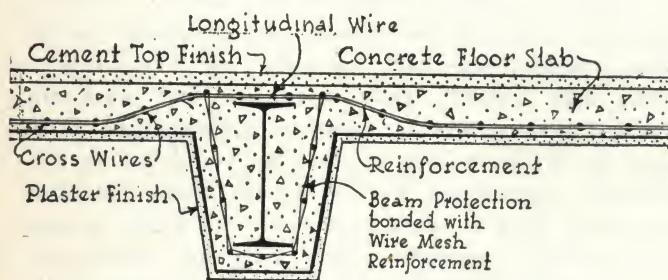
All reinforcement shall be free from excessive rust, scale, paint or coating of any character which will tend to prevent proper bonding of the concrete.

The fabric reinforcement shall weigh not less than 40 lb. per 100 sq. ft.

The main or heavier wires of fabric shall be spaced not more than 6 in. apart. The secondary or lighter wires of fabric shall be spaced not more than 12 in. apart.

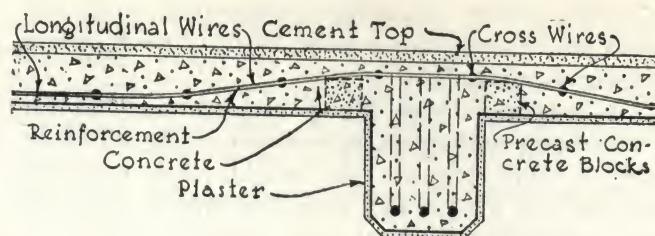


CONSTRUCTION FOR TILED FLOOR
IN NEW BUILDINGS

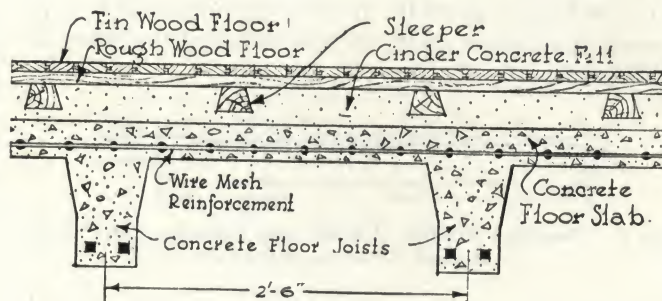


TYPICAL FLOOR CONSTRUCTION
STEEL BEAMS FIREPROOFED.

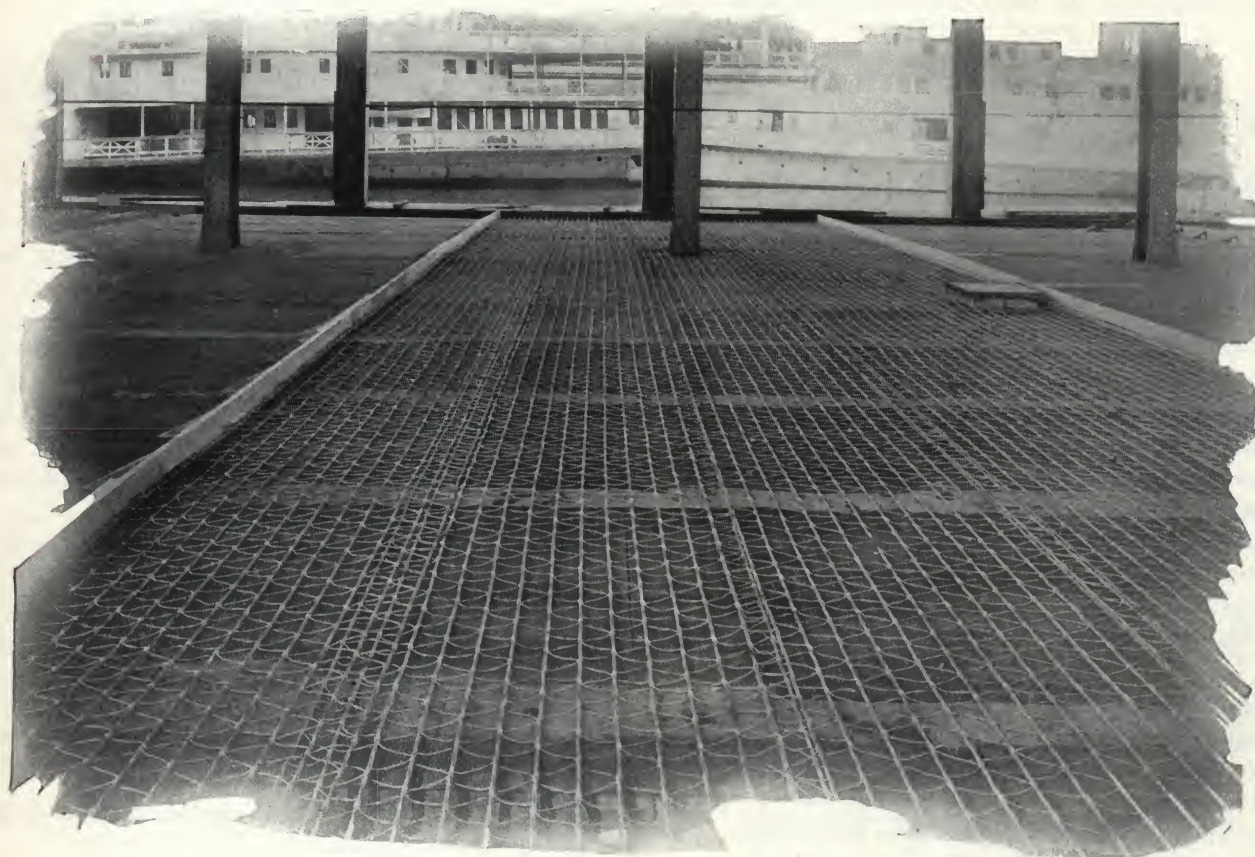
Triangle Mesh and Electric Weld Fabric Used for Reinforcement of Concrete Floor Construction



TYPICAL FLOOR CONSTRUCTION
WITH CONCRETE BEAMS.



TYPICAL FLOOR CONSTRUCTION
WITH CONCRETE FLOOR JOISTS.



Pier 42, North River, 56,000 Square Feet, Triangle Mesh Reinforcement Used

Note the large area of reinforcement with its heavy stranded longitudinals. Excellent results obtained with minimum installation cost

BARTON SPIDER-WEB SYSTEM, INC.

Reinforcing Steel; Manufacturers of the Barton Pan, Concrete Reinforcing Accessories and Metal Lath

TELEPHONES

LAFAYETTE 4142, 4143, 4144

3426 South Kedzie Avenue

CHICAGO, ILL.

Products

CONCRETE REINFORCEMENT: Round and Square Bars and Collapsible Column Spirals.

CONCRETE REINFORCEMENT DEVICES and ACCESSORIES: Combination High and Scream Chairs, Bar Chairs, Slab Bar Spacers, Joist Bar Spacers, Beam Bar Spacers, Concrete-to-brick Anchors, Concrete Inserts, Continuous Collapsible Stirrups.

BARTON PAN (with integral lath) and BARTON LONG SPAN METAL LATH.

BARTON NAILING STRIP, a Combination Nailing Strip, Sleeper Anchor and Floor Scream.

Concrete Engineering Service

The Barton Spider-Web System is the owner of U. S. Patents No. 1,335,780 and 1,217,645 covering the broad use of combination and two and four-way belts of rods in reinforced concrete flat slab construction.

The Barton Spider-Web System permits only its authorized licensees to incorporate this system in their designs. Infringers will be prosecuted.

We also furnish complete engineering services for any type of reinforced concrete construction, for a nominal fee, whether or not the Barton Spider-Web System is used.

Barton Spider-Web System of Reinforced Concrete Flat Slab Construction

The combination of two-way and four-way belts of rods in reinforced concrete flat slab construction covered by the above mentioned patents is altogether distinctive.

We license architects and engineers to employ the



Barton Spider-Web System in their plans for a very nominal fee. We do not license contractors or material dealers. Correspondence is invited.

Description of the System—The illustration shows the method of placing the reinforcing steel in the Barton Mat or Type A system.

Factory-fabricated units (or mats) consist of continuous looped bars with ends bent down so as to regulate the exact height of the unit and to act as spacers for the lower bars. One such unit or mat is placed in each direction over the column head to take care of the negative stresses. The positive stresses at the center of the span are taken care of by belts of rods extending from column to column, both directly and diagonally, covering the entire panel area and resting near the bottom of the slab. These rods are short and easy to handle.

Advantages of the System—Insures maximum economy of design because it makes possible larger effective depths in the slab.

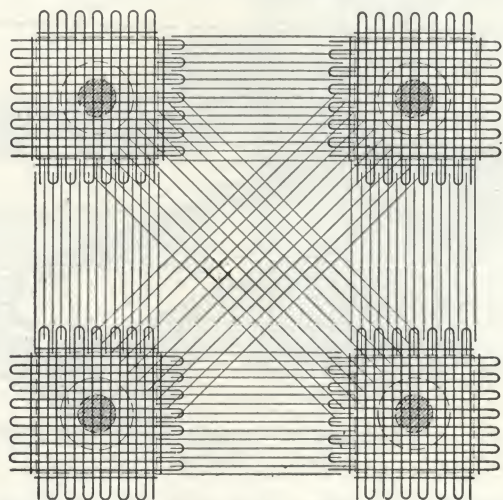
The Barton Spider-Web System results in a flat, level ceiling without the use of beams or girders.

This permits light to be diffused over the entire ceiling and allows sprinkler heads to be economically spaced so as to save up to 25% of the cost of the sprinkler equipment. Trolley beams can be placed flat against the ceiling instead of being hung on beams and hangers.

Barton Pan for Reinforced Concrete Joist Construction

The Barton Pan combines joist, ceiling and floor construction. The bottom of the pan is formed into metal lath, the heaviest on the market, dipped after being punched and has special claws for holding plaster besides ordinary perforations. The Barton Pan is properly set—not inverted—instantly ready for plastering and floor finishing.

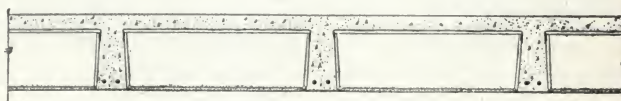
Simple in erection, easy and time-saving in handling; insures stiffness and rigidity. Top easily removable for installing pipes, conduits, boxes and anchorage means.



CROSS SECTION

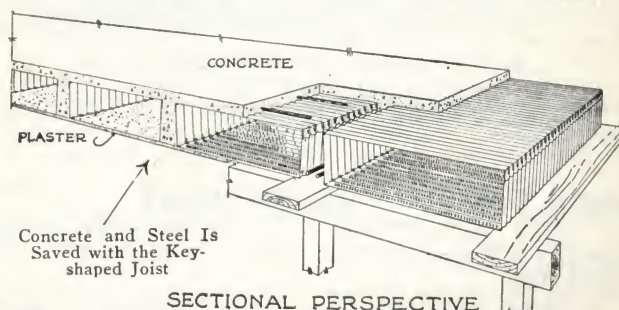
Barton Spider-Web System of Reinforced Concrete Flat Slab Construction

Showing the mat or Type A system using fabricated mats over columns with four-way reinforcement in the slab



TYPICAL SECTION

An Extension to Joist Spacing to 36 In. or More Is Attained



Concrete and Steel Is Saved with the Key-shaped Joist

SECTIONAL PERSPECTIVE

Barton Pan for Reinforced Concrete Joist Construction

No concrete is damaged in removing forms. Joists are always straight, shores can be removed speedily.

Watertight construction insures hard concrete. The Barton Pan saves time, labor and materials. Can be used in rows of any length.

Made from special hard steel sheets, with deep corrugations.

The outstanding feature of the Barton Pan is its reduction of dead load through its key-shaped joist as against the present wedge shape. By this means, the Barton Pan can save 20 to 27% of concrete required by ordinary removable and permanent pan construction and a resulting saving in steel.

Specifications of Pan Construction—The system of concrete floor and roof construction unless otherwise shown on the plans shall be a combination of concrete joists with the Barton Pan with integral lath, complete with end panels where required, manufactured by the BARTON SPIDER-WEB SYSTEM, Inc., Chicago, Ill.

All tile to be standard tile where possible, with approximate right angle—Barton Bend—at all angles.

Tile shall lap adjacent tile and shall accurately fit into each other as provided.

At the end of each row of tile, where rows join girders or walls, provide Barton End Units, locking same into the last corrugations, not stretched.

The lath formation shall be dipped in a good paint after being manufactured.

Barton Deformed Rib Bars

Rolled from new billet stock open hearth steel and conform to the specifications of the Association of American Steel Manufacturers. Made in square and round deformed sections in sizes $\frac{3}{8}$ to $1\frac{1}{4}$ in., the corners of the square bars being rounded to prevent splitting of the concrete.

Furnished cut to length and bent at mill or warehouse. Large stocks for immediate shipment.



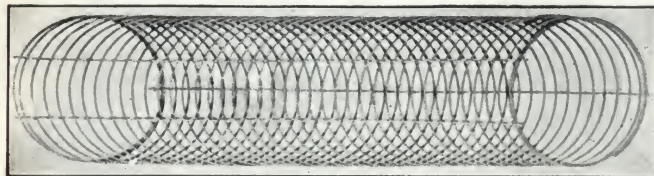
Square Deformed Bar



Round Deformed Bar

BARTON CONCRETE REINFORCEMENT BARS

Size, in.	Area, sq. in.		Weight per ft., lb.	
	Square	Round	Square	Round
$\frac{3}{8}$	.1420	.1115	.482	.379
$\frac{1}{2}$	.2525	.1982	.858	.674
$\frac{5}{8}$	.3945	.3098	1.341	1.054
$\frac{3}{4}$	.5681	.4462	1.932	1.517
$\frac{7}{8}$	.7912	.6073	2.629	2.064
1	1.0100	.7932	3.434	2.696
$1\frac{1}{8}$	1.2782	1.0039	4.346	3.413
$1\frac{1}{4}$	1.5781	1.2394	5.366	4.213



Barton Patented Collapsible Column Spiral

Coiled by machinery of special design (assuring uniformity of diameter) and assembled with the Barton patented link spacer.

Furnished in any length and in diameters of 10 to 38 in., inclusive; pitch, 1 to 4 in.

Carried in stock; immediate shipments assured

Barton Continuous Collapsible Stirrups

Shop fabricated and ready for the forms. No individual stirrups, chairs or wire to be misplaced or lost on the job.

Being one piece, it is easy to handle and requires little storage space.



Barton Continuous Collapsible Stirrup

Individual stirrups properly spaced and joined with the Barton patented tie rod become continuous collapsible stirrups. When so connected, the individual stirrups can not shift or change spacing.

At regular intervals, stirrups, specially designed to form legs, are placed. These support the other stirrups and the reinforcing bars at the proper distance from the bottom of the form. Chairs are integral.

Barton Nailing Strip

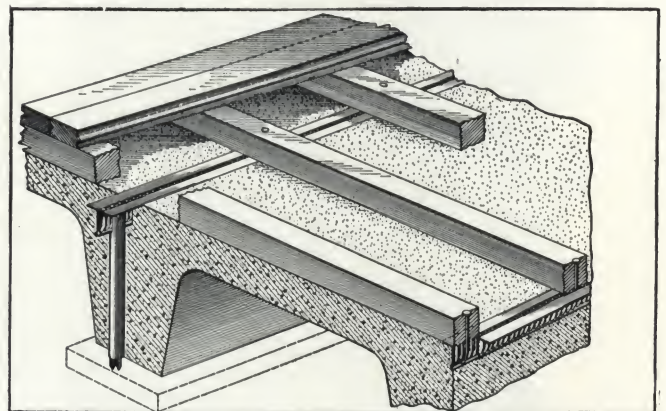
A combination nailing strip, sleeper anchor and floor screed.

This metal strip with its supporting unit (height in accordance with requirements) is simple to install. It is placed immediately after setting the metal forms and reinforcing steel and automatically acts as the screed for the concrete floor slab.

Floor sleepers may be anchored at any spacing desired by nailing to this strip. It may also be used where padding and carpet are placed directly above the concrete as in hotels and office buildings.

When placed in joist, beam, wall and column forms, it may be used for the installation of suspended ceilings, metal lath and wall furring and as an anchoring device for various purposes.

It makes possible the use of concrete lumber for fireproof partitions and other construction.



Barton Nailing Strip

Barton Combination High and Screed Chairs

Used for accurately locating and holding top reinforcing rods over column heads, over indirect bands in two-way flat slab construction and over beams and girders. Also used for supporting screeds in connection with floor slabs. Locking prong to hold bars in place, also wire and rail holes. Extra large seating area giving maximum strength. Carried in stock in all sizes from 3 to 9 in. high.

Barton Bar Chairs

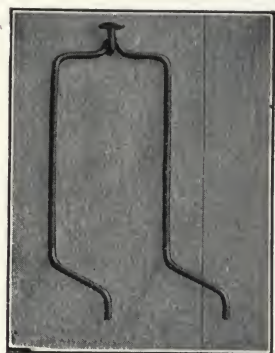
Furnished in place of the Barton combination high and screed chairs, where the bars over column heads are only 2 or 3 in. in height. Made of strip steel and furnished for exact height as called for on steel plans.

Barton Concrete-to-brick Anchors (Patented)

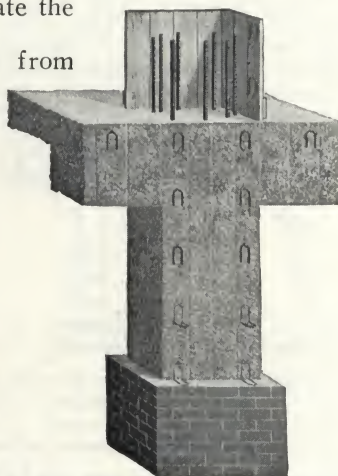
These devices are used for bonding brick veneer, stone, terra cotta or tile wainscoting to concrete surfaces. They are nailed to the inside of the form and left in place when the latter are removed.

Barton anchors are economical because no expensive drilling through forms is necessary to install them and because they do not mutilate the forms.

Immediate shipments from stock.



Anchor Nailed on Form Preparatory to Pouring of Concrete

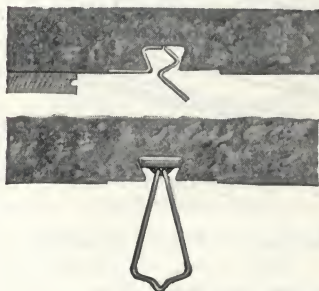


Anchors Left in Place Upon Removal of Forms

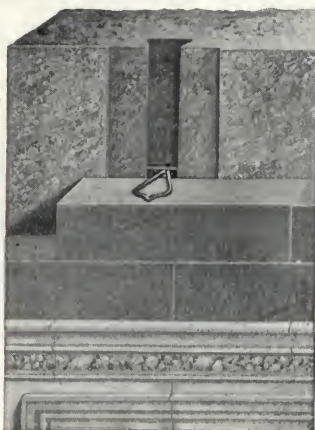
Barton Concrete-to-brick Anchors

Barton Key Slot Forms and Anchors (Patents Pending)

A system of metal forms that are removable from a key-shaped channel in concrete construction. With this system key-shaped anchors are inserted to fasten veneer of terra cotta, face brick, stone or any masonry to concrete after cement forms are removed.



Barton Key Slot Forms and Anchors



Barton Slab Bar Strip Spacer (Patented)

This strip spacer is well known and serves the same purpose as Barton slab bar spacer. It is made up special for each job.



Showing Bars Spaced, Supported and Tied on Barton Slab Bar Spacers

Barton Joist Bar Spacers

Designed to carry either one or two bars and are adaptable to any type of ribbed floor construction. Carried in stock and furnished in any width or height to meet the requirements. Made of strip steel, a combination of strength and durability.

Barton Beam Bar Spacers

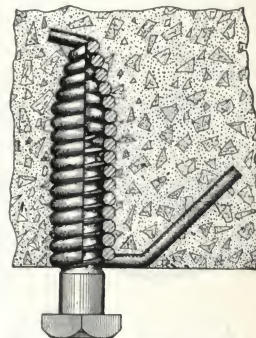
Made from strip steel with a large seating area for each bar. Will not tip. Carried in stock and furnished for exact height and width of beam and number of bars in each layer.

Barton Patented Concrete Inserts

Barton concrete inserts are used in concrete slabs, beams or columns for attaching shaft hangers, pipes, fixtures, sprinkler systems, etc. They are made of special drawn wire and are so coiled that the threads of standard lag bolts will mesh with them.

Their carrying capacity has been demonstrated by many years use and by Robert W. Hunt tests. They are the lowest priced inserts on the market because no unnecessary material is used in their construction.

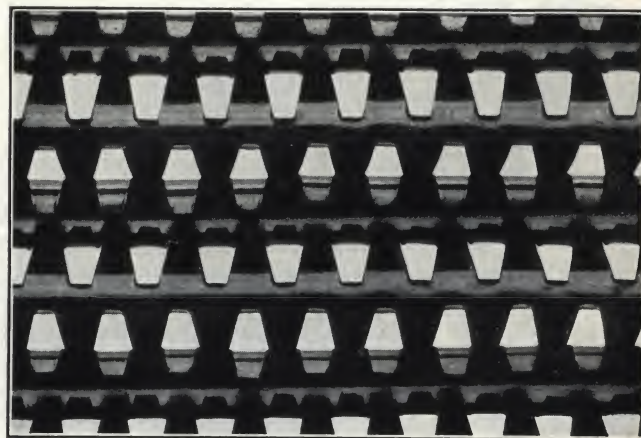
In 1/2, 5/8 and 3/4-in. sizes, with or without lag bolts. Stocked for immediate shipment.



Barton Concrete Insert—Lag Bolt in Place

Barton Long Span Metal Lath

A new style of metal lath. The unique feature is that it is made from steel sheets, with deep corrugations. The sides of the corrugations are punched to form talons or claws lying within the depth of the corrugations.



Barton Long Span Double Lath

The outstanding characteristics of the lath are:

Strength: made from special hard material for ceiling work, it allows a spacing of channel supports of 36 in. or more.

A true surface and minimum thickness of finished plaster work, as the outer surface of the corrugations provides a *rigid* and *perfectly level* troweling surface.

Economy: because the inner or back surface of the corrugations prevents more plaster being forced through than is necessary for a good key.

A good key and a good clinch, from the formation of the talons or claws between corrugations.

Spanning 36-in. centers, it eliminates intermediate channels and pencil rods, saving this cost and the time and labor cost of their installation.

CONCRETE CLIP & WIRE CO.

Manufacturers of Wire and Flat Steel Products for Building Construction

536-548 East 133rd Street, NEW YORK, N. Y.

Products

WIRE CLIP REINFORCEMENT for Concrete Fireproofing; HANGERS and HAIRPINS for Suspended Ceiling Construction; REINFORCING BAR CUTTERS and BENDERS.

Also Steel and Galvanized Mortar Boxes, Special Tools, Bridle Irons, Wall Ties and Ashlar Anchors.

Wire Clip Reinforcement

In order to prevent concrete fireproofing from cracking and falling off, wire clips are used on the bottom of structural steel members. They are manufactured in several styles, and the choice of style is a matter of personal preference.

Economy Clips—The Economy Clip (Fig. 52) has the longitudinal spacing member close up to the bottom of steel member to prevent interference with crosswise flow of concrete. The loops are under the flange, evenly spaced to provide adequate reinforcement. On extra wide flanges, two or more longitudinal reinforcing loops.



Fig. 52. Economy Clip



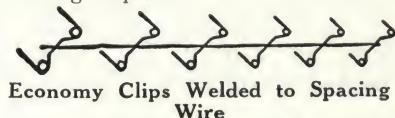
Fig. 51. Master Clip



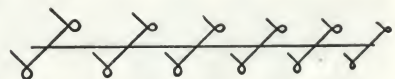
Fig. 53. Individual Clip



Fig. 54



Master Clips—The Master Clip (Fig. 51) has the loops extending beyond the edges of flange of the structural member, thereby providing the reinforcing loops at the outside corners.



Master Clips Welded to Spacing Wire

Sizes—Both Master and Economy Clips are generally furnished electrically welded, 11½ in. apart, to a longitudinal spacing wire 5 ft. long; and packed 50 lengths (250 ft.) per bundle. This spacing may be varied to meet special conditions.

Either the Economy type, Master, or the clip shown (Fig. 54) may be furnished individually without being welded to a spacing wire. In this form they are used as concrete and brick wall ties.

White Clip—The White Clip is furnished in straight lengths and is zigzagged across the beam flange very much like lacing up a shoe. The advantages of this clip are that it grips the flange very tightly, as each clip pulls hard on its neighbors; the flow of concrete is assisted by the diagonal direction of the wires. The clips proper extend beyond the

flange reinforcing the corners of the soffit.

Hung Ceilings

Usual practice for hung ceiling construction calls for ¾ or 1-in. cross furring channels 12 or 16 in. on centers, depending

on type of metal lath used. These are fastened to main furring channels or angles, which are usually 4 ft. on centers, by means of wire hairpins which we manufacture in shape shown as Fig. 12. The top bend in Fig. 12 further reduces erection time on the job. Hairpins quickly and securely tie main furring and cross furring together more rigidly than loose wire.

Ceilings are usually hung from hangers embedded in the concrete construction or attached to structural steel or wood members.

Hanger shown (Fig. 21 usually called toggle hanger) is the standard type of hanger used for suspended ceilings in concrete construction. When wood joists, steel beams supporting wood construction, or other conditions are encountered, we manufacture various types of hangers to support the ceilings. Those shown below are typical.

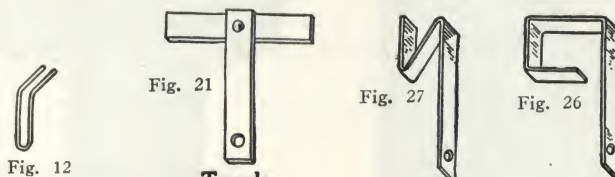


Fig. 12

Hairpin

Fig. 21

Toggle Hanger

Fig. 27

Fig. 26

Hangers

Special Jobs—It is sometimes desirable to omit the main carrying or furring members. The hangers below are notched for either ¾ or 1-in. channels. Notice that some of these types are designed to hang from bottom of structural members.

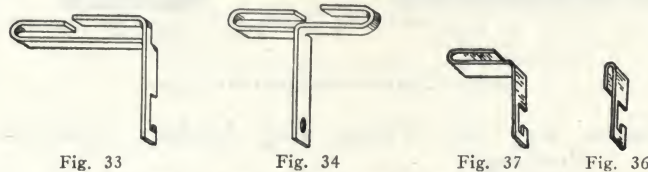


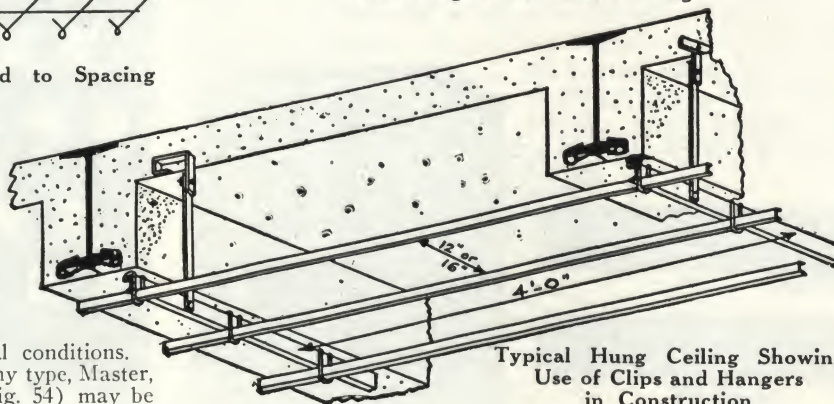
Fig. 33

Fig. 34

Fig. 37

Fig. 36

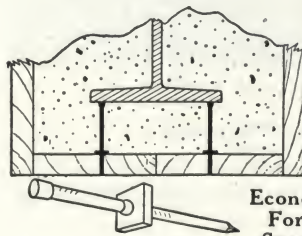
Beam Hangers for Cross Furring



Typical Hung Ceiling Showing Use of Clips and Hangers in Construction

Economy Form Spacers

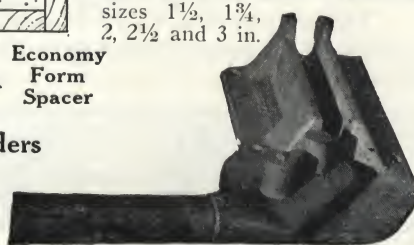
These are furnished to accurately space forms, giving an equal thickness of fireproofing at all points with a minimum of field labor. Made in sizes 1½, 1¾, 2, 2½ and 3 in.



Economy Form Spacer

Economy Bar Benders

No. 1 Bender will bend up to 1¼-in. round bars while the No. 2 is for smaller bars, up to ¾ in.



No. 1 Bar Bender

CONCRETE STEEL COMPANY

42 Broadway
NEW YORK, N. Y.

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JACKSONVILLE, FLA.

Products

CONCRETE REINFORCEMENT BARS; COLLAPSIBLE COLUMN REINFORCEMENT; CONCRETE REINFORCEMENT DEVICES, including SUPPORTING, SPACING and TYING DEVICES for holding bars in place in forms; WIRE SOFT-FIT CLIPS; WALL ANCHORS and TIES; CONCRETE INSERTS; CURB BARS; SAFETY STAIR TREADS; SHEET LATH; EXPANDED METAL LATH (Plain and Self-furring); EXPANDED METAL REINFORCEMENT; RIB LATH; HOT ROLLED and COLD FORMED CHANNELS; CORNER BEADS; BASE BEADS; WIRE DEVICES; ROLLED STEEL WINDOWS of all types.

For Havemeyer Truss, see page A572.

Engineering Departments

Experienced and efficient engineering departments are maintained in our district sales offices and will lend every assistance in solving all concrete reinforcement problems.

Havemeyer Concrete Reinforcement Bars

These deformed bars (Figs. 1 and 2) are rolled in square and round sections, with the deformations running longitudinally and entering directly into the tensile strength of the bar, no metal being used for the mechanical bond only. At all points they have constant uniform area of cross section exactly equal to the cross-sectional area of a plain bar of same size. Thus the purchaser secures all the advantages of a deformed bar with the same weight as a plain bar. He does not have to pay extra for the weight of the lugs.

As the projections and depressions are rolled longitudinally, there are no sharp angles to start a fracture when bar is bent. Tests prove the very superior bending qualities of Havemeyer bars.

Specifications for Steel—Havemeyer bars are rolled to any desired standard specification from new billet steel at mills which do not re-roll rails. This eliminates all possibility of substitution of inferior metal.

Shop Bending and Fabricating—Our warehouses are equipped for accurately bending and fabricating bars. This service eliminates a bending gang and bending machines on the job. Our warehouse charges for bending are less than it would cost the contractor if he did the work himself. Furthermore, shop bending assures the architect that every bar is bent accurately.

Fabricated units can be made up in our warehouses by using Havemeyer Beam-Saddles, Bar-Tys, etc., assuring proper spacing and placing of bars.



Fig. 1. Round

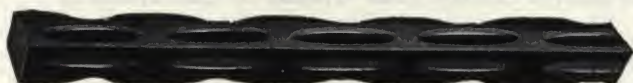


Fig. 2. Square

Havemeyer Concrete Reinforcement Bars

HAVEMEYER CONCRETE REINFORCEMENT BARS Ten Standardized Sizes Carried in Stock

Size .....in.	1¼ sq.	1½ sq.	1 sq.	1 rd.	¾ rd.	¾ rd.	¾ rd.	¾ sq.	¾ rd.	¾ rd.
Areas ....sq. in.	1.563	1.266	1.000	.785	.601	.442	.307	.250	.196	.110
Wght. per ft., lb.	5.313	4.303	3.400	2.670	2.044	1.502	1.043	.850	.668	.376
Mill extra for size per 100 lb. ...	Base	Base	Base	Base	Base	Base	10c	20c	20c	40c

Havemeyer deformed bars have a uniform area of cross section and the same weight per foot as plain bars.

Above standardized sizes recommended by the War Industry Board and adopted by the American Concrete Institute and by the Distributors of Reinforcing Bars.

Collapsible Column Reinforcement

Havemeyer Collapsible Column Spiral—Wire is accurately coiled to proper diameter and correctly spaced with a rigid spacer. Shipped collapsed, ready to be opened up and placed in the form.

Havemeyer Collapsible Columns—Havemeyer bars used for longitudinal members and for bands, the latter being attached to longitudinal members by Bar-Tys. Shipped collapsed for convenience in shipping and handling. Readily opened and set in place. These can be fabricated in our warehouses or by the contractor on the job. The use of Bar-Tys constitutes the cheapest method of assembling column steel.

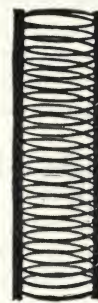


Fig. 3. Col-
lapsible
Spiral



Fig. 4. Col-
lapsible
Column

Securo Bar-Spacers for Supporting, Spacing and Holding Slab Reinforcing Bars

Made from hoop steel. Locking prongs and legs self-contained. Facilitate inspection—a missing bar is detected by its absence from the chair seat.

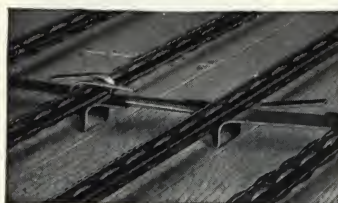


Fig. 5. Bar-Spacer

Standard height from underside of bar to form, ½, ¾ and 1 in. Minimum spacing between bars, 3 in. Booklet No. A8.

Havemeyer Bar-Tys for Tying Together Reinforcing Bars at Intersections

Used for tying together bars in walls, bent-up bars to supporting rods in slab, tying stirrups to beam bars, for fabricating columns, etc. More quickly attached than soft wire and much more secure.

Made from high grade spring steel wire in various sizes to accommodate any combination of bars.

Carried in stock.
Booklet No. A4.



Fig. 6. Bar-Ty

Havemeyer Ty-Chairs for Tying and Supporting Slab Reinforcing Bars

Quick, simple and economical. Made from high grade spring steel wire.

Standard distance from underside of bar to forms, 1 in.; special, $\frac{3}{4}$ to 2 in. Made in various sizes to accommodate any combination of bars used. Carried in stock. Booklet No. A4.

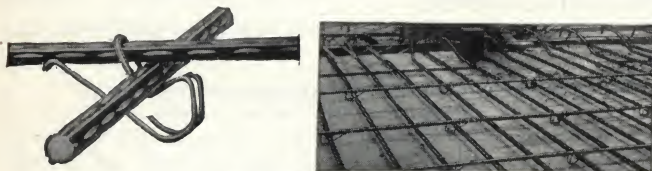


Fig. 7. Ty-Chair

One Ty-Chair used at each intersection on large bars and at every third intersection on small bars

Havemeyer Hy-Chairs for Supporting Head Rods Over Columns and Bent-up Bars in Slabs

Cheaper and better than concrete blocks. Made from pressed steel, beaded for strength and punched with locking prong and nailing holes.

Shipped nested. Easily carried and quickly distributed. Maximum size bar, $\frac{3}{4}$ in. Range in height from $1\frac{1}{2}$ to $8\frac{1}{2}$ in. Provided with nailing holes to insure retaining position in forms when concrete is poured. Booklet No. A8.

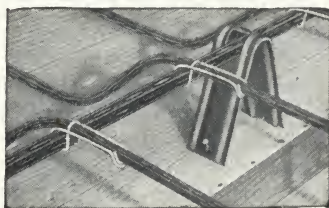


Fig. 8. Hy-Chair

Havemeyer Easel-Chairs for Supporting and Spacing Two Bars in a Joist

Used in terra cotta and steel tile construction. Made from high grade spring steel wire. Spring of locking arm securely holds bars in place. Single easel-chairs support one bar and both arms lock on the bar; double easel-chairs support two bars, one arm locking on one bar and the other arm on the opposite.

Standard distance from underside of bar to forms, 1 in.; special, $\frac{3}{4}$ to 2 in. Carried in stock. Booklet No. A4.

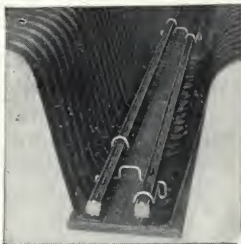


Fig. 9. Easel-Chair

Havemeyer Beam-Saddles and Separators for Supporting, Spacing and Holding Reinforcing Bars in Beams, Girders, Lintels, etc.

Saddles space and support lower layer of bars; separators space and support the upper layer.

Standard height from under side of bar to forms, $1\frac{1}{2}$ and 2 in. Made $\frac{1}{2}$ in. short of beam widths. Standard clear distance between layers, 1 in. Made from hoop steel. Locking prongs hold bars in position. Booklet No. A8.

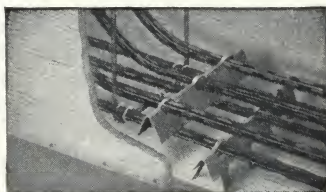


Fig. 10. Beam-Saddle and Separator

Havemeyer Round Nose Curb Bars

Staggered and flared anchors act as reinforcement. Absence of continuous web permits accurate

and even bending without kinking. Stocked in 10 and 12-ft. lengths, galvanized. Booklet No. A6.

We also make angle nose curb bars for stair nosings and platform edges. Booklet No. A6.



Fig. 11. Round Nose Curb Bar

Security Anchor and Wall-Tys

Used especially for bonding brick veneer, stone, terra-cotta or tile wainscoting to concrete surfaces. Also used for holding metal lath ceilings and for anchoring floor screeds.

Anchor is made from hoop steel; Tys from steel spring wire. Standard length of anchors is 8 ft.

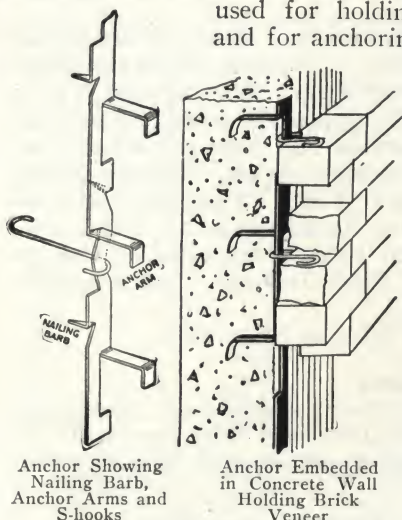


Fig. 12. Applications of Security Anchor and Wall-Tys

Concrete Inserts

Dayton Adjustable-Inserts—Made from highest grade malleable iron, cast in one piece with keyhole slot for adjustment.

No. 3 is for $\frac{1}{4}$ to $\frac{7}{8}$ -in. standard bolts; No. 5 for $\frac{3}{8}$ to $\frac{3}{4}$ -in. standard bolts, inclusive. Carried in stock. Booklet No. A7.

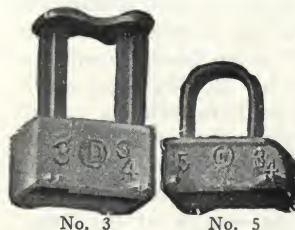


Fig. 13. Dayton Adjustable-Inserts

Havemeyer "Y" Socket-Inserts—Made from highest grade malleable iron. Broad nailing base with four nailing holes insures against displacement. Accommodate $\frac{3}{8}$ to $\frac{3}{4}$ -in. bolts with standard thread, both inclusive. Carried in stock. Booklet No. A7.



Fig. 14. "Y" Socket-Insert

Havemeyer Slotted-Inserts—Made from high grade pressed steel. Standard lengths, 12, 18, 24, 36 in. Accommodate $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -in. bolts; $\frac{7}{8}$ -in. bolt special. Have 6 nailing holes. Closed slot and removable end caps prevent seepage of concrete to inside. Can be used singly, or, with end caps removed, can be placed end to end for a continuous run. Carried in stock. Booklet No. A7.



Fig. 15. Slotted-Insert

Havemeyer Safety Stair Treads ("SaniTread")

"SaniTread," a combination of steel plate and lead slugs, can be applied to any type of concrete stairs. Cut to required lengths in multiples of 3 in. Carried in stock. Booklet No. A6.

Havemeyer Metal Lath

An ideal base for ceilings, walls, partitions and exterior stucco work. A stiff heavy product made of



Fig. 16. Havemeyer Flat Lath

steel, plain or galvanized, or of pure iron, especially well suited for overcoating or long spans.

WEIGHTS OF HAVEMEYER LATH

2.2 lb. per sq. yd.	*3.00 lb. per sq. yd.
*2.5 lb. per sq. yd.	*3.40 lb. per sq. yd.

*Asterisk indicates weights that are standard.
All sheets are 24x96 in.; 1 7/8 sq. yd. per sheet; 9 sheets per bundle; 16 sq. yd. per bundle.

Flat-Rib Metal Lath

Has reinforcing ribs 1/2 in. wide, 1 3/4 in. apart center to center. A rigid, flat, strong lath, permitting wide spacing of studs, joists or channels, saving both labor and material.

Sheets are square and there is no loss in laps. They permit scratching in of the mortar and doubling back from same scaffold, practically two-coat work; a decided economy in both mortar and labor.

Weights per yard: painted, 2.75, 3.2 and 3.5 lb.; galvanized, 3.6 lb. Sheets are 24x96 in., 9 sheets to the bundle, covering 16 sq. yds.

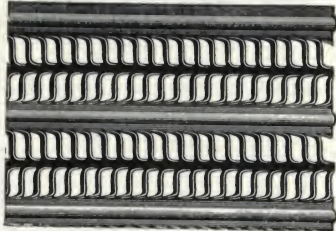


Fig. 17. Flat-Rib Metal Lath

Havemeyer 3/4-in. Rib Lath

For roof construction, partitions, floor slabs, outside walls, etc.

Windows—Rolled Steel—All Types

Information furnished on request.

Havemeyer Expanded Metal

Sizes with large diamonds are used for reinforcing, especially for culverts, sewers, bridges, tanks, etc. Smaller diamonds for machinery guards, enclosures, railings, lockers, stucco, etc. Furnished in full range of sizes from 3x7 in. to 1/2x1 3/4 in.

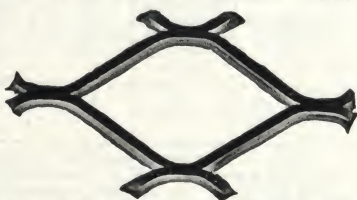


Fig. 18. Havemeyer Expanded Metal

Havemeyer Channels, Angles, Flats

Hot Rolled—Furnished in any size on short notice.



Fig. 19. Havemeyer Cold Formed Channel

Cold Formed—For suspended ceilings, furring, columns, false beams, cornice work, or for solid or hollow partitions. Stock lengths, 12, 14, 16, 18 and 20 ft.

STANDARD SIZES HAVEMEYER CHANNELS

Gauge No.	16	16	16	16
Width	3/4	1	1 1/2	2
Flange	3/8	3/8	3/8	3/8
Weight per 1000 ft.	276	332	456	580

Havemeyer Corner Beads

Wing Bead—No. 26 gauge special analysis galvanized sheet. Stock lengths, 6, 7, 8, 9, 10 and 12 ft.; 10 pieces to bundle; weight, 200 lb. per 1000 ft.

Curved Point Base Screenshot—Forms a permanent ground for plastering and secures a sanitary base with precisely true lines. Fabricated from tightcoat galvanized open-hearth sheets. Lengths 10 and 12 ft. Weight 225 lb., crated, per 1000 ft.

Bull Nose Bead—No. 26 gauge galvanized steel, 3/4-in. radius. Lengths, 6, 7, 8, 9 and 10 ft.; weight, 273 lb. per 1000 ft.

Base Bead

For cement base No. 26 gauge galvanized sheets. 12 pieces per bundle; weight, 135 lb. per 1000 ft.

Expansion Corner Beads

Made of tightcoat, galvanized, open-hearth steel. Takes much less time to erect than other types.

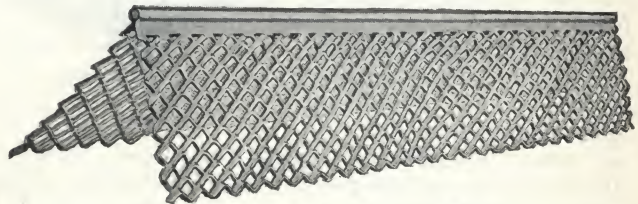


Fig. 20. Expansion Corner Beads

Furnished in 6, 7, 8, 9, 10 and 12-ft. lengths. Weight per 1000 ft., 240 lb.

Also cut from pure copper or zinc for exterior use with stucco.

Expansion Bull Nose Bead

Weight: No. 26 gauge, 375 lb.; No. 24 gauge, 470 lb.

Expansion Trim

Information furnished on request.

Havemeyer 3/8-in. Rib Lath

An exceptionally stiff metal lath—A labor and material saver, therefore a money saver.

Sheets are 24x96 in.; ribs spaced 4.8 in. center to center; ribs 3/8 in. high. Rapid erection results from using a smooth sheet. Economy results from perfect fit of interlocking ribs along sides and ends, from reduced number of fastenings to supports, and from saving in material by spacing supports further apart without sacrificing stiffness of plaster.



Fig. 21. Havemeyer 3/8-in. Rib Lath

MAXIMUM SPANS RIB LATH

Weight lb. per sq. yd.	Ceilings		Partitions	
	Steel furring, in.	Wood joists, in.	Steel studs, in.	Wood Studs, in.
4.0	30	36	36	40
3.5	24	30	30	36
3.0	19	24	24	30
2.75	16	19 1/2	19 1/2	24

Wire Devices

Our wire shops are prepared to manufacture, on short notice, any type of wire device required for the installation of suspended ceilings or for securing lath. Tie wire staples, etc., carried in stock.

Wire Mesh

A. S. and W. Triangle and Electric Weld; stock or mill shipments.

THE CONSOLIDATED EXPANDED METAL COMPANIES

GENERAL OFFICES

Steelcrete Building
WHEELING, W. VA.

SALES OFFICES AND WAREHOUSES

ATLANTA, GA., 232 Marietta Street
BOSTON, MASS., 201 Devonshire Street
BUFFALO, N. Y., 50 Wecker Avenue
CHICAGO, ILL., 2531 Arthington Street

CLEVELAND, OHIO, 9913 Elk Avenue
NEW YORK, N. Y., 103 Park Avenue
PHILADELPHIA, PA., 1075 Germantown Avenue
PITTSBURGH, PA., Oliver Building

ST. PAUL, MINN., 1429 Marshall Avenue

EXPORT OFFICE, 152 West 42nd Street, NEW YORK, N. Y.

Products

"STEELCRETE" MESH for the following uses: Expanded Metal Concrete Reinforcement; Road Mesh for Highway Reinforcement; Bank Vault Protection; Beam Wrapper.



Also Underwriters' Tested "Steelcrete" Mesh and Accessories for safety guards, shop enclosures, window guards, lockers, etc.

For Expanded Metal for Armored Vaults, see page A1103; for "Steelcrete" Expanded Metal Plastering Lath, Stucco Binder, Corner Bead and Cold Rolled Channels, see page B1293.

Sectional Area

Expanded metal sheets up to 16 ft. in length are furnished with a sectional area of .60 sq. in. and under. The 12-ft. sheets, and shorter, may be had up to 1.00 sq. in.

Scope of Use

"Steelcrete" mesh is the most widely used and oldest of concrete reinforcements for floor and roof slabs, sewers, conduits, tanks, roads, highway bridges, culverts, retaining walls, etc.

In bank vault construction, the design provides an entanglement of steel embedded throughout the concrete; proof against the cutting flame.

Description

"Steelcrete" mesh as it is made today is a steel diamond mesh fabric, in flat sheets, cold drawn from special low carbon open hearth steel. The cold drawing of this material by the "Steelcrete process" increases the elastic limit to above 55,000 lb. per sq. in., and thoroughly tests each strand. Thus "Steelcrete" has a guaranteed elastic limit more than 60% higher than commercial medium steel.

Slabs reinforced with "Steelcrete" mesh are better adapted to severe usage than slabs reinforced with a steel having low elastic limit and of a low yield point.

Specifications for the Use of "Steelcrete" Mesh Reinforcement

The "Steelcrete" mesh shall be laid on the forms with long way of the diamond meshes extending in a direction transversely to supporting beams. The separate sheets shall be lapped one mesh on the side and one or more meshes on the end, according to weight of metal used and other conditions, and wired together with annealed tie wire at a sufficient number of points for the purpose of holding sheets in position while depositing the concrete—unless the design is such as to allow the lapping of sheets on sides only. The concrete shall be deposited through the meshes of "Steelcrete," keeping the

metal about $\frac{1}{2}$ in. from bottom of slab. To obtain a more continuous action of adjacent floor slabs, and to prevent cracks over supports, the "Steelcrete" is raised to within about $\frac{3}{4}$ in. of top of the slab over supporting beams. (If "Steelcrete" occurs, in vertical walls, etc., the location and long way of meshes should be specified.)

STANDARDS FOR "STEELCRETE" EXPANDED METAL

Designation of mesh	Effective sectional area sq. in. per ft. width	Approx. weight per sq. ft., lb.	Standard width of sheets, ft.-in.	Sq. ft. in a standard sheet of various lengths				Sheets in a standard bundle
				8 ft.	10 ft.	12 ft.	16 ft.	
3-13-075	.075	.25	6-4	50.67	63.33	76.00	101.33	10
3-13-10	.10	.34	7-0	56.00	70.00	84.00	112.00	7
3-13-125	.125	.42	5-8	45.33	56.67	68.00	90.67	7
3-9-15	.15	.51	7-0	56.00	70.00	84.00	112.00	5
3-9-175	.175	.60	6-0	48.00	60.00	72.00	96.00	5
3-9-20	.20	.68	5-3	42.00	52.50	63.00	84.00	5
3-9-25	.25	.85	4-2½	33.67	42.08	50.50	67.33	5
3-9-30	.30	1.02	7-0	56.00	70.00	84.00	112.00	2
3-9-35	.35	1.19	6-0	48.00	60.00	72.00	96.00	2
3-4-40	.40	1.36	4-7	36.67	45.83	55.00	73.33	2
3-4-45	.45	1.53	4-1	32.67	40.83	49.00	65.33	2
3-4-50	.50	1.70	7-4	58.67	73.33	88.00	117.33	2
3-4-55	.55	1.87	6-8	53.33	66.67	80.00	106.67	2
3-4-60	.60	2.04	6-1½	49.00	61.25	73.50	98.00	2

Note: All the above sizes are furnished in a standard diamond 8-in. length and approximately 3-in. width. All sizes are furnished in stock lengths 8, 12 and 16 ft. In addition, all sizes from 3-13-075 to 3-9-35, inclusive, are furnished in stock lengths of 10 ft.

EXTRA HEAVY "STEELCRETE" EXPANDED METAL

Manufactured from $\frac{1}{8}$ -in. plate

Designation of mesh	Effective sectional area sq. in. per ft. width	Approx. weight per sq. ft., lb.	Standard width of sheets, ft.-in.	Sq. ft. in a standard sheet of various lengths			Sheets in a standard bundle
				8 ft.	10 ft.	12 ft.	
3-1-75	.75	2.74	5-5	43.33	54.17	65.00	1
3-1-100	1.00	3.63	4-0	32.00	40.00	48.00	1

Note: The above sizes are furnished in a diamond 8-in. length and approximately 3-in. width. Both sizes are furnished in stock lengths of 8, 10 and 12 ft. In addition, intermediate sectional areas will be furnished from stock lengths of 8 and 12 ft. The standard width of sheets will be furnished for each case on application.

Printed Matter and Co-operation

THE CONSOLIDATED EXPANDED METAL COMPANIES issue the following literature:

The "Steelcrete" Handbook, 240 pages, containing useful tables and designing data.

"Expanded Metal vs. Bars," giving tests.

"Time-tested Products," a booklet catalogue listing and describing all expanded metal products.

"Steelcrete Metal Lath," a booklet describing metal lath and kindred products.

"Steelcrete Industrial Mesh Handbook," a descriptive and instruction booklet on layout and fabrication of safety guards for all purposes.

Representatives and estimators travel out of all the various offices. "Steelcrete" products can be obtained from warehouses or mill shipments.

MITCHELL-TAPPEN COMPANY

Standardized Metal Caging ("SMC")

15 John Street, NEW YORK, N. Y.

REPRESENTATIVES

AKRON, OHIO, HARDWARE & SUPPLY Co., 475 So. High Street
BALTIMORE, MD., J. BAYARD EMBICK, 813 American Building
BOSTON, MASS., ROBERT B. CAMPBELL, 49 Ellery Street
CHICAGO, ILL., OLNEY J. DEAN & Co., 137 So. La Salle Street
DETROIT, MICH., E. W. NICKLIN Co., General Motors Building
GREENVILLE, S. C., R. P. SWEENEY Co.
INDIANAPOLIS, IND., ARCHITECTURAL ENGINEERING Co., W. Ohio Street

LOS ANGELES, CALIF., SAMSON ENGINEERING Co., Bradbury Building
MONTREAL, QUE., C. G. PORTER & Co., 503 New Berks Building
SAN FRANCISCO, CALIF., BADT-FALK & Co., 346 Calle Building
PITTSBURGH, PA., PITTSBURGH BUILDING SPECIALTIES Co., Jones Law Building
TORONTO, ONT., H. A. J. ALDINGTON, 53 Yone Street Arcade
UTICA, N. Y., H. H. FREY, 7 Springate Street

Standardized Metal Caging (Pat. Dec. 15, 1914)

"SMC," for fireproofing steel structures. A wire basket or cage (see illustration) which firmly grips beam flange extending below and beyond flange, permanently locking concrete protection to steel, thereby providing a continuous strengthening skeleton at a pre-determined or fixed offset distance from the flange.



Application of Standardized Metal Caging

End wire of section is caught over end of beam, and workman easily holds and pulls out section, which automatically locks to the structural member. Stretch out after applying

"SMC" cannot "bunch"; it pulls out like a camera bellows, maintaining equal spacing of about 5 in. under middle of beam. It clasps flange tightly at edges leaving a clear space for flow of concrete under flange. When used on girders, columns or deep beams, additional wires of special shape (see HS below) may be used to reinforce the side protection or haunches.

Exclusive features shown in illustration. "SMC" comes to job ready to use and can be easily applied by inexperienced labor.

"SMC" is shipped in collapsed sections about 4 ft. long, each containing 250 clamps, and is easy and inexpensive to handle. Such a section of size A, B, or C when pulled out, is sufficient to cover about 120 ft. of beam flange, 30 pieces of substitute material 4 ft. long or 120 pieces 1 ft. long would have to

be handled for the same length of beam, and then would only provide a more or less unsatisfactory substitute.

SIZES OF "SMC" FOR COLUMNS

S. M. C. No.	Size of jaw opening	Width of flange	H Columns Caging for both flanges	Clamps per 100 lin. ft.
A	7 1/2" x 5 1/2"	4" - 5" 6" - 6 1/2"	4' 5" 6' 8" H 23.5 to 34.5 lb 10' 33.5 to 47.5 lb. 12' 40.5 to 55 lb. 14' 43 to 58.5 lb.	400 450
B	10 1/4" x 7 1/2"	8" - 8 1/2"	8' 32 to 62.5 lb. 8' 67.5 to 91 lb. 10' 49.5 to 77.5 lb. 12' 52.5 to 70 lb. 14' 55 to 73.5 lb.	440 450
B Sp'l.	10 1/4" x 1 1/4"	8 1/4" - 8 1/2"	10' 49.5 to 77.5 lb. 12' 52.5 to 70 lb. 14' 55 to 73.5 lb.	420
C	13" x 7 1/2"	10" - 10 1/2"	10' 83.5 to 136.5 lb. 12' 65.5 to 119.5 lb. 14' 69 to 90 lb.	420 610
C Sp'l.	13" x 1 1/2"	10 1/2" - 10 3/4"	12' 126.5 to 190 lb. 14' 84 to 139 lb.	624
11 Sp'l.	14 1/2" x 1 1/2"	12 1/2" - 12 3/4"	14' 147 to 228.5 lb.	610
12 Sp'l.	16 1/2" x 1 1/2"	14 1/2" - 14 3/4"	14' 237 to 288.5 lb.	650
12 Sp'l.	16 1/2" x 2 1/4"	14 3/4" - 15"		702

Channel Material

Can be used on all channels	Size	Channel Material	Clamps per 100 lin. ft.
	5 1/4" x 3 1/2"	6" channel, H. S. size 14"	277
		7" channel, H. S. size 14"	286
		8" channel, H. S. size 14"	294
		9" channel, H. S. size 14"	303
		10" channel, H. S. size 18"	313
		12" channel, H. S. size 18"	329
		15" channel, H. S. size 21"	333

Note: On large beams use one haunch stiffener with each clamp. On large columns use one haunch with each two clamps. All sizes in stock.

S. M. C. No.	Size of jaw opening	Width of beam flange	For Use on Standard Beams	For Use on Carnegie Beams	For Use on Bethlehem Beams and Girders	Clamps per 100 lin. ft.
A	7 1/2" x 5 1/2" Use on flanges from smallest up to 6 1/2" x 1 1/2" thick	3" - 3 1/2" 3 1/2" - 4 1/2" 4 1/2" - 5" 5" - 5 1/2" 5 1/2" - 6" 6" - 6 1/2"	4" 7.7-10.5 lb. 5" 10-12.25 lb. 6" 12.5-17-25 7" 15.3-17.5-20 lb. 8" 18.4-20.5-23-25 lb. 9" 21.8-25 lb. 9" 30-35 lb. 10" 22.4-25.4-30-35-40 lb. 12" 27.9-31.8-35-40.8-50 lb. 12" 60 lb. 15" 37.8-42.9-45-50-55 lb. 15" 60.8-65-70-75 lb. 18" 46-48.2-55-60-65-70	4" 13.8 lb. 5" 18.9 lb. 6" 18-21 lb. 9" 21-25 lb. 6" 20-22.5-27.5 lb. 9" 21. 10" 23-26-30. 15" 35 lb. 16" 38 lb.	8" B 17.5-19.5 lb. 9" B 20.5-24 lb. 10" B 23.5-28.5 lb. 12" B 28.5-32-36.5 lb. 12" B 28.5-36.5 lb. 15" B 38.5-41-46 lb.	182 190 200 206 214 222 235
B	10 1/4" x 7 1/2" Use on flanges from 6" to 9" wide x 1 1/2" thick	6 1/2" - 6 1/2" 6 1/2" - 7" 7" - 7 1/2" 7 1/2" - 8" 8" - 8 1/2" 8 1/2" - 9"	15" 70-81.3 lb. 18" 48.2-70 lb. 20" 65.4-70-75 21" 57.5-60.4 lb. 18" 75-80-85-90 lb. 20" 81.4-85-90-95-100 lb. 24" 69.5-79.9-85-90-95-100 lb. 21" 60.4 lb. 24" 74.2 lb. 27" 90 lb. 2-8s 25.5 lb.	9" 29-32-35 lb. 11" 25 lb. 13" 30 lb. 8" 24-27-30 lb. 12" 28-32-34-36 lb. 14" 33-36-38-39-42 lb. 16" 40-43-45-50 lb. 18" 47-51-52-58 lb. 8" 31-60 lb. 10" 31-36-42 lb. 12" 40-45-50. 14" 48-53-58 16" 58-63-68 lb. 21" 58-60-64-70 lb. 24" 70 lb. 9" 38-43-48 lb. 18" 67-72-78 lb.	15" B 44-64-71.5 lb. 18" B 49-52-54.5-59 lb. 20" B 59-64-5-69 8" BG 31-37 9" BG 36-38.5 lb. 18" B 64-69-74 lb. 20" B 73-82 lb. 22" B 65.5-68.5-71.5 lb. 24" B 73.5-84.5 9" BG 36-43.5 lb. 10" BG 41.5-50 lb.	190 200 206 214 222 235
BS	10 1/4" x 1 1/2"	8" - 9"		9" 66-72-78-84-90 lb. 21" 92 lb.		235
C	13" x 7 1/2" Use on flanges from 9" to 11 1/2" x 1 1/2" thick	9" - 9 1/2" 9 1/2" - 10" 10" - 10 1/2" 10 1/2" - 11" 11" - 11 1/2" 11 1/2" - 11 3/4"	2- 9s 21.8-25-30 lb. 2- 9s 35 lb. 2-10s 25.4 lb. 2-10s 30-40 lb. 2-12s 31.8-35-40.8-45 lb. 2-12s 50-55 lb.	10" 49-56-63 lb. 21" 80 lb. 24" 76-85-94 lb. 27" 91-101 lb. 10" 70-77-84 lb. 12" 75-83-91 lb. 14" 61-68-75 lb. 10" 92 lb. 12" 100 lb.	24" B 95.5-104.5 lb. 26" B 91 lb. 28" B 106 lb. 12" BG 51.5-76.5 lb. 30" B 121 lb. 15" BG 69-74-80.5 lb. 2-9s B 20.5 lb. 15" BG 99-105-111 lb. 18" BG 87.5-100 lb.	190 200 206 215 222 235
CS	13" x 1 1/2"	9 1/2" - 11"		27" 112 lb. 30" 115-125-135 lb.		215
11	14 1/2" x 1 1/2" Use on flanges from 11 1/2" to 13 1/2" wide up to 1 1/2" thick	11 1/2" - 12 1/4" 12 1/4" - 12 1/2" 12 1/2" - 12 3/4" 12 3/4" - 13" 13" - 13 1/2" 13 1/2" - 13 3/4"	2-15s 42.9-55 lb. 2-15s 60 lb. 2-18s 55 lb. 2-15s 65-75 lb. 2-20s 65.4-70. 2-18s 60-75	10" 100-108 lb. 12" 110-120 lb. 14" 85-95-105 lb. 16" 76-90 lb. 18" 86-93-100 lb. 24" 100-110-120 lb. 10" 116 lb. 10" 124 lb. 12" 130-140 lb. 10" 132 lb. 21" 104-112-120 lb. 10" 140 lb.	15" BG 135-147 lb. 20" BG 107-120 lb. 2-10s B 23.5 lb. 24" BG 114-129 lb. 2-12s B 28.5 lb. 20" BG 135-149 lb. 2-12s B 36.5 lb. 24" BG 133-149 lb.	305 312 325 340 355 370
12	16 1/2" x 1 1/2" Use on flanges from 13 1/2" to 15 1/2" wide up to 1 1/2" thick	13 1/2" - 13 3/4" 13 3/4" - 14 1/4" 14 1/4" - 14 1/2" 14 1/2" - 14 3/4" 14 3/4" - 15" 15" - 15 1/4"	2-20s 75 lb. 2-20s 81.4-85-90 lb. 2-18s 75-90 lb. 2-20s 95-100. 2-24s 80-95	14" 115-125-135 lb. 18" 100-107-115 lb. 24" 130-140-150-160 lb. 27" 145-160 lb.	26" BG 144-160 lb. 2-15s B 38.5 lb. 28" BG 165-175 lb. 2-15s B 54.5 lb. 30" BG 181-200 lb.	302 312 325 340 355 370
12S	16 1/2" x 1 1/2"	13 1/2" - 14 1/4" 14 1/4" - 14 1/2" 14 1/2" - 14 3/4"		12" 150 lb. 27" 175-190 lb. 30" 180-200-220-240 lb. 12" 160 lb. 12" 170-180 lb.		312 325 340
12S	16 1/2" x 1 1/2"	14" - 14 1/4" 14 1/4" - 14 1/2" 14 1/2" - 15"		12" 190 lb. 12" 200-210 lb. 12" 220-230 lb.		312 325 355
13S	18 1/2" x 1 1/2" 18 1/2" x 1 1/2" 18 1/2" x 2 1/4"	15 1/2" - 15 1/4" 15 1/4" - 15 1/2" 15 1/2" - 16"		14" 131-145-155-165 lb. 18" 175-185-195 lb. 15" 205-215-225-235 lb. 16" 245-255 lb. 16" 265-275-285-295-305 lb.		302 302 312

Note S after size indicates special.

KALMAN STEEL COMPANY

THE CORRUGATED BAR COMPANY IS NOW CONSOLIDATED WITH THIS COMPANY

Manufacturers of Concrete Reinforcement Products

1456 Wrigley Building
CHICAGO, ILL.

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		PITTSBURGH, PA.	ST. PAUL, MINN.	SYRACUSE, N. Y.	

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Products

CORRUGATED BARS for concrete reinforcement; COLUMN SPIRALS; STEEL TILE; CONCRETE ACCESSORIES: Spacers, Beam Chairs, etc.; Screed Chairs; Inserts; Sleeper Anchors.

Also Corr-Bar Units; Metal Lath; Wire Fabric; Steel Grating; Metal Column Forms; and related products.

Corrugated Bars

Deformed bars of highest grade steel, rolled from new billets exclusively, in square and round sections in accordance with the following schedule.

STANDARD SIZES CORRUGATED BARS

Round			Square		
Size, in.	Net area, in sq. in.	Weight per ft., lb.	Size, in.	Net area, in sq. in.	Weight per ft., lb.
$\frac{3}{8}$	.11	.38	$\frac{1}{2}$	.25	.86
$\frac{1}{2}$	.19	.66	1	1.00	3.43
$\frac{5}{8}$	.30	1.05	$1\frac{1}{8}$	1.26	4.34
$\frac{3}{4}$	.44	1.52	$1\frac{1}{4}$	1.55	5.35
$\frac{7}{8}$	.60	2.06			
1	.78	2.69			

Information as to standard price extras for size, length, quantity, etc., furnished on request.



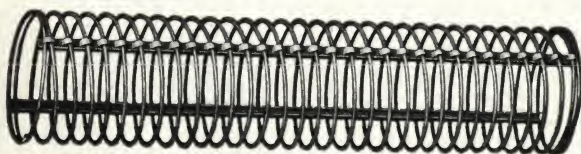
Corrugated Rounds (Patented)



Corrugated Squares (Patented)

Column Spirals

Kalman spirals are strongly and accurately made; coiled by machinery of special design, which preserves regularity of diameter, and assembled to specified pitch, length, and diameter with stiff channel iron spacers to maintain alignment and allow collapsing for convenient shipment and handling.



Column Spiral

Corrugated Bars

TRADE-MARK

Removable Steel Tile

Contractors report that Kalman removable steel tile effect savings in form work that often mount to as high as 3¢ per sq. ft. of floor area on ribbed construction.

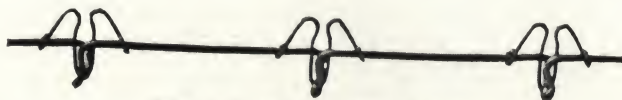
Because of the large investment involved, Kalman removable steel tile are leased to the contractor and erected by the Corr Service Erection Co. Every piece of Kalman removable steel tile is completely cleaned and reconditioned before it is put on a job.

Concrete Accessories

Bar Supports and Spacers—Practical devices to aid in accurate and economical setting of reinforcing steel.

Clip Spacers—The new Kalman clip spacer is the nearest to an automatic bar holding device that can be made.

With it, accurate steel setting is reduced to the simple job of stepping on the bars after they have been laid in position.



The New Kalman Clip Spacer

The legs of this spacer are spaced exactly as specified. On each leg is a strong wire spring clamp. The steel setters drop a bar over each leg of the spacer—stepping on each bar as they go. As a result, every reinforcing bar is automatically forced into the spring clamp.

And once in place, the bars are *locked*—they cannot move in any direction. Such things mean new setting speed; new spacing accuracy, new low costs. Write for bulletin.

Rib Chairs—Unusually economical accessories that assure the absolutely accurate steel setting required in ribbed slab construction of any kind. Kalman rib chairs are made to fit the ribs for which they are intended. Because of this, they can be quickly placed in position. All the steel setter has to do is to drop the bars into these chairs. They hold the bars in the exact position specified. And they do not interfere with the flow of concrete.

Furnished in sizes for 4 or 5-in. rib width, in $\frac{1}{2}$, $\frac{3}{4}$ or 1-in. rod elevation.



Rib Chair

Beam Chairs—Kalman beam chairs are made of heavy wire, are electrically welded, and trussed for added lateral stiffness. They are rigid and strong, and hold



Kalman Beam Chair

reinforcing bars exactly as specifications say they should be.

Made to order to fit any reinforcing requirement and any beam design. Furnished in any height up to and including 2½ in. Packed in strong fiber cartons.

Beam Bolster—An unusually strong and adaptable support for beam reinforcing. They can be set quickly and easily. Furnished in stock lengths of 4 or 5 ft.; to be cut to shorter lengths on the job when required.



Beam Bolster

Kalman beam bolsters can be had in various heights from 1 to 4 in. Shipped in bundles of 100 ft. Always carried in stock for immediate shipment.

High Chairs—The new Kalman high chair can be used wherever tees or steel bars are needed to support concrete reinforcing.

The legs pull apart and lock at the exact height specified. Then, the supporting bars are dropped into



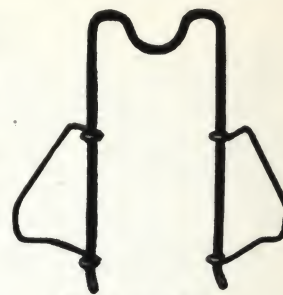
Used with Steel Bars Used with Tees
Kalman High Chair

the cradle of each chair. Or, if tees are used, the chair is simply turned around, and the stem of the tee is inserted in a slot at the top, where the legs meet.

Kalman high chairs are made of hard steel wire and will not sag or spread. They hold either tees or reinforcing bars in place at any height from 3 to 15 in.

Screed Chairs—Used for accurately striking-off concrete floor slab. The main body is made of a single piece of heavy steel wire. Attached to each leg of this is a movable supporting wing.

On the job, Kalman screed chairs are easily set. The wings can be moved to any position desired—and a nail in the end of each makes the entire chair absolutely rigid. Leveling pipes are laid in the grooves of each chair—concrete is poured and the entire job is finished by pulling the screed boards across the leveling pipes. After screeding, the pipe is removed for re-use. The chairs stay in.



The New Kalman
Screed Chair

Inserts

The Kalman hanger insert safely supports loads up to 300 lb. from concrete slab ceilings. Push it down at the desired spot on the forms, hit it a few blows with a hammer, and the setting job is finished. No further work is necessary. A wire ring or a strap hanger drops below the ceiling level when the forms are taken down. Supports are easily fastened to this.



Hanger and Adjustable
Inserts

For heavier loads, the Kalman adjustable insert assures absolutely safe hanging. It is made of malleable iron and will last as long as the concrete itself. With it, there are no nails to clip. The holding staple stays in the forms.

Sleeper Anchors

Devices for securely fastening nailing strips to the top surface of concrete slabs. Sleeper anchors are embedded in concrete while it is soft and, after the concrete is set, they provide a strong, positive, and permanent anchorage for sleepers. Kalman sleeper anchors are the most efficient devices so far developed for this purpose. Their V-shaped loops readily penetrate to full embedment in the concrete and provide a perfect mechanical bond, which absolutely prevents loosening once the concrete is set. Made of No. 20 gauge metal and heavily galvanized to resist rust. Furnished in three sizes for 2x2, 2x3, and 2x4-in. sleepers. All sizes carried in stock for immediate shipment.



Sleeper Anchors

Column Forms

Adjustable metal forms strongly and simply made. They produce true round columns with accurate and graceful profiles where the flared head merges with the shaft. Kalman column forms are furnished to contractors on a lease and erection basis.



Column Form

Engineering Service

Expert engineering service is one of the most valuable features of the KALMAN STEEL COMPANY Service. At all district sales offices expert help is available on matters of estimate, design, and detail of reinforced concrete structures of all types, together with reliable advice concerning the use and purposes of all Kalman products.

JOSEPH T. RYERSON & SON INC.

ESTABLISHED 1842

Reinforcing Steel, Metal Lath, Steel Sash and Steel Products

GENERAL OFFICES
CHICAGO, ILL.

CHICAGO, ILL.	ST. LOUIS, MO.	PLANTS DETROIT, MICH.	BOSTON, MASS.	JERSEY CITY, N. J.
MILWAUKEE, WIS.	CINCINNATI, OHIO	CLEVELAND, OHIO		BUFFALO, N. Y.
REPRESENTATION IN				
DENVER, COLO.	HOUSTON, TEX.	NEW YORK, N. Y.	LOS ANGELES, CAL.	
MINNEAPOLIS, MINN.	NEWARK, N. J.	SAN FRANCISCO, CAL.	TULSA, OKLA.	

Products

CONCRETE REINFORCING MATERIALS, including: Plain and Deformed Reinforcing Bars, Triangle Wire Mesh, Electrically Welded Rectangular Mesh, Column Spirals, Continuous Wire Mesh Stirrups, Beam Wrapping, Fabricated Units, Road Center Strips, Wire Rods, Wire, Furring Channels and Angles, Miscellaneous Reinforcing Accessories, such as Bar Chairs, Bar Spacers, Bar Ties, Inserts, etc.

EXPANDED METAL PRODUCTS, including: Expanded Metal Lath, Expanded Metal Reinforcing, Corner Beads, Metal Picture Mouldings, Base Screed, Base Grounds, Rib Lath.

SAFETY TREADS AND PLATES, including: Mason Safety Treads, Firmtread Floor Plates and Treads, Sheet Steel Subtreads and Risers.

IRON AND STEEL PRODUCTS, including: Bars, Bar Shapes, Structural, Rails, Plates, Sheets, Boiler Tubes and Fittings, Shafting, Chain, Rivets, Bolts, Nails, Refined Iron, Alloy Steel, Tool Steel, etc.

SMALL TOOLS.

Bars

At our eight warehouse plants located throughout the country, we carry a complete stock of plain and deformed bars, both round and square. These bars are rolled from new billet stock, conforming to standard specifications of the American Society for Testing Materials, Serial Designation A-15-14. Bars, of structural, intermediate and hard grade, are carried in stock in lengths up to 60 ft.

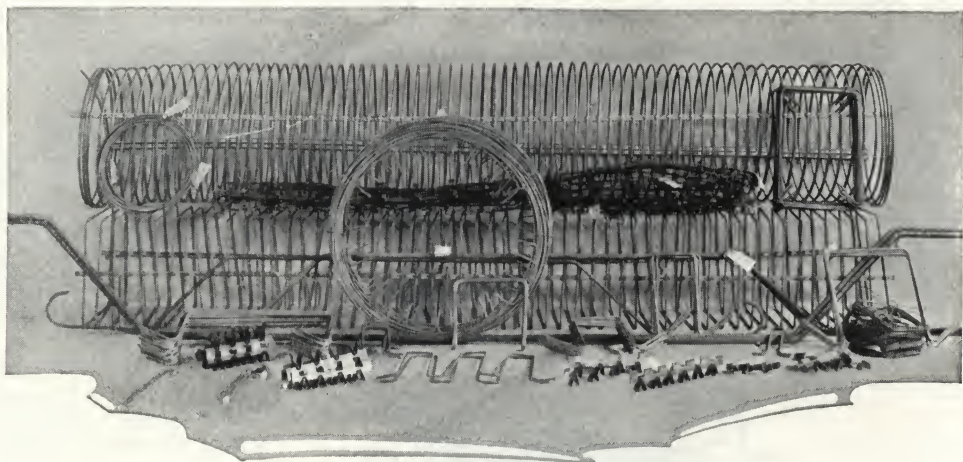
Round deformed bars are carried in the following diameters: $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 in. Square deformed bars are carried in the following sizes: $\frac{1}{2}$, 1, $1\frac{1}{8}$ and $1\frac{1}{4}$ in.



Ryerson Round Deformed Reinforcing Bar



Ryerson Square Deformed Reinforcing Bar



A Few Ryerson Reinforcing Products

Bending and Fabricating

We have the most up-to-date machinery and other equipment for fabricating, and can bend bars to any shape required for beam, joist and slab rods, stirrups, ties, hoops, etc.

Spirals and Continuous Hooping

On our spiral machines we manufacture spirals for round columns, continuous uniform hooping for square and rectangular columns, and continuous single unit stirrups for beams and girders. Spirals are made from new first quality wire rod in sizes from $\frac{3}{16}$ to $\frac{1}{8}$ in., inclusive.

Both round and square hooping can be collapsed for shipment.

Triangle Wire Mesh Reinforcement

We always carry on hand a large stock of triangle wire mesh for slab reinforcement. This material is carried in rolls in standard gauges and sizes of mesh and can be shipped at once. Electrically welded rectangular mesh, is also in stock, or can be shipped direct from factory.

Road Strips and Highway Construction Material

We furnish completely fabricated material for reinforcing roads, culverts and bridges, including metal road strips and all necessary reinforcing fabrics, supports and spacers.

Accessories

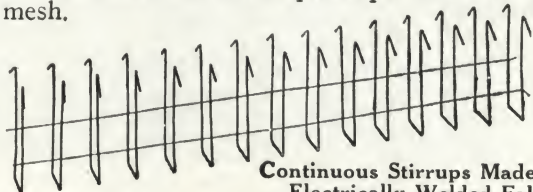
In addition to bars and spirals, we carry complete stocks of all accessories such as beam, joist and slab bar spacers, bar and screed chairs, bar ties, wire, etc., also wire fabric and expanded metal for reinforcing roadways and for floor slabs, concrete pipe, etc., angles, channels

and pencil rods for suspended ceilings, furring and similar purposes.

Continuous Wire Mesh Stirrups

Continuous wire mesh stirrups are formed on our specially constructed power machines, thus insuring accurate bending and perfect alignment. Continuous stirrups save time and money in the job, eliminating slow and tedious hand tying of bars and individual stirrups. Over 30,000 of these continuous stirrups were used in the construction of the Palmer House in Chicago.

We are also equipped to furnish beam wrapping, step reinforcement and other special pieces formed from wire mesh.



Continuous Stirrups Made from Electrically Welded Fabric

Expanded Metal Reinforcing

We are prepared to furnish from stock, expanded metal in meshes varying from $\frac{1}{2} \times 1\frac{1}{4}$ in. to 3×8 in. and in a wide range of standard sizes. Special meshes and sizes delivered promptly, direct from the factory.

Metal Lath, Plastering Channels, etc.



$\frac{3}{4}$ -in. Rib Lath

Deep ribs and strong mesh eliminate the need of wood forms

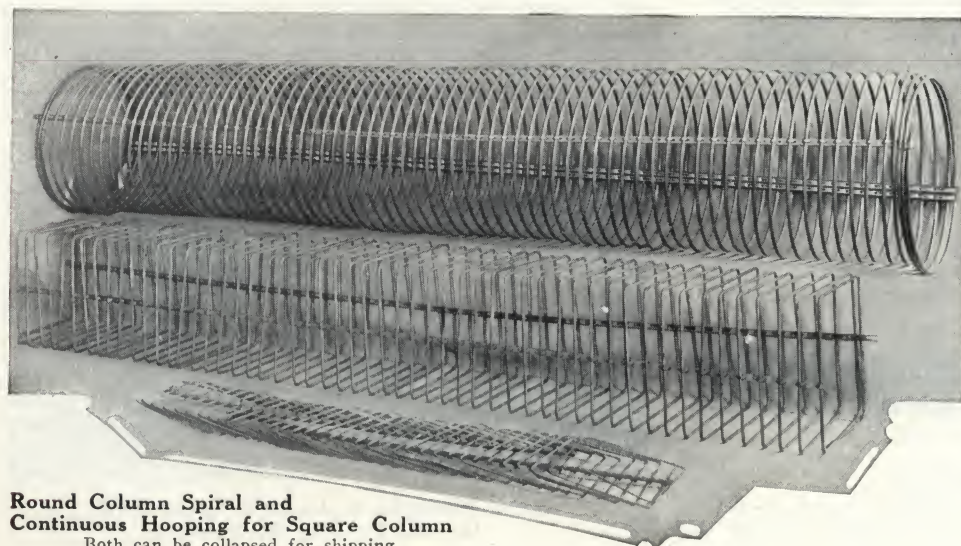
We are in a position to furnish all the steel requirements for plastering. This service includes expanded metal lath, rib lath, scotch lath, corner bead, bullnose corner bead, picture mould, curved point base screed, base grounds, hot rolled channels, cold formed channels, pencil rods, angles, tees, flats, wire, etc.

Immediate deliveries from our warehouse stocks or direct from factories in Chicago and the East.

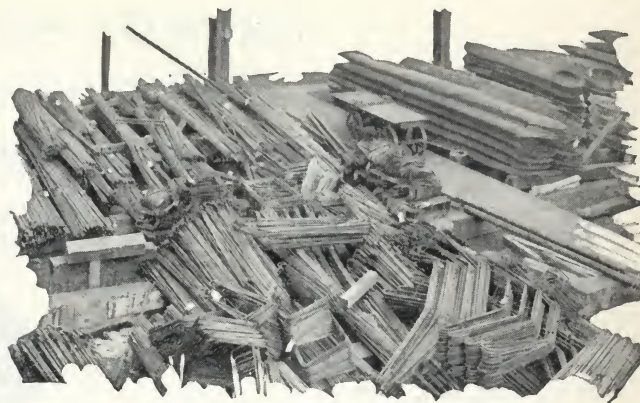
Welded Steel Windows

Standard industrial units can be furnished at once from stock, either with or without ventilators. These windows are made of rolled sections, electrically welded at all intersections, giving the frame great rigidity and strength.

Continuous top hung windows with mechanical operators and architectural projected windows can be furnished to meet almost any requirement. Send your plans



Round Column Spiral and Continuous Hooping for Square Column
Both can be collapsed for shipping

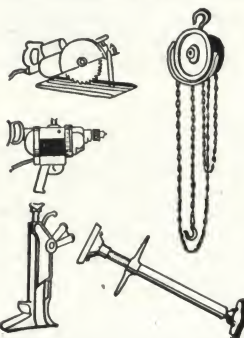


Shipping Bay in a Ryerson Plant
Reinforcing materials ready for loading

for prices and complete description of our complete service.

Small Tools

Prompt service on all the hundred and one small tools needed for construction work is another feature of our complete service to builders. Every tool is backed by the Ryerson Guarantee. If you haven't our tool catalogue and price list, write and we will mail them at once.



Portable electric saws, electric drills, trench braces, jacks, hoists, furnaces, reamers, rivet forges, riveting hammers, electric hammers, clamps, grinders, punches, shears, drift pins, etc., are a few of the items available.

Delivery

Our large stocks of bars and other material enable us to make exceptionally quick delivery on reinforcing material—all cut, bent, bundled and tagged ready for the forms. By use of special aluminum tags with stamped, raised letters and numerals, the identification marks showing the location in the building of each bundle can not be obliterated. These tags are not subject to rust. Specially designed 40-ft. trailers for



This Tag Identifies Each Piece

tractors, with steel adjustable skids, enable us to haul the longest material and unload with a minimum of effort and without distortion or damage to the material. All of our Steel-Service Plants have private switch tracks connecting with trunk line railroads, affording exceptional service on freight shipments.

Ryerson Steel-Service

In addition to reinforcing materials we carry all kinds of steel products at each of our plants, thus giving the contractor a convenient source upon which to draw for such other steel as he may require on a job.

Bars	Babbitt
Shapes	Wire
Structurals	Turnbuckles
Rails	Corrugated roofing
Shafting	and siding
Plates	Stair treads
Sheets	Firm tread plates
Rivets	Boiler tubes and
Bolts	fittings
Chain	Refined iron, etc.

TRUSCON STEEL COMPANY

Manufacturers of Reinforcing Steel and Building Specialties

YOUNGSTOWN, OHIO

For Branch Offices, see Local Telephone Directory

Products

REINFORCING STEEL, KAHN TRUSSED BARS; RIB BARS; COLUMN HOOPING; STEEL FLORETTES; CONCRETE INSERTS.

Also Curb Bars; Contraction Joints; Steel Road Forms; Welded Steel Fabric.

For Steel Roof Decks, see page A171; for Steel Joists, see page A578; for Steel Windows and Doors, see pages A1082-1085; for Metal Lath, etc., see pages B1306-1307.

Truscon Service

Because of the inclusiveness of the line of permanent building products which it manufactures, Truscon has no special interest apart from the economy it will effect for the client, in any particular type of construction. If Truscon is allowed to co-operate with you in the solution of a problem in structural design you are assured in advance of the unbiased assistance and advice of specialists whose only desire is to find the right solution. The service of Truscon's large staff of experienced engineers is yours for the asking.

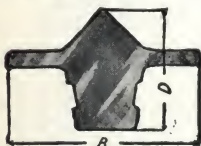


Rigid Connection



Section Kahn Trussed Bar

D & B, in.	Wt. per lin. ft.	Area, sq. in.
$\frac{1}{2} \times 1\frac{1}{2}$	1.4 lb.	0.41
$\frac{3}{4} \times 2\frac{1}{8}$	2.7 lb.	0.79



Section Kahn Trussed Bar

D & B, in.	Wt. per lin. ft.	Area, sq. in.
$1\frac{1}{2} \times 2\frac{1}{4}$	4.8 lb.	1.41
$1\frac{3}{4} \times 2\frac{3}{4}$	6.8 lb.	2.00
$2 \times 3\frac{1}{2}$	10.2 lb.	3.00

Kahn Trussed Bars

Open hearth steel, concrete beam, girder, floor and arch reinforcement. Unit bars with 45° rigid diagonals formed from flanges on the main body producing 12 to 30% stronger beams than loose stirrups; save steel in design and labor in installation; increases safety, fire-proofness and shockproofness.



Standard Shear
Middle portion left unshored



Center Shear
Entire bar sheared to center



One-way Shear
All diagonals sheared, inclining in one direction



Special Shearing
As directed by purchaser

LENGTH OF DIAGONALS

Size, in.	Standard lengths, in.	*Special lengths, in.
$\frac{1}{2} \times 1\frac{1}{2}$	12	(6) 8 (18)
$\frac{3}{4} \times 2\frac{1}{8}$	12, 24	8 (18) 30
$1\frac{1}{2} \times 2\frac{1}{4}$	12, 24, 36	8 (18) 30
$1\frac{3}{4} \times 2\frac{3}{4}$	36	(24) 30 (48)
$2 \times 3\frac{1}{2}$	36	(24) 30 (48)

*Note: The special lengths enclosed in parentheses are ordinarily available only for items of 5 tons or more.

Rib Bars

Special rolled steel section with series of cross ribs to secure maximum grip. Carried in stock in warehouses in various cities, furnished straight or bent as ordered.



Square Rib Bar



Round Rib Bar

Truscon Collapsible Column Hooping

For reinforcing concrete columns. Shipped in the form of flat, circular coils of exact diameter and accurately spaced by



TRADE-MARK

means of special spacers. These coils spring automatically into complete hooped column on cutting the small fastening wires.

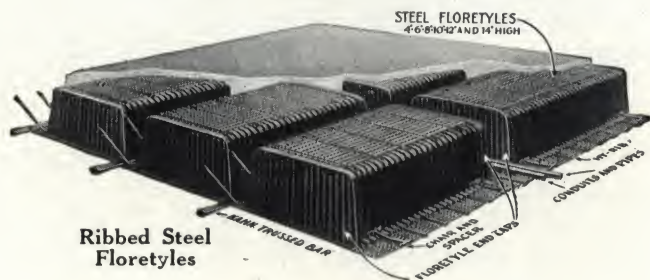
Rib bars are ordinarily used as vertical reinforcement in conjunction with column hooping.

Diameter of coils: 9 to 36 in. Pitch: $1\frac{1}{2}$ to 12 in.

Truscon Floretyle Construction

Truscon Floretyle construction consists of rows of specially formed steel Floretyles separated by reinforced concrete joists and covered with a thin layer of concrete.

Ribbed Floretyles—The ribbed Floretyles used in this construction are manufactured in powerful presses operated with multiple dies which insure accuracy and uniformity. Across the tops, deep stiffening ribs give the Floretyles exceptional rigidity. The rib adjacent to one end of each tile is omitted, leaving a long free apron end to lap over the rib of the adjacent tile to readily obtain adjustment in the length of the row. The corrugated sides, rounded corners and corrugated flanges along the bottom edge add to the stiffness and prevent deformation.



Ribbed Steel Floretyles

Truscon Locktype System—An improved Floretyle construction consisting of deep ribbed steel Floretyle whose flanges are locked into the prongs of the ribs of Truscon Locktype Lath.

Truscon Locktype Lath is furnished in rolls 100 ft. long x 2 ft. wide, the ribs running in the direction of the 2 ft. width. It consists of ribs $\frac{3}{8}$ in. high spaced 4.8 in. center to center with a diamond mesh between the ribs. At the proper distance from the ends, each rib has a prong punched upward. Locktype Lath is shipped in rolls with the ribs turned inward. After it rolls out on the form, the ribs and prongs are on the upper side for immediate placing of the ribbed Floretyle.

Locktype construction is easily and speedily erected. It saves in concrete and plastering cost and insures true and straight concrete joists with positive attachment of the ceiling in reinforced concrete construction. It insures constant width of concrete joists, making unnecessary the use of any spacers, and saves all expensive nailing of the steel Floretyle to the form boards.

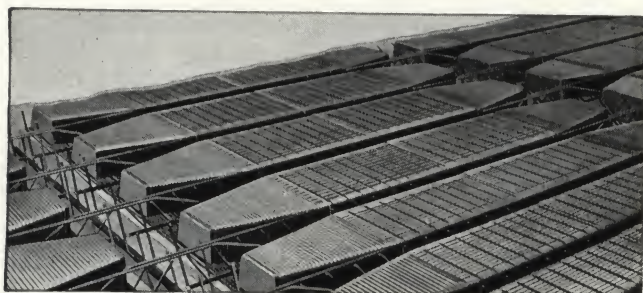


Placing Floretyles in Locktype Construction

Inset shows close-up of lath prong

Truscon Florestyle Construction with Cantilever End Tyles—Greater economy in reinforced concrete design is obtained by increasing the negative bending moments and decreasing the positive bending moments. *Stress—Strain* studies of completed structures indicate that the work of carrying loads is very largely done by these negative moments in monolithic construction like reinforced concrete.

Truscon Cantilever Florestyles, used at the ends of the rows, provide the width of concrete joists adjacent to the supports



Cantilever Florestyle Construction

necessary to take advantage of this more economical method of designing. Shearing stresses are also more economically handled by the increased width of concrete than by the use of loose stirrups.

Cantilever Florestyle can be used either with $\frac{3}{8}$ -in. Hy-Rib ceiling or with Lockstyle Lath. Cantilever end caps of proper size are used to close the small ends of the cantilever Florestyle.

Truscon Florestyle Construction with Removable Florestyles—In buildings comprised of several typical floors laid out in oblong panels, with long spans and not requiring a plastered ceiling, Truscon Florestyle construction with removable



Florestyles will often be found very economical. Truscon engineers, with years of experience from which to draw, are in an ideal position to show when this type of construction can be applied with the utmost efficiency. The removable steel Florestyles used in this construction are usually leased to the contractor for the duration of the job.

These removable steel Florestyles are made of 16 gauge steel, so designed as to be readily removable, extremely sturdy and very economical. The ribs across the top add to their rigidity, eliminating the necessity of excessive crowning, which is wasteful of concrete.

Truscon Removable Florestyles are furnished either with straight sides as shown or with a $\frac{3}{8}$ -in. flange along the bottom edge.

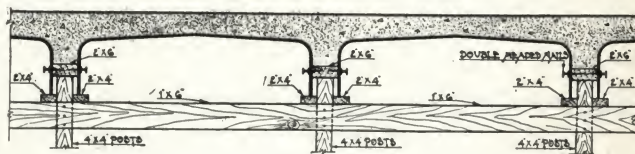
Properties of Removable Florestyles—Heights: 6, 7, 8, 9, 10, 11, 12, 13 and 14 in. Approximate width at base: 20 in. Standard lengths (nominal): 3 ft. Actual length is 1 in. greater, to allow for end laps.



End Tyles to close rows of Florestyles are furnished 14 in. high and 1 ft. 10 in. long. For other heights of removable Florestyle, use wooden ends nailed into the florestyle in the field or sheet steel end caps (non-removable) of the proper size.

Truscon Wydespan Construction

Truscon Wydespan Construction requires less concrete and less wasteful timber centering than other types of reinforced concrete systems. With Wydespan forms the joist spacing is



approximately 4 or 5 ft. and a top slab of only $2\frac{1}{2}$ in. is recommended. Comparative estimates indicate that Wydespan forms show a tremendous saving over other types of forms. An alternate design in Wydespan is the best argument for its use.



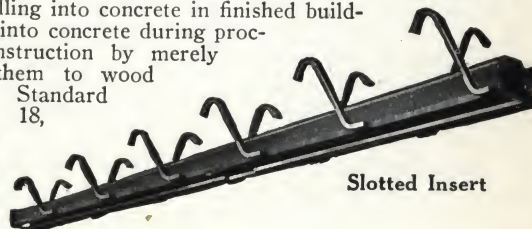
Properties of Truscon Wydespan Forms—Manufactured from 16 gauge steel.

Height: 16 in. only—but adaptable for 5 to 15-in. depths of floors.* Approximate width at base: 40 and 52 in. Standard length (nominal): 12 in. Actual length 2 in. longer to allow for end laps.

Truscon Slotted Inserts

Used in concrete slabs, beams or columns for attaching shaft hangers, fixtures, sprinkler systems, etc. Obviate expensive drilling into concrete in finished building. Built into concrete during process of construction by merely fastening them to wood centering. Standard lengths 12, 18,

24, 36, 48 and 60 in. For $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ -in. bolts.



Slotted Insert



Tapped Insert

Truscon Tapped Inserts

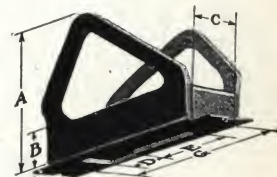
Made of highest quality pressed steel; furnished tapped for $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ -in. bolts or $\frac{3}{8}$ -in. pipe.

Used where exact location of attachment is known. This insert is especially designed for plumbers who require one which will accommodate pipe rather than standard bolts.

Adjustable Inserts

DIMENSIONS OF TRUSCON ADJUSTABLE INSERTS (INCHES)

Size	A	B	C	D	E	G
$\frac{1}{2}$	$2\frac{3}{8}$	$1\frac{3}{4}$	$\frac{7}{8}$	$1\frac{3}{8}$	$1\frac{5}{8}$	3
$\frac{5}{8}$	$2\frac{3}{8}$	$1\frac{3}{4}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{7}{8}$	4
$\frac{3}{4}$	$2\frac{3}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	5



Adjustable Inserts

*Forms are provided with nailholes to permit raising or lowering them on the centering to secure any desired depth floor and joist within the above limits.

WICKWIRE SPENCER STEEL COMPANY

Electrically Welded Wire Fabric for Concrete Reinforcement

GENERAL OFFICES

41 East 42nd Street
NEW YORK, N. Y.

OFFICES AND WAREHOUSES

WORCESTER, MASS.
LOS ANGELES, CAL.

BUFFALO, N. Y.
LOS ANGELES, CAL.

DETROIT, MICH.
SAN FRANCISCO, CAL.

CLEVELAND, OHIO

CHICAGO, ILL.
SEATTLE, WASH.

Product

CLINTON ELECTRICALLY WELDED WIRE FABRIC for Concrete Reinforcement.

For Wire Lath, see pages B1274-1278.

Clinton Electrically Welded Wire Fabric

Scope of Use—Clinton welded wire, a mesh reinforcement, is especially suited for floors, roofs, walls, roads, sidewalks, sewers, reservoirs, levees and all kinds of slab construction.

The material is used to special advantage in all kinds of work involving the covering or protection of steel with concrete, as in buildings, bridges, subways and tunnels.

Material—Clinton electrically welded wire fabric is a wire mesh made up of a series of parallel longitudinal wires, spaced certain distances apart and held at intervals by means of transverse wires arranged at right angles to the longitudinal ones, and securely welded to them at the points of intersection by a patented electrical process.

Wire—Clinton electrically welded wire fabric is fabricated from a special grade of good quality steel wire, possessing such strength, elasticity, and ductility as to render it especially suited to structural use.

The wire will develop an average ultimate strength of 70,000 to 80,000 lbs., with a maximum, in some cases, of 85,000 lbs. per sq. in.

Innumerable tests and investigations which have been made upon welded wire during the past 15 years have proved, beyond the shadow of a doubt, that the process of welding does not in any way lessen the tensile strength of the longitudinal wires. Specimens when tested, whether they break at or between the welds, will invariably show the full tensile strength of the longitudinal wire when compared with the strength of the plain wire before welding.

Electric Weld—In Clinton welded wire the transverse wires are welded to the longitudinal wires by means of an electric current. They are not in any way secured by winding, or by loops or clips, and for this reason the casual observer sometimes concludes that the wires are merely soldered together. This idea is wrong. The connection is made



The Clinton Electric Weld

In this view the two wires have been cut through at their point of union, revealing a perfectly smooth surface. It is a perfect weld; the two wires are actually fused together.

by an absolute and perfect weld, in which the two wires are actually fused into one homogeneous section.

A great number of tests have been made upon the welded connections, and it has been shown that the shearing strength of the weld in many cases actually exceeds the tensile strength of the longitudinal wire.

Rectangular Mesh—Clinton welded wire is rectangular or square mesh. There are no zigzag or diagonal members in the material.

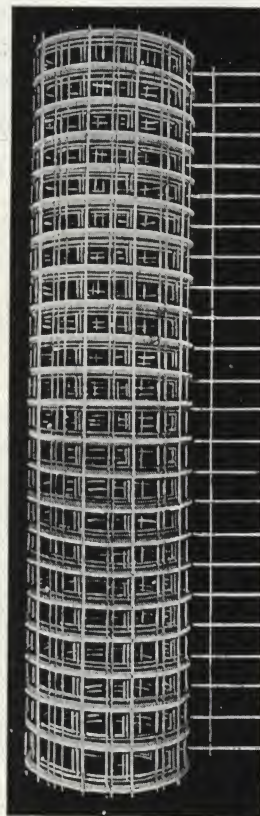
When used as reinforcement in floor slabs, the longitudinal members are thus located in the line of tension; while the transverse or secondary members, arranged at right angles to them, afford a most efficient means of distributing concentrated loads in a direction perpendicular to the main reinforcing members.

In floor slabs, designed and estimated on the basis of distributed loads, this is a most important factor in enabling a slab to receive a very heavy load on a small area. Clinton welded wire fabric, affording, as it does, an efficient transverse as well as longitudinal reinforcement, prevents cracking due to changes in temperature and provides a perfect network of steel which knits and binds the concrete together, reinforcing it securely in all directions.

Perfect Bond—There is perfect adhesion of concrete to this fabric, because it has no clips or wrapped wires to prevent free flow of the aggregate when it is being poured; therefore, no voids exist in the completed work. Transverse strands, which are of much heavier gauge than can be used in any other wire fabric, are securely welded to longitudinal strands at right angles to the latter, and provide absolute anchorage against movement of the fabric when subjected to strain.

Unbroken Continuity—By using Clinton welded wire in floor slabs it is possible to obtain a perfect continuity from span to span without any lapping or splicing of the members.

Fabric is delivered in rolls, and may be laid in continuous sheets up to 200 ft. in length. The result is no waste, no lapped ends, no weak points.



Roll of Clinton Electrically Welded Wire
Shipped also in sheets if desired

Economy and Accuracy of Installation—The use of welded wire eliminates all cost and trouble involved in the spacing and wiring of loose members. Spacing is established by machinery, and it is impossible for the relative position of various members to become changed in the slightest degree.

The fact that great quantities of material can be laid accurately in a very short time by unskilled labor, with absolute assurances that every strand of wire is in its proper position, renders welded wire the safest, simplest and most economical reinforcing material for all kinds of slab construction.

Finish—Unless otherwise ordered, Clinton electrically welded fabrics are furnished made with plain steel longitudinal and transverse strands. The price is lower than for fabrics galvanized throughout, the difference being controlled by the market price of spelter used in the galvanizing process.

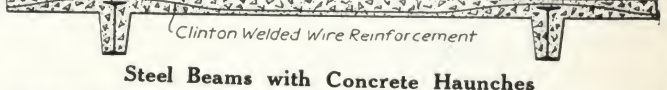
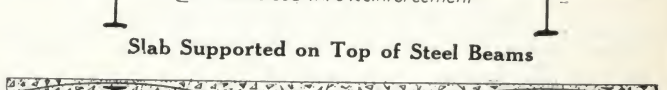
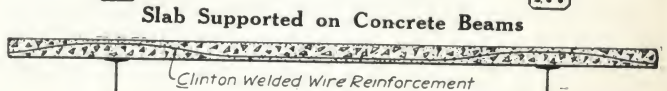
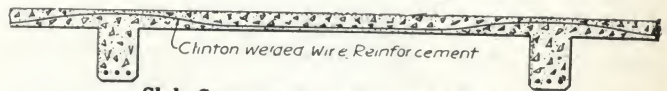
Galvanizing—Clinton electrically welded fabrics are also made from steel wire, which is thoroughly galvanized before being welded. Galvanizing affords protection against the development of rust if the material is exposed to the weather by reason of delays in its use in the work, or if the concrete is of inferior quality and contains elements injurious to steel, or is so porous as to permit the entrance of moisture or destructive gases.

Reinforced Concrete Slab Tables

The tables following the illustrations of the arches are based on accepted formulæ. The loads given at heads of the varying tables cover customary roof and floor loads, and are the safe applied load in addition

to the weight of the slab. No allowance, therefore, need be made for the weight of the slab. The tables have been compiled on a basis of a maximum compression in concrete of 650 lbs. per sq. in. with a maximum tension in the steel of 20,000 lbs. per sq. in.; spans being

considered as continuous, i. e., $M = \frac{Wl^2}{12}$



REINFORCED CONCRETE SLAB TABLES

Reissued April 1, 1922

Table I. Applied Load 50 Lbs. per Sq. Ft.

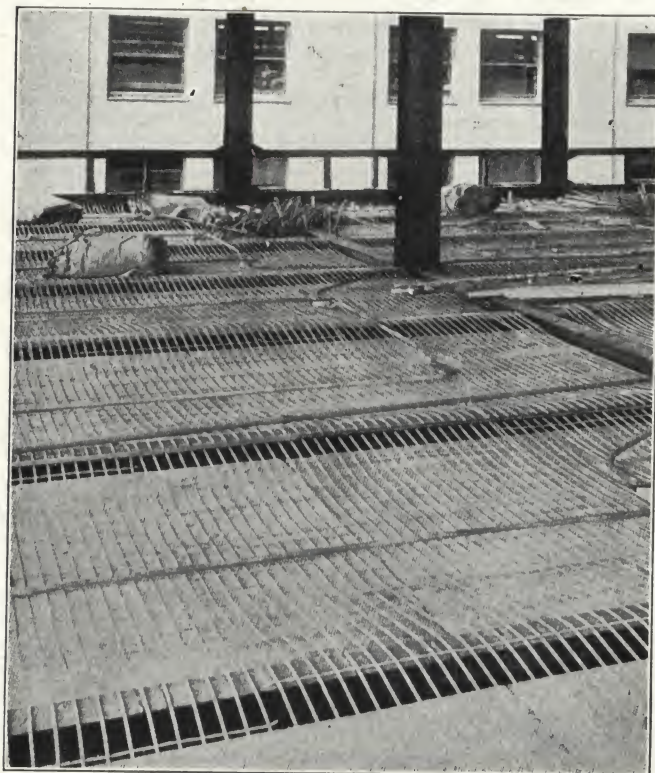
Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x12 9&12	4x12 9&12	4x16 7&11	4x16 5&10	4x16 4&9	3x16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	4x12 9&12	4x12 9&12	4x16 8&12	4x16 6&10	4x16 4&9	3x16 3&8	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	.....	4x12 8&12	4x16 7&11	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....	.....
5	1	.....	.....	.....	4x16 7&11	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....	.....
6	1	.....	.....	.....	.....	4x16 6&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....

Table II. Applied Load 75 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x12 9&12	4x12 8&12	4x16 6&10	4x16 4&9	3x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x12 9&12	4x12 8&12	4x16 7&11	4x16 5&10	3x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	.....	4x12 8&12	4x16 7&11	4x16 5&10	3x16 4&9	2x16 5&10	.....	.....	.....	.....	.....	.....
5	1	.....	.....	.....	4x16 7&11	4x16 5&10	3x16 4&9	2x16 4&9	.....	.....	.....	.....	.....	.....
6	1	.....	.....	.....	.....	4x16 6&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....

Table III. Applied Load 100 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x12 9&12	4x16 7&11	4x16 5&10	3x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x12 9&12	4x16 8&12	4x16 6&10	3x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	.....	4x12 8&12	4x16 7&11	4x16 5&10	3x16 4&9	2x16 5&10	.....	.....	.....	.....	.....	.....
5	1	.....	.....	.....	4x16 6&10	4x16 5&10	3x16 4&9	2x16 4&9	.....	.....	.....	.....	.....	.....
6	1	.....	.....	.....	.....	4x16 5&10	3x16 4&9	2x16 4&9	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	.....	.....	4x16 4&9	3x16 3&8	2x16 4&9	.....	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	.....	.....	.....	.....



City Hall Annex, Boston, Mass.

EDWARD T. P. GRAHAM, Architect

View during construction of floor, showing Clinton electrically welded wire in position, ready for pouring concrete; entire floor reinforced with drawn steel wire (the best known material for tensile reinforcement); every unit accurately spaced and securely held in its proper position—an unbroken continuity of reinforcement from one side of the building to the other

REINFORCED CONCRETE SLAB TABLES (Continued)
Table IV. Applied Load 125 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x12 8&12	4x16 5&10	3x16 5&10	3x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4x16 7&11	3x16 5&10	3x16 4&9	2x16 5&10	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4x16 7&11	3x16 5&10	3x16 4&9	2x16 5&10	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	.....	4x16 5&10	3x16 5&10	3x16 3&8	2x16 4&9	2x16 3&8	.....	.....	.....	.....	.....	.....
6	1	.....	.....	4x16 6&10	3x16 5&10	3x16 3&8	2x16 4&9	2x16 3&8	2x16 1&7	.....	.....	.....	.....	.....
7	1	.....	.....	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	2x16 1&7	2x16 0&6	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	4x16 4&9	3x16 3&8	2x16 4&9	2x16 3&8	2x16 1&7	2x16 0&6	.....	.....	.....

Table V. Applied Load 150 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x12 8&12	4x16 5&10	3x16 4&9	2x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4x16 6&10	3x16 4&9	3x16 3&8	2x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4x16 7&11	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....
6	1	.....	.....	4x16 6&10	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	4x16 5&10	3x16 3&8	2x16 4&9	2x16 3&8	2x16 2&8	2x16 1&7	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	4x16 3&8	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	2x16 1&7	2x16 0&6	.....	.....

Table VI. Applied Load 175 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x16 7&11	4x16 4&9	3x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x12 8&12	4x16 5&10	3x16 5&10	2x16 5&10	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4x16 6&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	.....	4x16 6&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....
6	1	.....	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	4x16 6&10	3x16 3&8	2x16 4&9	2x16 3&8	2x16 2&8	2x16 1&7	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	4x16 3&8	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	2x16 1&7	2x16 0&6	.....	.....

Table VII. Applied Load 200 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x16 6&10	3x16 5&10	3x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x16 7&11	3x16 5&10	3x16 4&9	2x16 5&10	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	4x12 8&12	4x16 5&10	3x16 5&10	2x16 5&10	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	4x16 6&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
6	1	.....	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	4x16 6&10	3x16 3&8	2x16 4&9	2x16 3&8	2x16 2&8	2x16 1&7	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	4x16 4&9	3x16 3&8	2x16 5&10	2x16 3&8	2x16 2&8	2x16 1&7	2x16 0&6	.....	.....

Table VIII. Applied Load 225 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x16 6&10	3x16 5&10	2x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x16 7&11	3x16 5&10	2x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	.....	4x16 5&10	3x16 4&9	2x16 5&10	2x16 3&8	.....	.....	.....	.....	.....	.....	.....
6	1	.....	.....	.....	4x16 6&10	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....	.....
7	1	.....	.....	.....	.....	4x16 3&8	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	.....	4x16 4&9	3x16 3&8	2x16 5&10	2x16 3&8	2x16 2&8	2x16 1&7	.....	.....

REINFORCED CONCRETE SLAB TABLES (Continued)
Table IX. Applied Load 250 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton fabric required												
		Span of slab, in ft.												
		4	5	6	7	8	9	10	11	12	13	14		
3½	¾	4x16 5&10	3x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4x16 6&10	3x16 5&10	3x16 3&8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	4x16 7&11	3x16 5&10	2x16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	1	.....	3x16 6&10	3x16 4&9	2x16 4&9	2x16 1&7	.....	.....	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3x16 5&10	3x16 4&9	2x16 4&9	2x16 2&8	.....	.....	.....	.....	.....	.....	.....
7	1	.....	.....	.....	3x16 4&9	2x16 5&10	2x16 3&8	2x16 2&8	.....	.....	.....	.....	.....	.....
8	1½	.....	.....	.....	.....	3x16 3&8	2x16 4&9	2x16 3&8	2x16 2&8	2x16 1&7	.....	.....	.....	.....

Note: Values in all these tables indicate size of mesh and gauge of wires in Clinton fabric. Thus, 4x16, 7&11 indicates a fabric having No. 7 gauge longitudinal wires on 4-in. centers welded to No. 11 gauge transverse wires on 16-in. centers.

Reinforcements below and to left of zigzag lines may also be safely used in cinder concrete without exceeding 300 lbs. per sq. in. compression in the concrete. In using cinder concrete, applied loads as given may be increased 3½ lbs. for each inch thickness of slab.

Wire

Size of Wire—The fabrics listed below are suggested as combinations which may be used to special advantage. While all of these fabrics are not actually carried in stock, the majority of them may usually be obtained upon short notice. When only a small quantity is desired it is sometimes less expensive to use a stock grade, even though it possesses greater strength than the work requires.

The longitudinal or transverse strands may be of Nos. 0 to 13 inclusive, Washburn & Moen gauge wire. When the same size of wire is not required in both members of the fabric, the heavier size can be placed longitudinally or transversely, as may be specified, but there should not be a difference exceeding 6 numbers on heavy grades, or 5 numbers in light grades, between the longitudinal and transverse strands.

PROPERTIES OF WIRE AND SECTIONAL AREA OF FABRICS

Size per W. & M. gauge	Diam. of 1 wire, in.	Sectional area of 1 wire, sq. in.	Weight per lin. ft. of 1 wire, lbs.	Sectional area (sq. in.) of longitudinal wires only in 1 ft. of fabric width when spaced as shown below				
				2 in.	3 in.	4 in.	5 in.	6 in.
No. 0	.3065	.07378	.2506	.4426	.2951	.2213	.1770	.1475
No. 1	.2830	.06290	.2136	.3774	.2516	.1887	.1509	.1258
No. 2	.2625	.05411	.1838	.3246	.2164	.1623	.1298	.1082
No. 3	.2437	.04664	.1584	.2798	.1865	.1399	.1119	.0932
No. 4	.2253	.03986	.1354	.2391	.1594	.1195	.0956	.0797
No. 5	.2070	.03365	.1143	.2019	.1346	.1009	.0807	.0673
No. 6	.1920	.02895	.0983	.1737	.1158	.0868	.0694	.0579
No. 7	.1770	.02460	.0835	.1476	.0984	.0738	.0590	.0492
No. 8	.1620	.02061	.0700	.1236	.0824	.0618	.0494	.0412
No. 9	.1483	.01727	.0586	.1036	.0691	.0518	.0414	.0345
No. 10	.1350	.01431	.0486	.0858	.0572	.0429	.0343	.0286
No. 11	.1205	.01140	.0387	.0684	.0456	.0342	.0273	.0228
No. 12	.1055	.00874	.0296	.0524	.0349	.0262	.0209	.0174

Spacing of Longitudinal Wires—The longitudinal wires may be spaced on centers of 2 in., or more in steps of 1 in. The distance between centers of outside longitudinal wires can not exceed 100 in.

Spacing of Transverse Wires—The transverse wires can be spaced on centers of 2 to 10 in., inclusive, in steps of 1 in., and on centers of 10 to 18 in., inclusive, in steps of 2 in. They must project at least ½ in. beyond the outside longitudinals and may, if required, be extended to a maximum length of 102 in.

Rolls and Sheets—Special lengths of rolls or sheets, as may be required, can be made to order. Rolls may be of any desired length not exceeding 400 ft. in the light grades, depending upon the weight and convenience in handling. Sheets should not exceed 20x7½ ft. if shipped in box cars, or 32x8 ft. if shipped on flat cars.

Special Designs in New York, N. Y.

In the city of New York the allowable capacities of floor slabs are no longer based on tested approvals, but may now be determined by a newly devised method of computation which applies to flat slabs of either stone or cinder concrete when cast between steel beams, and only when the span of slab does not exceed 8 ft. For these conditions a minimum thickness of 4 in. is required.

While 4 in. is thus fixed as the minimum thickness of slab, still, a 4-in. thickness may be used on any span up to 8 ft., and for any load which does

not exceed the computed capacity of the slab; the actual capacity in any case being determined by the thickness of slab, the conditions of continuity, and the amount and kind of reinforcement used.

Because of the unaccountable strength of short span slabs as shown by actual tests, the city of New York has adopted an empirical formula to be used in designing slabs of 8-ft. span and less when confined between steel beams.

The tables below have been computed by this formula for the conditions of continuous wire mesh reinforcement.

SLAB REINFORCEMENT UNDER NEW YORK, N. Y., CODE

Sectional area of steel reinforcement required, square inches per foot in width, for concrete arches of various spans based on Clinton Electrically Welded Fabric

Total load in lb. per sq. ft. including weight of slab	Spans, in feet and inches																
	4-0	4-3	4-6	4-9	5-0	5-3	5-6	5-9	6-0	6-3	6-6	6-9	7-0	7-3	7-6	7-9	8-0
4-inch Cinder Concrete Slab, 1-2-5 Mixture																	
100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.074	.087
125	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.087	.101	.101
150	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.120
175	.043	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140
200	.043	.052	.052	.062	.062	.074	.074	.087	.101	.101	.120	.120	.140	.140	.140	.162	.162
225	.052	.052	.062	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140	.147	.162	.162
250	.052	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.162	.174	.202	.202
275	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239
300	.062	.074	.074	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259
325	.074	.074	.087	.101	.101	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280
350	.074	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.280
375	.074	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.302	.302
400	.087	.101	.101	.120	.140	.140	.162	.174	.202	.202	.239	.239	.259	.280	.280	.302	.330
425	.087	.101	.120	.120	.140	.147	.162	.202	.202	.239	.239	.259	.259	.280	.302	.330	.359
450	.101	.101	.120	.140	.147	.162	.174	.202	.239	.239	.239	.259	.280	.302	.330	.359	.389

4-inch Stone or Gravel Concrete Slab, 1-2-4 Mixture or Equal

100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.052	.062	.062	.074
125	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.052	.062	.062	.074
150	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.052	.062	.062	.074
175	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.052	.062	.062	.074
200	.043	.043	.043	.052	.052	.062	.074	.074	.087	.087	.101	.101	.101	.120	.120	.140	.140
225	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.101	.101	.120	.120	.140	.140	.140
250	.043	.052	.062	.062	.074	.074	.087	.101	.101	.101	.120	.120	.120	.140	.140	.140	.140
275	.052	.062	.062	.074	.087	.087	.101	.101	.101	.120	.120	.140	.140	.140	.140	.140	.140
300	.052	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140	.140	.140	.140	.140
325	.062	.062	.074	.087	.101	.101	.120	.120	.120	.140	.140	.140	.140	.140	.140	.140	.140
350	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140	.140	.140	.140	.140	.140	.140
375	.074	.074	.087	.101	.120	.120	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140
400	.087	.087	.087	.101	.120	.120	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140
425	.087	.087	.101	.120	.120	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140
450	.087	.087	.101	.120	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140	.140

STANDARD SIZES—CLINTON WELDED FABRIC

Style No.	Spacing of wires, in.		Size wires W & M gauge		Sec. area of steel sq. in. per ft. width		Weight per 100 sq. ft.	Standard, rolls, in.		Style No.	Spacing of wires, in.		Size wires W & M gauge		Sec. area of steel sq. in. per ft. width		Weight per 100 sq. ft.	Standard, rolls, in.	
	Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal	Transverse		Widths	Length		Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal	Transverse		Width	Length
*216-28	2	16	2	8	.325	.015	119.4	48 and 60	150	412-77	4	12	7	7	.074	.025	35.4	72	200
*216-38	2	16	3	8	.280	.015	103.6	48 and 60	150	412-88	4	12	8	8	.062	.021	29.6	72	200
*216-49	2	16	4	9	.239	.013	88.5	48 and 60	150										
*216-510	2	16	5	10	.202	.011	74.6	48 and 60	150	*59-1212	5	9	12	12	.021	.012	11.8	100	400
*216-610	2	16	6	10	.174	.011	64.7	48 and 60	200	612-06	6	12	0	6	.148	.029	65.3	72	†
*316-28	3	16	2	8	.217	.015	82.6	48 and 84	150	612-33	6	12	3	3	.093	.047	51.2	72	200
*316-38	3	16	3	8	.187	.015	72.0	48 and 84	150	612-44	6	12	4	4	.080	.040	43.8	72	200
*316-49	3	16	4	9	.160	.013	61.4	48 and 84	150	612-55	6	12	5	5	.067	.034	37.0	72	200
*316-510	3	16	5	10	.135	.011	51.8	48 and 84	150	612-66	6	12	6	6	.058	.029	31.8	72	200
*316-610	3	16	6	10	.116	.011	45.1	48 and 84	200	612-77	6	12	7	7	.049	.025	27.0	72	200
*416-38	4	16	3	8	.140	.015	56.1	48 and 84	150	22-1010	2	2	10	10	.086	.086	60.3	56	200
*416-49	4	16	4	9	.120	.013	47.9	48 and 84	150	*22-1212	2	2	12	12	.052	.052	36.8	56	300
*416-510	4	16	5	10	.101	.011	40.4	48 and 84	200	44-44	4	4	4	4	.120	.120	85.3	84	150
*416-610	4	16	6	10	.087	.011	35.2	48 and 84	200	44-66	4	4	6	6	.087	.087	61.9	84	150
*416-711	4	16	7	11	.074	.009	29.7	48 and 84	200	44-88	4	4	8	8	.062	.062	44.1	84	200
*412-812	4	12	8	12	.062	.009	25.5	48 and 84	200	66-44	6	6	4	4	.080	.080	57.8	84	200
*412-912	4	12	9	12	.052	.009	21.8	48 and 84	200	66-55	6	6	5	5	.067	.067	48.8	84	200
*412-1012	4	12	10	12	.043	.009	18.6	48 and 100	300	66-66	6	6	6	6	.058	.058	42.0	84	200
*412-1212	4	12	12	12	.026	.009	12.6	48 and 100	400	66-77	6	6	7	7	.049	.049	35.7	84	200
412-55	4	12	5	5	.101	.034	48.4	48 and 72	200	*66-88	6	6	8	8	.041	.041	30.0	84	200
412-66	4	12	6	6	.087	.029	41.6	48 and 72	200	*66-1010	6	6	10	10	.029	.029	20.7	96	300

*Denotes sizes ordinarily carried in stock. †Shipped only in flat sheets.

CHICAGO EXPANSION BOLT COMPANY

(Not Incorporated)

127 South Clinton Street
CHICAGO, ILL.

A Distributor Is Near You—Let Us Put You in Touch with Him

Products

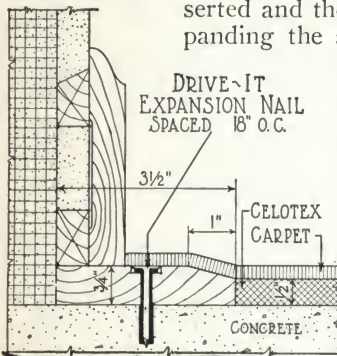
DRIVE-IT EXPANSION NAILS; EXPANSION BOLTS; EXPANSION NUTS; EXPANSION PIPE AND CONDUIT HANGERS; EXPANSION ANCHORING UNITS; TOGGLE BOLTS.

Also Conduit or Pipe Clamps, Hand and Electric Reciprocating Drills and Tools for installing expansion bolts, Concrete Inserts and Expansion Shields.

Drive-It Expansion Nails (Patented)

A new expansion nail developed for holding wooden carpet strips in position over concrete floors.

A hole is drilled through the wooden carpet strip and into the concrete base in one operation in 30 seconds, by an electric hammer drill. The assembled unit, consisting of a lead alloy sleeve and hardened nail, is inserted and the nail driven, expanding the sleeve into every crevice of the hole, securing the wooden strip permanently. No vibration can

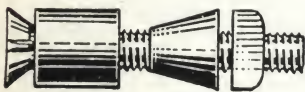


Detail of Carpet Strip in The Stevens Hotel, Chicago, Ill.

HOLABIRD & ROCHE, Architects
57 miles of carpet strip secured to concrete floors with Drive-It nails in this building

Chicago Expansion Bolt

Consists of 4 parts: galvanized bolt, soft lead cylinder, hard metal cone and nut. This bolt has been in service for 10 years and is standard equipment with many public service corporations and other large users. The 1/4-in. sizes will sustain direct full loads of from 1500 to 2000 lb. Double equipment will hold up to the strength of the bolt used.



CHICAGO EXPANSION BOLTS

Size bolt, in.	Diam. hole, in.	Usual depth hole, in.	Weight per 100, lb.	Size bolt, in.	Diam. hole, in.	Usual depth hole, in.	Weight per 100, lb.
5/16x1	3/8	3/4	3	1/4x4	1 1/2	1 1/2	10
5/16x1 1/4	3/8	3/4	3	1/4x5	1 1/2	1 1/2	11
5/16x1 1/2	3/8	3/4	3 1/2	1/4x3 1/2	1 1/2	1 1/2	16
5/16x1 3/4	3/8	3/4	3 1/2	1/4x3	1 1/2	1 1/2	18
5/16x2	3/8	3/4	4	1/4x3 1/2	1 1/2	1 1/2	20
1/4x1 1/4	1/2	1	6	1/4x4	1 1/2	1 1/2	21
1/4x1 1/2	1/2	1	6 1/2	1/4x5	1 1/2	1 1/2	22
1/4x2	1/2	1	7	1/4x6	1 1/2	1 1/2	24
1/4x2 1/4	1/2	1	7 1/2	1/4x4	1 1/2	2	45
1/4x2 1/2	1/2	1	8	1/4x5	1 1/2	2	51
1/4x3	1/2	1 1/4	9	1/4x6	1 1/2	2	56
1/4x3 1/4	1/2	1 1/4	9 1/4	1/4x7	1 1/2	2	61
1/4x3 1/2	1/2	1 1/4	9 1/2	1/4x8	1 1/2	2	66
				1/4x7 1/2	1	5	71
							144



Double Equipped Chicago Expansion Bolt—Used for setting machine tools, heavy shafting hangers, etc.

Proved protection against vibration strains, as well as regular load.

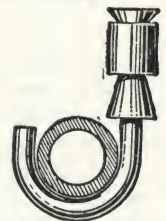


Chicago Expansion Pipe and Conduit Hanger

The cheapest and most substantial pipe and conduit hanger on the market. All hooks are galvanized.

CHICAGO EXPANSION PIPE AND CONDUIT HANGER

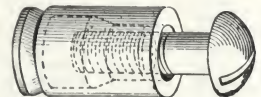
Pipe size, in.	Diam. shank, in.	Diam. hole, in.
1/2	1/4	1/2
3/4	1/2	1/2
1	1/2	1/2
1 1/4	1 1/2	1 1/2
1 1/2	1 3/8	1 3/8



Chicago Expansion Nut or Insert

Consists of only two parts which are assembled and used as one: an expansion member or sleeve of lead alloy compressed around a double wedge internally threaded member. The hump gives a greater expansion with a given amount of lead and provides maximum holding power in holes of various sizes.

The illustration shows the complete assembly in phantom view. Note that the threaded end of nut is near front of hole, giving space at bottom of hole to accommodate bolts of varying lengths.



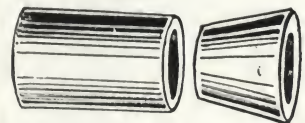
CHICAGO EXPANSION NUT OR INSERT

Screw No.	Threads to the inch	Diameter of hole, in.	Minimum depth of hole, in.
6	32	1/4	3/8
8	32	5/16	1/2
10	24	3/8	1 1/2
12	24	7/16	3/4
14	20	1/2	3/4
16	18	5/8	1 1/8
18	16	3/4	1 1/8
20	14	7/8	1 3/8
22	13	1 1/8	2
24	11	1 1/8	2

Other sizes and threading on application. Packed in boxes of 100, including one hollow expander.

Chicago Expansion Anchoring Unit

For fastening any standard machine bolt in concrete or brick. Two units are used for anchorages of ordinary strength.



CHICAGO EXPANSION ANCHORING UNIT

Diam. bolt, in.	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2
Minimum depth, in.	1 3/4	1 7/8	2 1/2	2 3/4	3 1/4	4 1/4	4 3/4	5 1/4
Diam. hole and drill required, in.	1	1 1/8	1 1/8	1 1/2	1 3/8	2	2 1/8	2 3/8

Chicago Toggle Bolt

The standard fastening for use on tile walls. Inserted through hole in hollow tile walls, toggle drops at right angle, giving perfect anchorage.



KOHLER DIE & SPECIALTY CO.

Concrete Inserts and Metal Specialties

DEKALB, ILL.

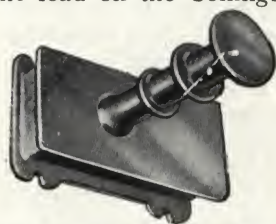
CHICAGO REPRESENTATIVE: W. L. HARRISON, 1148 Builders Building

Products

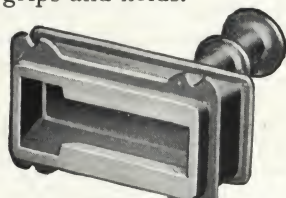
ADJUSTABLE or SLOTTED CONCRETE INSERTS, Stem Type and Loop Type; THREADED CONCRETE INSERTS, Pressed Steel and Cast: FLATTENED END BOLTS.

Adjustable or Slotted Inserts

Stem Type—Made with a corrugated stem that extends up into the compression area of the concrete, the correct place to hang the load. The tapering, ribbed base is so shaped that it gives the greatest possible supporting strength to concrete member. In this insert, the fullest strength of the concrete is developed. The greater the load on the Collings insert the tighter the concrete grips and holds.



Note Corrugated Stem and Tapering Base with Flange at Top



View of Chamber for Bolt

Collings Insert

(Patented March 26, 1918)

The Collings insert, when placed in the form, is never in the way of the reinforcing bars, and is so designed that the concrete flows freely around it. There are no sharp corners and with the Collings insert less surface is exposed in the ceiling after the forms are removed than with any other—a very desirable feature.

The Collings insert may be used upside down in the floor for anchoring chairs, machinery or permanent fixtures, but its greater field is in the ceiling for supporting shaft hangers, sprinkler systems, electric lights, piping and overhead rails.

The size of the chamber permits the use of either the nut or the head of the bolt.

Loop Type—For use in thin slab construction. We are now prepared to furnish the adjustable inserts in loop type as illustrated. This is one of the best designed and most practical inserts on the market. Dimensions are as shown herewith:



Loop Type

ADJUSTABLE INSERTS—SIZES, WEIGHTS AND LIST PRICES

	Size bolt	Height	Weight per 100	List price
Stem type	$\frac{1}{2}$ in.	$3\frac{3}{4}$ in.	76 lbs.	16c each
	$\frac{3}{8}$ in.	$3\frac{3}{4}$ in.	90 lbs.	19c each
	$\frac{3}{4}$ in.	4 in.	115 lbs.	23c each
Loop type	$\frac{1}{2}$ in.	$2\frac{1}{8}$ in.	45 lbs.	13c each
	$\frac{3}{8}$ in.	$2\frac{1}{8}$ in.	63 lbs.	16c each
	$\frac{3}{4}$ in.	$3\frac{1}{8}$ in.	81 lbs.	20c each

Discounts will be quoted on application.

Flattened End Bolts

For use in suspending overhead piping and other work supported from concrete inserts. Flattened, punched, and threaded one end.



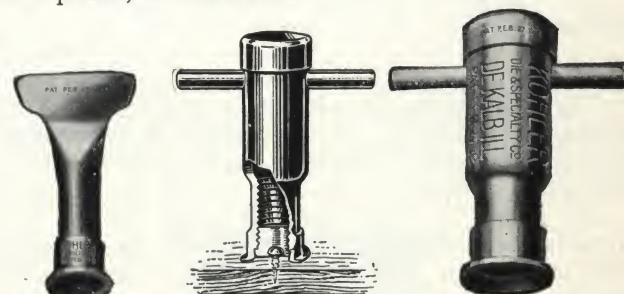
SIZES AND PRICES, FLATTENED END BOLTS

No. 3—Machine thread, bolt ends, $\frac{3}{8}$ x 2 in.	8c each
No. 4—Machine thread, bolt ends, $\frac{1}{2}$ x $2\frac{1}{2}$ in.	10c each
No. 5—Machine thread, bolt ends, $\frac{5}{8}$ x $2\frac{1}{2}$ in.	12c each

List prices are subject to discount, which will be quoted on application.

Kohler Threaded Concrete Inserts

Advantages—The Kohler Threaded Concrete Inserts are now supplied either with the screw point or with nailing lugs at the base for use in place of the screw points, as illustrated.



Pressed Steel Insert
Construction of $\frac{3}{8}$ and $\frac{1}{2}$ -in. sizes

Steel Insert in Form, with Screw Point in Place
Construction of $\frac{5}{8}$ -in. size

Insert without Screw
Construction of $\frac{5}{8}$ -in. size

This screw point makes it possible to set the insert accurately and quickly in the form. A blow with a hammer and a couple of turns with the hand sets this screw down so that the insert is held secure in a vertical position ready for the concrete to be poured. After the work is finished the forms are easily pulled away from the screws, which are then quickly removed, leaving the insert free for the threaded bolt.



Cast Insert with Screw Point

Exact Size of Screw Point Used in $\frac{5}{8}$ -in. Insert
(Patented Feb. 27, 1912)

Cast Insert with Nailing Lugs

The cast threaded inserts with the nailing lugs at the base are preferred in many places instead of the screw points. They are quickly set and the cost is less.

THREADED INSERTS—SIZES, WEIGHTS, AND LIST PRICE

Size bolt	Height	Weight per 100	List price
Pressed Steel Threaded Inserts			
$\frac{3}{8}$ in.	$2\frac{1}{2}$ in.	8 lbs.	10c each
$\frac{1}{2}$ in.	3 in.	$13\frac{1}{2}$ lbs.	13c each
$\frac{3}{4}$ in.	$3\frac{1}{4}$ in.	42 lbs.	17c each
Cast Threaded Inserts with Screw Points			
$\frac{3}{8}$ in.	$2\frac{3}{4}$ in.	23 lbs.	13c each
$\frac{1}{2}$ in.	$3\frac{1}{4}$ in.	45 lbs.	15c each
$\frac{3}{4}$ in.	$3\frac{1}{2}$ in.	75 lbs.	19c each
$\frac{1}{2}$ in.	$3\frac{3}{4}$ in.	85 lbs.	22c each
$\frac{3}{4}$ in.	$3\frac{3}{4}$ in.	110 lbs.	28c each
Cast Threaded Inserts with Nailing Lugs without Screw Points			
$\frac{1}{2}$ in.	$3\frac{1}{4}$ in.	45 lbs.	13c each
$\frac{3}{8}$ in.	$3\frac{1}{8}$ in.	66 lbs.	17c each
$\frac{3}{4}$ in.	$3\frac{3}{8}$ in.	72 lbs.	20c each

List prices are subject to discount which will be quoted on application.

Economy—These inserts, regularly spaced in the ceilings, floors or walls of reinforced concrete buildings mean a saving of time and heavy expense in attaching or rearranging shafting, piping or other interior equipment. A necessity in concrete construction.

SECURITY INSERT COMPANY

Ceiling Sockets for Concrete Work

145 West Oxford Street
PHILADELPHIA, PA.

Product

THE SECURITY INSERT, or CEILING SOCKET, for Concrete Work.

The Security Insert

The Security Insert solves in a practical way the problem of the hanging of machinery or fixtures from the ceilings or walls of factories, warehouses and other buildings of concrete construction.

Its design is the result of most careful and exhaustive study. The practicability of the Security Insert is proven because it is being specified repeatedly.

The illustrations show the ease of installation and many other commendable features of this socket, such as the absence of any fixed thread, the ease and flexibility of placement of bolt and nut, the strength of design, maximum grip in the concrete, etc.



Introducing or Removing Nut



Bolt and Nut in Position

Eleven Reasons for Specifying the Security Insert

The design, construction, and application of the Security Insert embody many superior features of which the following are the most important:

(1) The sturdy design of the Security Insert enables it to carry, with a factor of safety, the safe load of the bolt.

(2) The nut being placed up in the concrete, the strain is not entirely dependent on the casting, but is reinforced by the concrete itself.

(3) It has no fixed thread to become rusty or damaged.

(4) In place of fixed thread a standard steel nut (the strongest thread possible) is placed in the insert when ready to use.

(5) This nut is renewable at any time.

(6) A stud or a bolt may be used, whichever is more convenient for the work.

(7) The Security Insert may be nailed to the form, thus avoiding waste of time and lumber, and the large flat base assures its remaining upright during pouring.

(8) A unique and convenient way to install the Security Insert is the use of a machine cut wood block as shown in the illustration. This block fits into the rectangular shank of the insert which is merely set down over it. With this method there are no nails left protruding from the ceiling to be clipped off. The resultant savings reduce the cost per insert set in place.

(9) It is desirable to place inserts in all parts of concrete buildings, even offices, storerooms, etc., for they provide easy means for fastening partitions, etc. A unique and exclusive feature of the Security Insert is that the holes may be concealed by means of a cardboard disk which fits the washer recess and can be painted.

(10) Once placed, the Security Insert is always ready for use. There is nothing in the socket to get out of order or deteriorate.

(11) The Security Insert has been found to be the most practical means for providing safe, permanent anchorage for any loads from the lightest partition to the heaviest crane.

Safety

Above all, the Security Insert is safe. Even with vibrating loads the nut and bolt are secure. Besides, the Security Insert will carry with a factor of safety the safe load of the bolt.

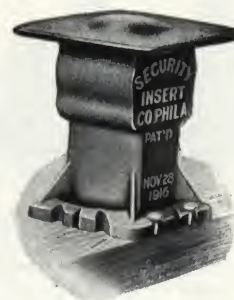
Indorsed by Builders Everywhere

Many of the finest industrial buildings in the United States are equipped with Security Inserts.

A list of prominent installations will be sent on request.



Cross Section Showing Machined Wood Block for Setting up Insert



Insert Nailed to Form

TABLE OF MEASUREMENTS

Size of bolt, in.	A in.	B in.	C in.	D in.	E in.	F in.
3/8	2 1/4	1 3/4	1 1/16	1 3/8	2 5/16	1 3/4
1/2	2 3/4	2	1 3/8	1 3/8	2 5/8	1 7/8
5/8	3	2 3/4	2 1/4	1 11/16	2 7/8	1 7/8
3/4	3	3	2 1/2	1 1/16	2 3/4	2 1/16
7/8	4	3	2 1/2	2 1/16	3 3/8	2 1/16
1	4	3	2 3/4	2 1/16	3 7/8	2 11/16



Dimension Diagram Security Insert

STRENGTH OF BOLTS
Assumed Tensile Strength 60,000 lb. per Sq. In.

Size of bolt.....in.	3/8	1/2	5/8	3/4	7/8
Ultimate strength.....lb.	4,100	7,600	12,100	18,100	25,200
Safe load factor 5.....	820	1,520	2,420	3,620	5,040

WEIGHTS AND PRICES

Made for the following size bolts.....in.	3/8	1/2	5/8	3/4 x 3	3/4 x 4	7/8
Shipping weight, 100 inserts.....lb.	40	70	110	140	170	185
List price.....each	11c	13c	17c	21c	25c	30c

Discounts and prices of wood blocks on application.

STERLING FOUNDRY CO.

Manufacturers of Concrete Inserts and Building Specialties

88 Estews Street
STERLING, ILL.

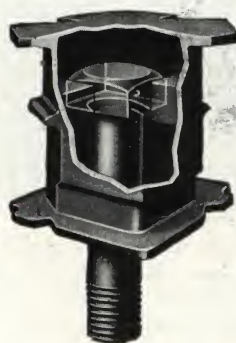
Products

The "BEST" CONCRETE INSERT (patented Oct. 12, 1926)..

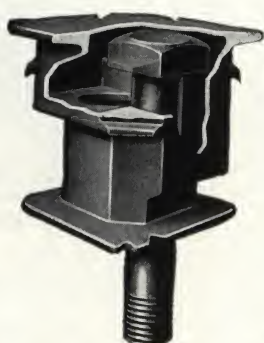
Also "Star" Coal Chute (patented), Foundation Gratings; Flue Thimbles; Back Pressure and Bell Trap Floor Drains; Cistern and Coalhole Covers and Rings; Patent Glass Door Fuel Chutes; Stud Sockets; Clean-out Doors; Foot Scrapers; Chimney Caps; Revolving Chimney Tops; Adjustable Ventilators.

"Best" Concrete Insert

It is very simple and compact in design; strong and rigid in construction and one of the quickest in action (placing or removing bolt) on the market. To place bolt in insert, bolt is held in vertical position with the threads down. In an instant with a slight hook motion, the head of the bolt is seated in a wrench-shaped socket. (See illustration below.)



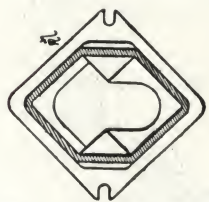
Insert with Wall Broken
Showing Bolt Seated
in Socket



Insert with Wall Broken
Showing Bolt Ready to
Be Pushed Over Into
the Seat Socket

Design

The design of the "Best" Concrete Insert permits either the head of the bolt or the nut to be placed in the insert, the wrench-shaped socket being large enough to take the nut, but small enough to give a "viselike" grip to the head of the bolt. The form and depth of the seat socket holds the bolt securely while the nut is being turned on or off.



Plan View. Top Re-
moved—Looking
Down

With this insert there is no possibility of a nut becoming rusted in or the thread being "jimmied" so that the bolt cannot be taken out of the insert.

Ordinarily, it is better practice to put the head of the bolt in the insert and allow the nut to be on the outside where it can be seen and can be tightened if it works loose.

Strength

The insert is designed to take the full strength of the bolt and puts the metal in compression. They can be safely used with the usual factor of safety for bolts.

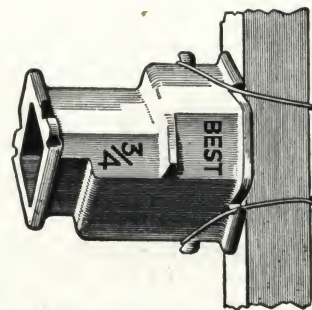
If desired, an eye bolt with standard head on the



Insert Showing Bolt in Position

other end can be used for raising a load by means of a differential block. This is a great convenience in a machine shop for raising materials to a machine and in a factory for changing die blocks.

If in a vertical wall, the bolt is supported in almost a horizontal position by the side of the insert. If desired, the insert can be held in place by wiring it to a reinforcing rod, as shown in cut below. Notches have been provided in the top of the insert, so this can be done quickly and securely.



Insert Showing Method of Attaching to Reinforcing
Rod to Hold in Horizontal Position

SIZES, WEIGHTS AND PRICES "BEST" CONCRETE INSERTS

Size bolt, in.	Height, in.	Weight, each	List price, each
$\frac{3}{8}$	$2\frac{1}{4}$	7 oz.	\$0.11
$\frac{1}{2}$	$2\frac{3}{8}$	11 oz.	.13
$\frac{5}{8}$	$2\frac{7}{8}$	1 lb.	.17
$\frac{3}{4}$	3	$1\frac{3}{8}$ lb.	.21
$\frac{7}{8}$	$3\frac{1}{8}$	$1\frac{3}{4}$ lb.	.25

Ask for discounts and sample insert (state size).

UNION STEEL PRODUCTS COMPANY

Continuous Chair Stirrups, Reed Soffit Clips,
Continuous Sleeper Spacing Anchors

ALBION, MICH.

BRANCH OFFICE: CHICAGO, ILL., 1148 Builders Building—Telephone, Randolph 6635
EASTERN FACTORY, ALBERT OLIVER & SONS, 711 East 140th Street, NEW YORK, N. Y.

Products

CONTINUOUS CHAIR STIRRUPS.
REED SOFFIT CLIPS.
CONTINUOUS SLEEPER SPACING ANCHORS.

Continuous Chair Stirrups

Concrete beam and joist reinforcement. Pre-spaced, shop assembled, welded stirrup units.

These stirrup units are made from the framing plans and reinforcing steel schedules, in any length, width, depth, or spacing. They are made of new billet steel only. The individual stirrups are *exactly* spaced in accordance with the specifications and held rigidly together by three longitudinal wires welded in place. Chairs and side spacers are welded on the bottom of the end and center stirrups in each unit.

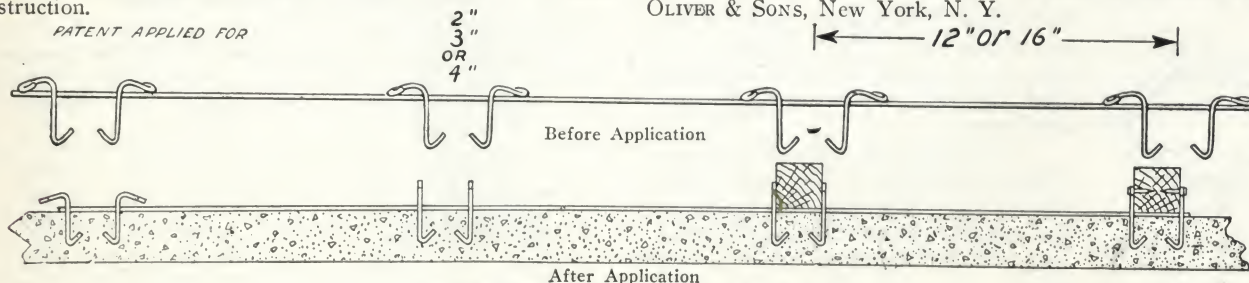


Setting 13 Joist Stirrups in Form in One Operation

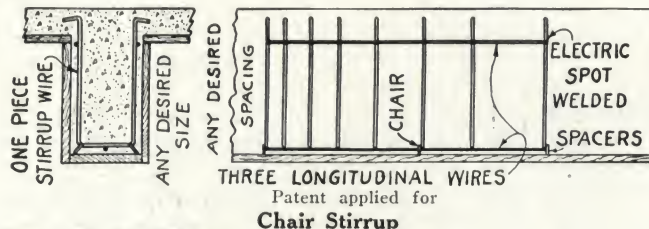
Steel setters place these stirrups in the forms in one-tenth the time required to set individual stirrups. The correct number of stirrups and exact spacing absolutely assured. No shifting when concrete is poured. No chairs required. Elimination of practically all hand wiring of stirrup wires to reinforcing rods. Shear reinforcing in finished beams must be in exact accordance with plans. Speeding up of the job an important factor.

Continuous Chair Stirrup Specifications—Beam and joist stirrups to be pre-spaced and welded together in a complete unit, with chairs and stirrup spacer incorporated in stirrups, of size, type and spacings as called for on plans, and as made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., or similar construction.

PATENT APPLIED FOR



Continuous Sleeper Spacing Anchors

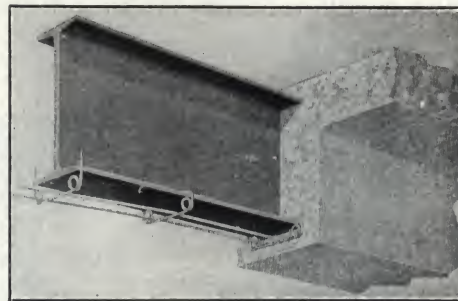


Reed Soffit Clips

Good practice demands that fireproofing around steel beams, girders, channels and columns be reinforced with some form of uniformly spaced clip. Reed Clips accomplish this purpose economically and efficiently.

Reed Soffit Clips are offset 1 in. from the flange, clips are spaced 12 in. apart; clips and longitudinal members are made of No. 12 galvanized wire. Manufactured and stocked in 5-ft. lengths; all widths from 3 to 30 in., varying by inches. Projections beyond loop vary from 2½ to 6 in. depending on width.

Specifications—Wrapping for reinforcing concrete fireproofing, of all-steel column flanges, and soffits of all-steel beams, girders, and channels to be of welded wire type, constructed so reinforcing wires are offset 1 in. from face of flange and firmly



Uniformly Reinforced Beam Soffits

clamped to steel members, such as the Reed Clips made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., and ALBERT OLIVER & SONS, 711 East 140th Street, Bronx, N. Y., or similar construction.

Continuous Sleeper Spacing Anchors

Continuous sleeper spacing anchors will assure correct and automatic spacing of sleeper anchors. No templates nor measuring necessary. Anchors are embedded in the concrete. The long wire rod is flush with the surface. The sleeper is placed in the cradle between each pair of anchors. Then the loops that project above the surface of the concrete are raised against the sleepers with a clawhammer. With the same hammer nails are driven through the eyelets into the sleeper.

Specifications—Sleeper anchors to be of group type composed of several pre-spaced wire clips rigidly connected together, of size and spacing as called for on plans and as made by UNION STEEL PRODUCTS COMPANY, Albion, Mich., and ALBERT OLIVER & SONS, New York, N. Y.

RAIL TRUING INSERT COMPANY

Manufacturers of Rail-Tru Inserts

606 Marquette Building, DETROIT, MICH.

Products

RAIL-TRU INSERTS for anchoring pipe rails to concrete.

Rail-Tru Inserts

The problem is to anchor pipe railing in concrete securely and in a vertical position. Concrete forms ordinarily warp and, naturally, any insert attached to the form for location is thrown out of true. With the insert out of true it is impossible to make railing line up without shims. Furthermore, only an insert placed before the concrete is poured can be permanent.

A problem of this kind can be solved only

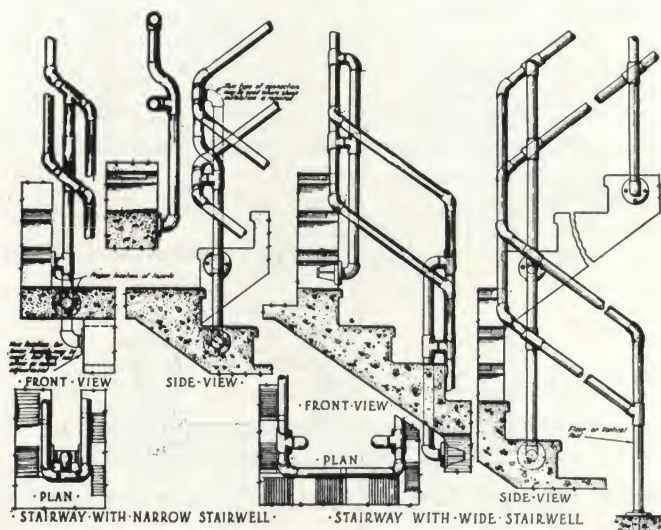
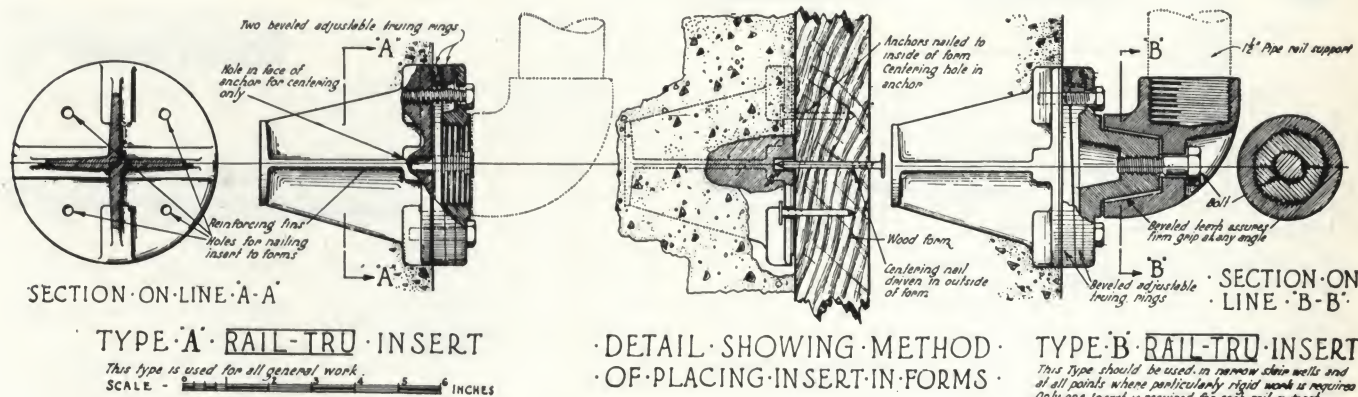


Rail-Tru Insert Assembly

rail truing, the turning of one or both of the adjustment rings causes the pipe railing to immediately assume a vertical position. The process is extraordinarily simple, and the adjustment may be made after the railing is in place.

With Rail-Tru Inserts it is not necessary to cut the forms—the inserts being self-centering. The center point is located very simply by driving a nail through the form. This nail fits into the centering hole in the face of the Rail-Tru Insert which can then be “back-nailed” to the form.

Rail-Tru Inserts do away with the need of shims which work out, expansion bolts which do



Various Methods for Using the Rail-Tru Insert

by use of Rail-Tru Inserts—the insert with the beveled adjustment rings. In the design of these inserts for

not always hold the flanges securely, and pipe sleeve calking is very uncertain at best.

Specifying Rail-Tru Inserts offers the architect the only method we know of that will ensure permanently secure, rigid anchorage for pipe railings. Furnished in four standard sizes to fit 1¼, 1½, 2 and 2½-in. standard pipe thread.

Specifications

Railing supports for all concrete stairs, ramps, platforms, area and retaining walls or wherever shown, shall be anchored with Rail-Tru Adjustable, Self-centering Inserts as manufactured by the RAIL TRUING INSERT COMPANY, Detroit, Mich.

All inserts shall have approved means of adjusting the true vertical position.

The use of split pipe, sleeves and other devices requiring expansion bolts, shims or calking for anchoring and plumbing rail supports shall not be permitted.

ACKERMAN-JOHNSON CO.

Expansive Screw Anchors, Expansion Bolts, Concrete Inserts

625 West Jackson Boulevard
CHICAGO, ILL.

Products

ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR; EXPANSION BOLTS; CONCRETE INSERTS. U. S. Patents: April 27, 1915, December 21, 1915, April 4, 1916, May 14, 1918; others pending. Patented in Canada, Great Britain, France, Belgium; others pending.

Ackerman-Johnson Expansive Screw Anchor

Adaptability—For attaching objects to hard materials, as concrete, brick, stone, tile, marble, etc.

Description and Operation—Consists of a doubly tapered internally threaded cone made of brass, iron or steel (Fig. 1), within a lead composition ductile sleeve (Fig. 2). These are assembled at the factory, the sleeve being forced on the cone to a normal position as at Fig. 3.



Fig. 1

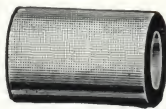


Fig. 2



Fig. 3

Ackerman-Johnson Expansive Screw Anchor

When installed as illustrated, the sleeve is driven farther toward base of the cone and is expanded generally to any degree required to swedge tightly against the sides of hole, effecting perfect holding contact throughout the length and circumference of the anchor. Thus consolidated with the wall material, the anchor provides a machine threaded hole the same as an ordinary tapped hole in a machine part. Any object may then be attached with a standard screw or bolt of suitable diameter.

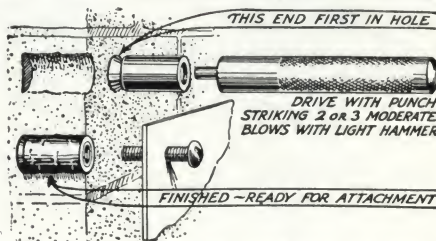


Fig. 4. Manner of Installing Anchor

The piloted setting punch supplied without charge with all anchors

The heavier the load attached, the more forcible becomes the expansion, causing the anchor to resist effort to pull it out far beyond the tensile strength of any screw or bolt.

Distinctive Advantages—Time saving through the use of Ackerman-Johnson anchors compared with old methods more than compensates their total cost.

They save much of drilling cost, requiring least depth for any stated load. They are installed instantly, without the aid of the screw, and before the fixture is lifted into position to be fastened. Their margin of safety is equal to that of steel bolts of correlating size.

They necessitate the least displacement of wall material and consequently less injury to buildings. They effect the neatest possible workmanship.

Sizes—The size of anchor is designated as the size of the bolt or screw to be used. Example: For

No. 10-24 screw, use No. 10-24 anchor; for $\frac{3}{8}$ -in. bolts use $\frac{3}{8}$ -in. anchor.

SIZES, EXPANSIVE SCREW ANCHORS

Screw or bolt size, in.	Threads per in.	Minimum dimension of holes required, in.		Specify anchor Size No.
		Diam.	Depth	
6	32	$\frac{1}{4}$	$\frac{3}{8}$	6-32
8	32	$\frac{5}{16}$	$\frac{1}{2}$	8-32
10	24	$\frac{3}{8}$	$\frac{5}{8}$	10-24
12	24	$\frac{7}{16}$	$\frac{3}{4}$	12-24
$\frac{1}{4}$	20	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{4}$ -20
$\frac{5}{16}$	18	$\frac{5}{8}$	1	$\frac{5}{16}$ -18
$\frac{3}{8}$	16	$\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{8}$ -16
$\frac{7}{16}$	14	$\frac{7}{8}$	$1\frac{3}{4}$	$\frac{7}{16}$ -14
$\frac{1}{2}$	13	$1\frac{1}{8}$	$1\frac{1}{2}$	$\frac{1}{2}$ -13
$\frac{9}{16}$	11	$1\frac{1}{4}$	2	$\frac{9}{16}$ -11

Packed 50 or 100 in box.

Stud Type Expansion Bolts

So great is the holding power of this anchorage, that when set in strong stone or concrete with only its one primary sleeve expanded, the bolt shank can be pulled in two, without the anchorage yielding.



Bolt with Primary Expansive Sleeve Only



Bolt with Primary and One Secondary Expansive Unit

Secondary Expansive Units—Made up of an expansive sleeve and a slip steel cone, giving additional anchorage equal to the primary unit. Calculate the minimum depth of holes for setting at twice the diameter of hole drilled.



Sectional View Showing Bolt with Primary Expansive Sleeve, One Iron Spacing Sleeve, and One Secondary Expansive Unit

Fig. 5. Stud Type Expansion Bolt

Diam. of bolt, at thread in.	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Diam. for hole . . . in.	$\frac{3}{8}$	$\frac{9}{16}$	$\frac{5}{8}$	1	$1\frac{1}{8}$
	$1\frac{1}{4}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	5
	$1\frac{1}{2}$	2	3	4	6
	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$	5	$7\frac{1}{2}$
	2	3	4	6	9
Length of bolt . . in.	$2\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$7\frac{1}{2}$	10
	3	4	5	9	12
	$3\frac{1}{2}$	$4\frac{1}{2}$	6	$10\frac{1}{2}$	15
	4	5	7	12	18
	...	...	8	15	...

Concrete Inserts

Ackerman-Johnson concrete inserts for moulding into the concrete when poured, afford minimum displacement of the concrete and maximum speed in setting. Can be furnished for all sizes of screws and bolts up to $\frac{5}{8}$ -in. diameter.

We invite requests for full information concerning inserts.

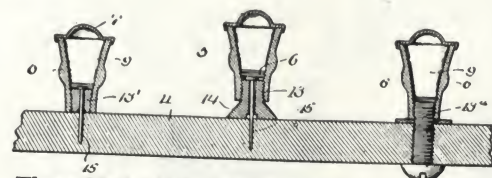


Fig. 6. Three Methods of Setting Inserts on to Form Lumber

Users of Ackerman-Johnson Products

Extensively adopted by leading contractors, manufacturers, railroads, shipyards, government departments and public utility companies.

ANKYRA MANUFACTURING CO.

Manufacturers of Expansion Bolts

149 Berkley Street, Wayne Junction
PHILADELPHIA, PA.

Product

ANKYRA ANKOR (Expansion) BOLTS.

Purpose

To provide a means of holding fixtures to any wall, whether hollow or solid, and so holding them that they shall never come loose.

Uses

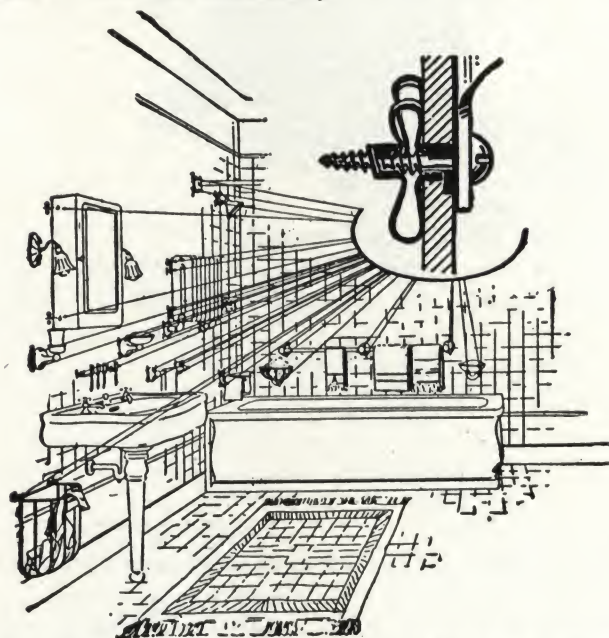
The uses for Ankyra Ankor Bolts are too many to permit of more than a description of typical cases.

Ankyra Ankor Bolts will fasten fixtures to lath and plaster, hollow tile, glazed tile, expanded metal lath, compoboard, sheet metal, brick or concrete walls—in fact they may be used in any sort of wall with assurance that the fixture will “stay put,” and yet that it may be removed and replaced at will, if alterations or renewals are necessary.

The illustrations show some uses; but a booklet giving detailed information will be mailed on request.

Other Advantages

Unlike wooden or lead plugs which are prone to loosen quickly because they dry out or are so soft that the threads wear out rapidly, Ankyra Ankor Bolts remain in the wall—rivet themselves in it—and, being made of steel, last indefinitely.



ANKYRA BOLTS USED FOR HOLDING FIXTURES IN BATHROOM

Tests show that Ankyra Ankor Bolts will support a greater load than can be carried on any hollow wall regularly used on standard construction.

- (1) The Ankyra sleeve is a self-riveting wing nut.
- (2) Ankyras can be installed so quickly that the labor and time saved is an exceedingly important factor. Contractors and plumbers have reported that they saved as much as 90% over ordinary methods.
- (3) Ankyras obviate the necessity of sounding for



TRADE-MARK
(Reg. U. S. Pat. Off.)

studding or making previous provision during construction for the location of fixtures.

- (4) The fixture may be removed by taking out screw, but Ankyra nut will not drop down inside of wall as it is an integral part of sleeve or bolt.



ANKYRA BOLT EXPANDED
Note wood screw
Self-riveting; self-adjusting



ANKYRA BOLT WITH
WOOD SCREW
BEFORE EXPANSION

- (5) Ordinary standard wood screws are used with Ankyra and may be selected to match other hardware.

- (6) Ankyras will hold until the wall itself gives way.

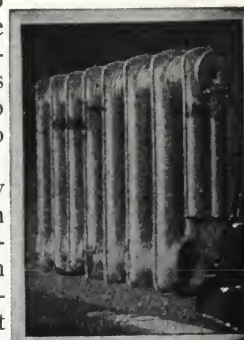
- (7) The alignment of grounds can be controlled regardless of irregularities in the face of the wall.

- (8) Ankyras are easily and quickly installed.

- (9) The solution to many especially vexing problems.

Fastening wall radiators to nearly any kind of wall, but more particularly to tile walls, is usually a ticklish proposition. Ankyras hold the radiator hooks firmly to any kind of wall and are easy to install, as well as permanent.

Bathroom fixtures—especially in public places—break loose with annoying and expensive frequency. The remedy lies in Ankyras which not only hold permanently, but can be used without fear of cracking or breaking the tile.



WALL RADIATOR
PLACED ON TILE
WALL

References

Hundreds of thousands Ankyra Ankor Bolts have been used in many of the largest and best known buildings in this country and Canada. Among them are:

The Woolworth, Metropolitan, Equitable and Widener Buildings; Massachusetts Institute of Technology; the Ritz-Carlton, Bellevue-Stratford and Marlborough-Blenheim Hotels; Detroit Free Library.

THE DAYTON SURE GRIP & SHORE COMPANY

Manufacturers of Sure Grip Sleeper and Furring Clips, Inserts, Form Tie and Spreader

East Monument Avenue

DAYTON, OHIO

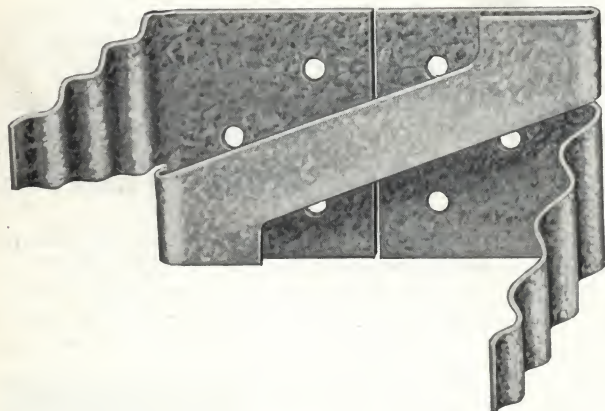
REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

SURE GRIP SLEEPER and FURRING ANCHORS, INSERTS, CONCRETE FORM TIE and SPREADER, and ADJUSTABLE SHORES.

Sleeper and Furring Anchor

A grip made of one-piece No. 20 gauge galvanized Armco Ingot Iron, which securely anchors sleeper to concrete floor slab. Is also used for furring on ceilings, beams, piers, columns and sidewalls of either concrete or brick.



Corrugated legs furnish positive anchorage to concrete.

Grip is full $1\frac{5}{8}$ in., in width, which permits the tacking of abutting ends of sleeper in one grip, leaving no loose ends to warp and squeak.

Center spacing section of the grip can be picked out, without in any way interfering with the working of the grip or its holding strength with concrete, where necessary high spots of concrete slab demand leveling.

Made in 2, 3 or 4-in. sizes.

Samples and installation data furnished on request.



Sure Grip Concrete Insert

Made of the best grade of certified malleable.

Wedge construction, which places the concrete in compression plus the extended flange that takes direct shear, enables Sure Grip Insert to carry with a large factor of safety, the safe load of bolt.

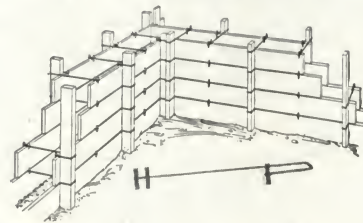
Adjustable in all directions.

Made in $\frac{1}{2}$, $\frac{5}{8}$ or $\frac{3}{4}$ -in. sizes.



Sure Grip Form Tie and Spreader

A one-piece wall form tie and spreader, that completely eliminates the old slipshod method of nailing



forms, twisting wire in forms and the old *wood spreader* (more generally left in the concrete than taken out).

Guarantees a perfectly straight wall, of the size specified.

Made in all sizes from 6 to 60 in. to fit any condition.

Samples and Literature

Samples and literature furnished on request.

THE BLASTEEL MANUFACTURING COMPANY

Floor Clips and Floor Devices

GENERAL OFFICE
KANSAS CITY, MO.

AGENTS IN PRINCIPAL CITIES

For Bulletin Boards and Window Operators, see page C3334

Spearpoint Giant Floor Clips

Maintain solid and permanent anchorage of wood floors to concrete.

They save time, material, labor and floor load by eliminating the necessity of a fill between sleepers, reducing the dead load 18,000 lb. per 1000 sq. ft.

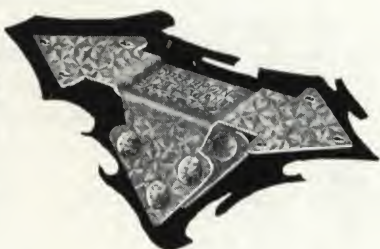
They provide an air space between the floor and concrete slab which acts as an insulator and safeguard against dry rot.

The three large bosses and two shoulders on each spearpoint give Spearpoint Clips the maximum anchorage. Spearpoint Clips are easier and more rapidly placed due to spearpoint shape of the flanges that insert in the concrete.

Made of 20 gauge galvanized metal for 2x2, 2x3 and 2x4-in. sleepers.

Spearpoint Standard Floor Clip

Where the super-strength of Spearpoint Giant is not essential or where building codes require a fill, the Spearpoint Standard gives unequalled anchorage at a still greater saving. For 2x2 standard sleepers only.



Blasteel Floor Joiners

The space provided within the anchor assures a tight threshold for all future time by simply tightening the screws as floors may shrink or wear.

All materials used in Blasteel Floor Joiners are rustproof and corrosionproof. Furnished in galvanized metal, brass or bronze.



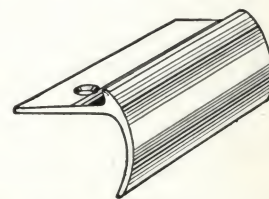
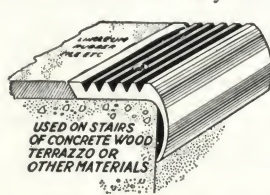
Top plate in flat or bullnose shapes.

Standard widths $2\frac{1}{8}$ and $3\frac{1}{4}$ in. Other widths on specification.

Blasteel Floor Joiners are easily installed in either old or new buildings.

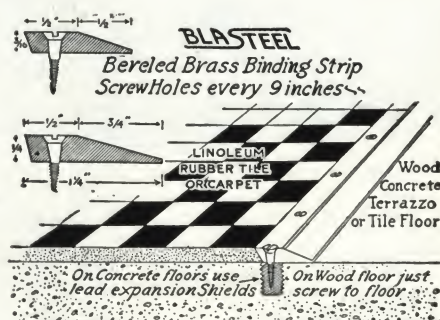
Stair Nosings

Improve the appearance of stairways, securely bind the tread covering, and protect it from curling and splitting. Provide a decorative safeguard against tripping. White metal and yellow brass.



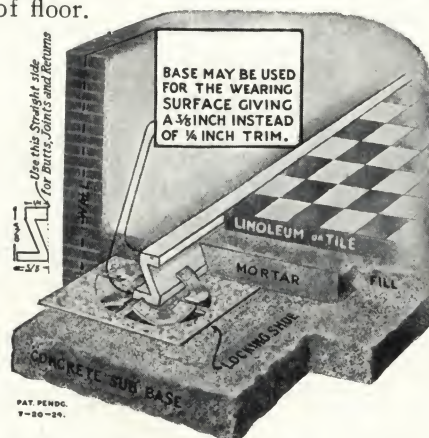
Blasteel Beveled Brass Binding Strip

An attractive and economical binding for floor coverings. Made to accommodate all thicknesses. Highly recommended for aisles, at doorways, and for all exposed edges.



Security Brass Binding Bar

For binding the edge of applied floor coverings or mastic floors when joined to concrete where an offset is formed to receive it, at the same time protecting the edge of the concrete. Especially recommended for entrances, corridors, elevator mats at floor landings, etc. Enhances beauty of floor.



Detailed Information

Detailed information on these products will be gladly furnished.

THE BULL DOG FLOOR CLIP CO., INC.

108 North First Avenue, WINTERSET, IOWA

135 BRANCH REPRESENTATIVES AND 20 CONVENIENT DISTRIBUTING PLANTS

Product

BULL DOG FLOOR CLIP for anchoring Wood Floors to Concrete.

Advantages of Bull Dog Floor Clips

- (1) Save 5¢ per sq. ft. by eliminating the cost of material and labor for a concrete fill.
- (2) Can be placed for 1/2¢ or less each, and sleepers can be laid 50% faster than if anchored by a fill material.
- (3) Reduce dead weight 18,000 lb. per 1000 sq. ft. of floor area.
- (4) Give a perfectly firm, level floor. Solid bed and anchor overcome all possibility of floor buckling, doming, or squeaking.
- (5) Provide a dry air space which prevents strips or finished floor from rotting. No drumhead or hollow sound is produced by this air space.
- (6) Permit conduits and pipes to be placed on top of slab right under finished floor.
- (7) Where a fill is considered necessary, Bull Dog Floor Clips save considerable in construction

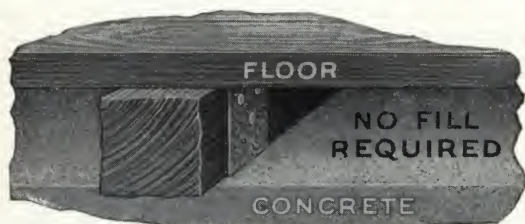
costs when used with any standard fill. Use of Bull Dog Junior Clip is recommended for a still greater saving.

Bull Dog Junior

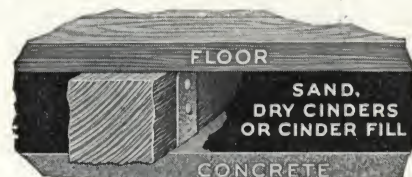
For floors where ordinances require a fill, or where a light clip is desired, the Bull Dog Junior effects a still greater saving in anchoring wood floors to concrete. It is one-half the width of the regular Bull Dog Clip and is made in three sizes for 2, 3 and 4-in. sleepers. When the Junior Clip is used in conjunction with a fill, we suggest spacing 16 in. and 2 1/2 ft. which requires about 300 clips per 1000 sq. ft. of slab at a cost, including installation, of \$9.00. This cost is more than offset in the time and expense of bracing the strips, beveling and shimming sleepers, and a large saving in expense of fill which can be made of any cheap, inexpensive mix, sand or cinders. Samples of each of the three sizes will be promptly furnished any interested architect or contractor.

Nails Now Furnished without Charge.

A sufficient quantity of the correct size nails is packed in each case of Bull Dog Clips shipped. This assures the use of the right size nails and saves the user their cost.



Bull Dog Standard without a Fill



Bull Dog Junior Where Fill Is Required

Bull Dog Floor Clip Installations

Users of Bull Dog Floor Clips are protected by reissue Patent 15881, July 29, 1924; Process Patent 15387430, May 19, 1925

"PUT THE BULL DOG ON YOUR PAYROLL"

PATENTED JUNE 14, 1921. NO. 1,361,740.

BULL DOG FLOOR CLIP
AS SHIPPED AND AS PLACED
IN SLAB WITH TABS FOLDED
DOWN FLAT OVER THE TOP

Put the Bull-Dog on your Pay-roll

WIDTH OF CLIP JUST ACCOMMODATES 1 1/2" x 1 1/2" STRIP DRESSED FROM 2" x 2".

BULL DOG CLIP
WITH TAB RAISED TO RECEIVE STRIPS
NAIL HOLES
LUGS KEYS IN CONCRETE

ONE PIECE CLIP, NO. 20 GAUGE SHEET METAL ASSURES STRENGTH AND RIGIDITY WHEN TABS ARE RAISED

NEW SHEET METAL GALVANIZED AFTER EXPANSION PREVENTS CRACKING OR CHIPPING OF GALVANIZING AND ASSURES LONG LIFE OF CLIP

SIX QUICK STEPS FOR LAYING WOOD FLOORS IN CONCRETE CONSTRUCTION.

THE PERFECT SYSTEM FOR ANCHORING A WOOD FLOOR TO A CONCRETE SLAB.

STEP NO 1.
PLACING CLIPS USING DOUBLE STRAIGHT EDGE AND GUIDES.

STEP NO 2.
TOP TABS BENT UP WITH CHISEL WHEN READY TO INSTALL SLEEPERS.

STEP NO 3.
SLEEPERS ARE PLACED BETWEEN RAISED TABS AND HELD SNUGLY.

STEP NO 4.
STRIPS ARE LEVELED UP AND NAILED THROUGH HOLES PUNCHED IN TABS.

STEP NO 5.
LOW PLACES ARE WEDGED AND THEN SLUSHED-IN WITH THIN CEMENT MORTAR.

STEP NO 6.
FINISHED FLOOR NAILED TO SLEEPERS IN USUAL MANNER.

WORKMEN CONSTRUCT GUIDE OF TWO PLANKS WITH STRAIGHT EDGES MARKED WITH SAW TO SECURE CORRECT SPACING WITHOUT MEASURING

WALKING ON PLANKS OF GUIDES ELIMINATES FOOT MARKS IN SOFT CONCRETE

CLIPS HELD WITH ENDS FLAT AGAINST STRAIGHT EDGE OF PLANK GUIDE AND EMBEDDED WITH TOP FLUSH ON CONCRETE

ANCHORAGE STRENGTHENED BY KEYING-LUGS ON CLIPS

CONCRETE WORKERS ARE THROUGH WITH JOB WHEN CLIPS ARE PLACED

CLIPS FLUSH IN HARDENED CONCRETE GIVE UNOBSTRUCTED FLOOR FOR USE

PERFECT SPACING AND ALIGNMENT SECURED AUTOMATICALLY WITH THE GUIDE, ELIMINATING ALL MEASURING

SCREEDS PLACED EVERY 8 OR 10 FEET IN SLAB BEFORE CONCRETE IS POURED PERMITS LEVELING OF SURFACE WITH STRAIGHT EDGE

NO HIGH SPOTS TO BE CUT DOWN

LEVEL SLAB SURFACE MINIMIZES LEVELING, WEDGING, AND SLUSHING

WEDGE

CEMENT MORTAR SLUSHING

FIRM ANCHORAGE AND DEAD AIR SPACE PREVENTS ANY BUCKLING, FLOOR SQUEAKS OR DRY ROT

NO FILL IS NECESSARY, BUT WHERE REQUIRED BY BUILDING ORDINANCES A DRY SAND FILL IS RECOMMENDED

NO DELAY, WAITING FOR CONCRETE FILL TO DRY OUT

CARPENTERS LAY STRIPS AND FINISHED FLOORING AT THE SAME TIME

BULL-DOG FLOOR CLIPS ~ INSTALLATION DATA.

THE AEROCRETE CORPORATION OF AMERICA

51 East 42nd Street
NEW YORK, N. Y.

Aerocrete—A Light Weight Concrete

Aerocrete is highly porous light weight concrete made from portland cement and cinders or slag. It differs from ordinary cement in that about 70% of its volume is made up of evenly divided cells which give the material a structure that resembles a honeycomb.

This cellular structure is produced by a substance added to the cement, which, when mixed with water, liberates hydrogen gas throughout the concrete mass, thereby producing innumerable isolated gas cells.

The presence of these gas cells in the mass gives Aerocrete its remarkable qualities, viz.:

(1) **Lightness**—Aerocrete weighs only one-third as much as ordinary concrete.

(2) **Heat Insulation**—Recent tests conducted by Professors Chas. McKergow and H. S. Reilley of McGill University show that Aerocrete has lower heat conductivity than any fireproof structural building material on the market.

(3) **Sound Deadening**—Aerocrete, due to its cellular structure, effectively damps out sound and thereby retards sound transmission to a remarkable degree and its acoustic qualities are also excellent.

(4) **Strength**—Despite its

lightness Aerocrete develops a compressive strength of from 400 to 500 lb. per sq. in.

Uses for Aerocrete

Aerocrete is used for fireproofing of joists, girders and columns; for precast reinforced floor beams, for building blocks, roofing slabs, walls, partitions and for insulation of cold storage plants, heating furnaces and hot blast stoves.

Aerocrete can also be poured on the job.

Aerocrete Is Easily Worked

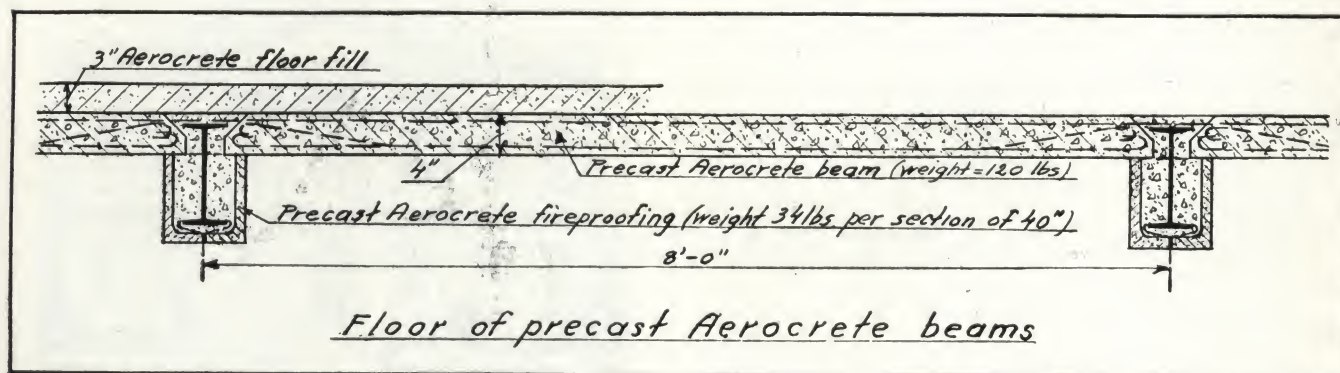
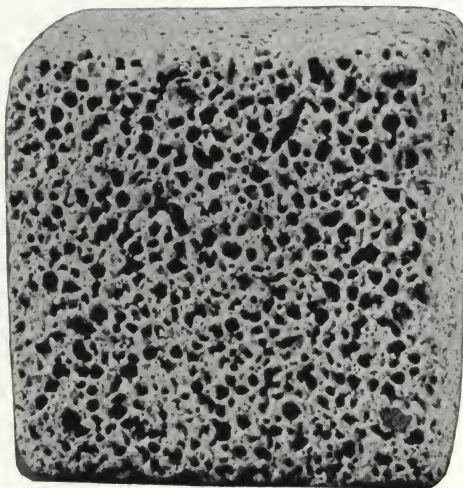
Aerocrete can be cut with a trowel, saw or chisel. It can be nailed or screwed to wood studs. On account of its lightness it is easily handled.

Licenses

Aerocrete has been used extensively in England and Canada for several years and is now being introduced into the United States. Licenses are being granted to responsible firms in various parts of the country to manufacture and sell Aerocrete.

Aerocrete Process is fully protected by patents.

Full particulars through the AEROCRETE CORPORATION OF AMERICA, 51 East 42nd Street, New York, N. Y.



THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete

105 West 40th Street, NEW YORK, N. Y.

SELLING AGENTS IN ALL THE PRINCIPAL CITIES IN THE UNITED STATES

Product

NAILCRETE (Nailing Concrete). Patented—name registered.



Nailcrete (Nailing Concrete)

Nailcrete is a cementitious, fibrous, *all-mineral* fireproof compound, containing no animal or vegetable matter, no acids, alkalis or any substance injurious to metals, wood or other construction materials coming in contact with it.

Nailcrete is regularly supplied in burlap bags containing in each case the correct quantity for the mix used. It is to be mixed on the job with portland cement, screened sand and clean water, and screeded smooth and level. Complete instructions with each shipment.

Origin

Nailcrete has been in successful commercial use for more than 18 years. It was developed after extended laboratory research and tests conducted by Grosvenor Atterbury, F.A.I. A., collaborating with the Russell Sage Foundation in connection with their economic construction developments.

Advantageous Qualities and Physical Properties

Nailcrete is absolutely fireproof and verminproof; will not shrink, swell, or rot; is unaffected by dampness, a poor conductor of heat and an effective sound-deadener.

Nailcrete has the same compressive strength as 1-3-6 cinder concrete and is 20% lighter (Nailcrete weighs about 90 lb. per cu. ft.) thereby saving steel in building design. Its nailing properties are unsurpassed, as Nailcrete holds nails better than pine.

Coefficient of expansion, also setting and drying periods are substantially the same as those of cinder concrete. Nailcrete calls for the same precautions against freezing, quick drying, etc., as are necessary with ordinary concrete.

NAILCRETE SLABS—SAFE LOADS IN LB. PER SQ. FT.

Gross sectional area of steel in sq. in. per ft. slab	Thickness of Nailcrete above steel	Span in feet									
		1½	2	2½	3	3½	4	4½	5	5½	6
¾-in. Hy-Rib, Ribplex or equal, .061 sq. in.	2 in....	480	312	176	122	...	...	...	...	...	...
	2½ in....	...	...	232	161	118	91	...	...	...	...
	3 in....	...	...	...	...	144	110	87	70	...	...
¾-in. Hy-Rib, Ribplex or equal, .1407 sq. in.	2 in....	...	...	...	158	114	87	...	...	...	...
	2½ in....	...	...	...	230	171	130	102	...	...	...
	3 in....	...	...	...	...	233	177	139	113	...	...
	3½ in....	...	...	...	...	...	228	180	146	121	...
	4 in....	...	...	...	...	...	...	238	193	159	134

Nailcrete weighs about 90 lb. cu. ft. or 7½ lb. per in., 1 ft. square. Table based on WL/10. For WL/8 (or simple span), deduct 20% from above.

Brace self-centering lath to support wet Nailcrete.

Safe loads on spans above 6 ft. furnished on request.

Total live and dead load on tile roofs: 2-ft. slab, 66 lb.; 2½-ft., 70 lb.; 3-ft., 74 lb.; 3½-ft., 78 lb.; 4-ft., 82 lb. per sq. ft.

Uses of Nailcrete

Nailcrete is used without sleepers and without underflooring or sheathing, and is more durable than the ordinary construction using wood sleepers and cinder-concrete fill. It is especially suitable as a fireproof nailing base for floors, roof covering of various kinds, etc., as follows:

(a) **Subfloors**—Nailcrete is laid 2 in. thick (weight about 15 lb. per sq. ft.) as a subfloor on top of the structural slab or floor arch, to which is directly applied wood flooring, cork tile, etc., giving the floor

greater resiliency and making it more impervious to sound. (See specifications.)

(b) **Reinforced Floor Slabs for Metal Lumber**—Nailcrete is used 2 in. thick on top of metal lath placed on metal lumber or bar joist floor beams. In this case the Nailcrete acts as fireproof floor slab and as a nailing base for the finished wood floor. (See specifications and table of safe loads.)

(c) **Roof Coating**—A fireproof, rotproof nailing base 1½ to 2 in. thick directly on top of roof slab to receive tile, slate, copper, etc. (See specifications.)

(d) **Reinforced Roof Slab**—A poured-in-place construction on rafters of steel, metal lumber or bar joists. (See specifications and table of safe loads.)

(e) **Nailcrete Floor-Fill**—Under cement finish, terrazzo, marble, tile, etc., as a non-corrosive fill in place of cinder concrete. (See specifications.)

(f) **Plaster, Interior and Exterior**—For interior plastering especially for fireproofing, sound-insulating and as a nailing base for wood paneling; for exterior plastering of penthouse walls, skylight curbs, etc., to receive the sheet metal covering. (See specifications.)

Cost

Nailcrete installed costs less than good wood sleeper and cinder-concrete fill construction. (Estimates furnished by all contractors.)

Service and Supervision

Where practicable, THE NAILCRETE CORPORATION will send a representative to the job, without expense to the contractor, to instruct users in the proper installation of Nailcrete.

References

A list of Nailcrete installations will be furnished on request.



Old Assay Office Front Restored as American Wing, Metropolitan Museum of Art, New York, N. Y.

GROSVENOR ATTERBURY, Architect; STOWE PHELPS and JOHN TOMPKINS, Associated

Nailcrete was used as a fireproof nailing base under all wood floors and also under copper roof

Specifications for Nailcrete

Note: Always specify Nailcrete by name.

Materials—Nailcrete shall be made with portland cement and sand strictly in accordance with the specifications of the manufacturer. All sand shall be sharp, clean, and screened through $\frac{1}{4}$ -in. mesh.

Preparatory Work—Immediately before Nailcrete is laid, the surface to be covered shall be swept broom-clean thoroughly wetted and grouted.

Setting—All Nailcrete shall be allowed to set properly before being walked on.

Note: Ordinarily 2 days in summer and 3 days in winter.

Nailcrete Subfloors—On structural floor construction Nailcrete shall be laid 2 in. thick and screeded, and, if necessary, troweled, to a level.

The wood floor is not to be laid until the Nailcrete has thoroughly dried out. Flooring to be nailed with 8d cut nails, driven at an angle of approximately 45°.

Note: For high class work specify (under the heading of Carpentry) 1 layer of tarred paper (not less than 2-ply) additional deadening felt, if desired, and the finish wood flooring to be used. Under-flooring is never necessary.

On Metal Lumber Beams—Cover the floors of rooms, etc. (specify which ones are to be covered), with metal lath secured directly to the beams (not over 2 ft. apart) and on top

of the metal lath put a bed of Nailcrete not less than 2 in. thick at the thinnest point, screeded level to receive the finish flooring specified under Carpentry.

Note: In high class work specify paper as above. Even in work of the highest class underflooring is unnecessary.

Nailcrete Roof Coating—The structural roof construction shall be covered with 2 in. of Nailcrete.

Note: If slate are thicker than $\frac{3}{4}$ in., consult THE NAILCRETE CORPORATION as to the thickness of the Nailcrete.

Reinforced Sloping Roof Slab—Cover steel rafters with self-centering lath (as specified by manufacturers) or pour in place fabric-reinforced Nailcrete slab in. thick. (See table for areas of steel and safe loads.)

Nailcrete Floor-Fill—Over structural arch apply in. Nailcrete Floor-Fill in accordance with manufacturer's specifications.

Plaster—Interior—Plaster interior walls to an approved finish, true and even as per instructions of THE NAILCRETE CORPORATION.

Exterior—Plaster the exterior of penthouse walls, skylight curbs, etc., with Nailcrete plaster 1 in. thick in 2 coats, scratch and finish, troweled (or floated) true and even.

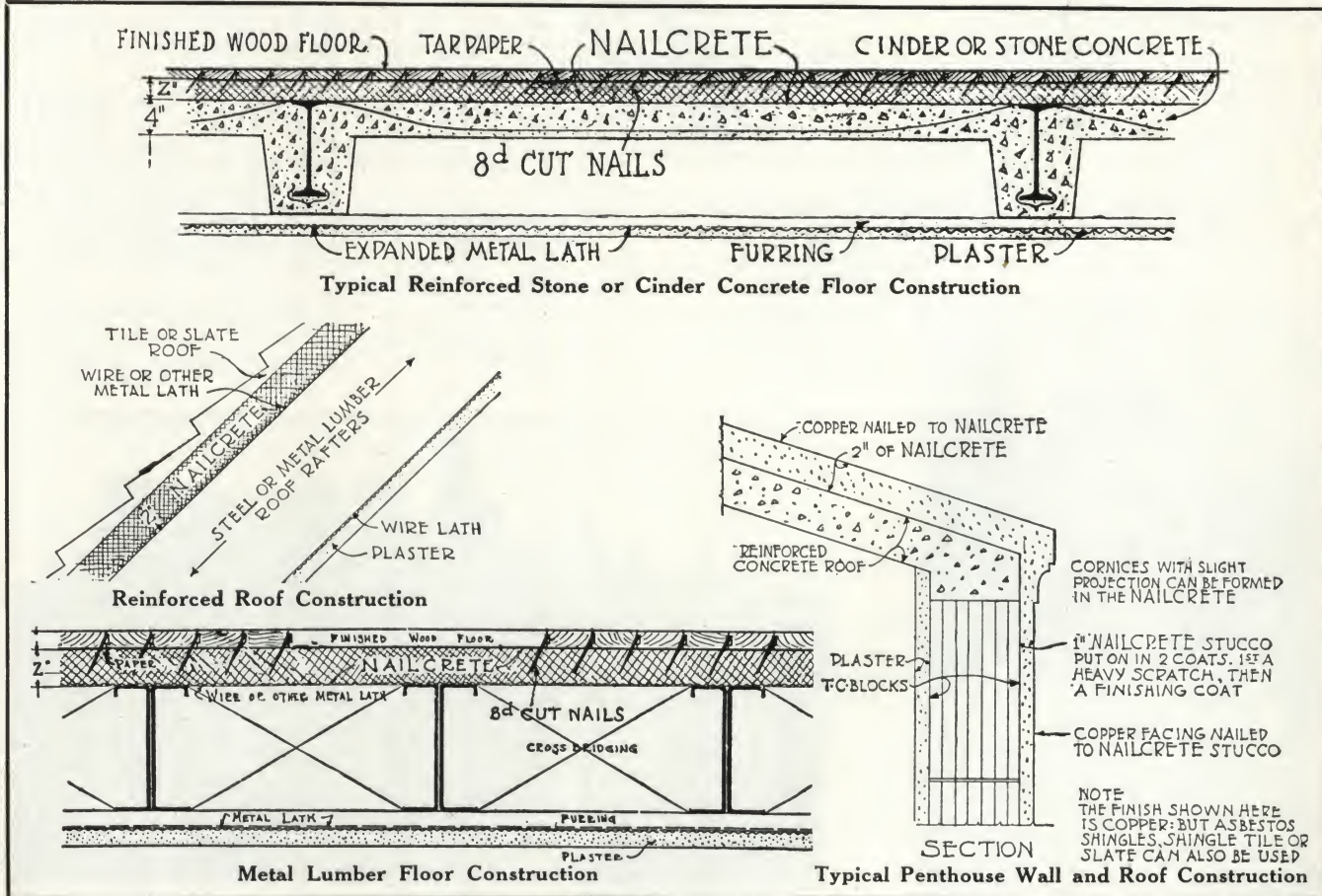
Note: If the Nailcrete plaster is to be applied to gypsum blocks, the blocks should be covered first with proper bonding material, and the Nailcrete is then to be applied while the bonding material is still tacky.



Lawrence Hall, Colgate University, Hamilton, N. Y.
WALTER B. CHAMBERS, Architect, New York, N. Y.



Residence of E. Richard Meinig, Wyomissing, Pa.
RITCHER & EILER, Architects, Reading, Pa.



Typical Examples of Nailcrete Construction

PORETE MFG. CO.

Manufacturers of Lightweight Concrete Products

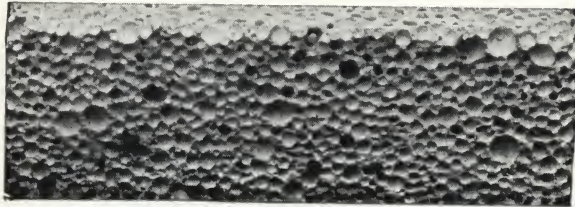
346 Riverside Avenue, NEWARK, N. J.

Product

PRECAST PORETE SLABS for roofs and floors.
 Porete-Nailfill, a Nailing Concrete.
 Porete is covered by United States patents.

What Porete Is

Porete is portland cement concrete of uniformly honeycombed structure and combines the durability of concrete with the lightness of wood. It is made of portland cement and sand only. Porete is made of a very rich cement mix and the reinforcing metal is thoroughly coated and protected against corrosion.



Full Size Structure of Porete

Porete has about one-third the weight of solid concrete.

On account of the air cells which it contains, it is a good heat and sound insulator and a better fire resisting material than solid concrete, because of its low heat conductivity. Its permanency is equivalent to that of concrete and its strength improves with age.

Porete Roofs—2 ft. 8-in. Span

Porete roof slabs, 24x32x1 1/4 in. thick, are laid on steel purlins at 2 ft. 8-in. centers and are fastened to them with heavy metal clips. After all the slabs are laid, a thin cement grout is worked into the rough surface and this roof deck is then ready for the waterproofing which is ordinarily a tar and felt roof.

Porete for Steep Roofs, Used as a Base for Slate, Tile or Metal Roofing—Where slate, tile or metal roofing has to be nailed up, the Porete slabs are covered with 1/2 in. of Porete-nail finish. This is a mixture of portland ce-

ment and sand with a fibrous fireproof mineral material. This finish forms a tough resilient sheet which becomes integral with the Porete, greatly adding to its initial strength.

Advantages—Porete roof slabs are a factory controlled product, accurately reinforced. In combination with a cement finish which is applied in the field, they make a lighter fireproof roof than any other material. Porete roofs can be adapted to any roof design, flat or slanting. They are easily erected even in cold weather.

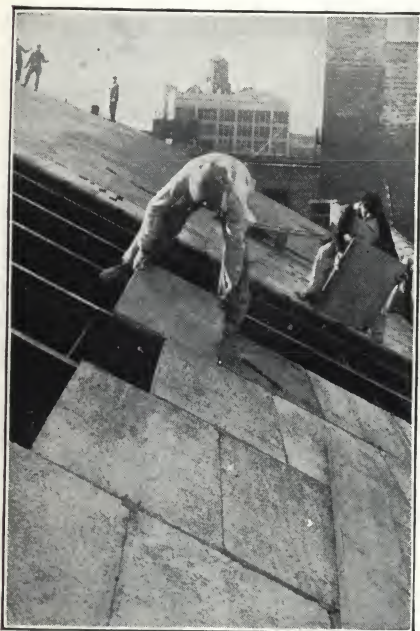
They weigh only 7 lb. per sq. ft., which is one-half as much as any other fireproof roof. A Porete roof will carry a live load of over 50 lb. per sq. ft. with a factor of safety of five. Buildings covered with Porete will cost less to heat, because Porete is a good heat insulating material.

Porete roof decks present a clean smooth stone finish on the underside. Due to their light weight there is a saving in the steel of the supporting trusses, especially on the larger spans.

CHANNEL PURLINS FOR PORETE-SLAB ROOF

Purlins Spaced 2'-8" c.c.									
Weight per Sq. Ft. of Purlins 3 lbs. + Porete 7 lbs. + Waterproofing 5 lbs. = 15 lbs. Total					Live Load 40 lbs. per Sq. Ft. Total 55 lbs. per Sq. Ft.				
Span in Feet	Section Modulus Required	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof	Span in Feet	Section Modulus Required	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof	Span in Feet	Section Modulus Required
6	0.40	3"x4.1C	1.1	6	0.49	3"x4.1C	1.1	6	0.49
7	0.55	"	"	7	0.68	"	"	7	0.68
8	0.72	"	"	8	0.88	"	"	8	0.88
9	0.91	"	"	9	1.11	"	"	9	1.11
10	1.12	4"x5.4C	1.9	10	1.38	4"x5.4C	1.9	10	1.38
11	1.36	"	"	11	1.66	"	"	11	1.66
12	1.62	"	"	12	1.98	"	"	12	1.98
13	1.90	"	"	13	2.32	5"x6.7C	3.0	13	2.32
14	2.20	5"x6.7C	3.0	14	2.69	"	"	14	2.69
15	2.53	"	"	15	3.10	"	"	15	3.10
16	2.88	"	"	16	3.52	6"x8.2C	4.3	16	3.52
17	3.25	6"x8.2C	4.3	17	3.97	"	"	17	3.97
18	3.64	"	"	18	4.46	"	"	18	4.46
19	4.06	"	"	19	4.96	7"x9.8C	6.0	19	4.96
20	4.50	7"x9.8C	6.0	20	5.50	"	"	20	5.50
21	4.96	"	"	21	6.06	"	"	21	6.06
22	5.45	"	"	22	6.65	8"x11.5C	8.1	22	6.65
23	5.95	"	"	23	7.27	"	"	23	7.27
24	6.48	8"x11.5C	8.1	24	7.92	"	"	24	7.92
25	7.03	"	"	25	8.59	9"x13.4C	10.5	25	8.59
26	7.61	"	"	26	9.30	"	"	26	9.30

For purlin table where the deflection is restricted, and for other loads, write us.



Laying Porete Slabs



Roof on Dormitory, Yale University
 JAMES GAMBLE ROGERS, Architect

Porete Roofs on Pressed Steel Joists or Trussed Bar Beams

The joists can be set farther apart than in usual construction and 25% less steel is required.

The slabs are fastened to the joists with nails or wire clips. In combination with these joists Porete provides a good looking, strong, durable, light-weight concrete roof in which the reinforcing metal is well protected from rusting.

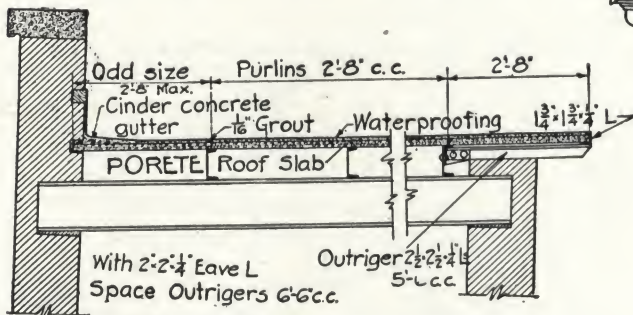


Savoy-Plaza Hotel, New York, N. Y.
McKim, Mead & White, Architects

Porete Roofs—Long Span

Purlin Slab Construction—This is a combination of a 5 to 6-ft. long channel slab and the 2 ft. 8-in. span porete slab. This roof is 1½ in. thick and weighs 12 to 15 lb. per sq. ft.

Flat Slab Construction—Consists of 4 to 5-ft. long precast slabs provided with a finish coat in the field. Thickness of roof 2¼ to 2⅝ in. Weight 11 to 14 lb. per sq. ft. We



Detail of Flat Roof; Parapet and Overhang

A Few Representative Porete Installations and Their Architects

Hospitals

St. Vincent's hospital, Montclair, N. J., Crow, Lewis & Wick
Hospital Buildings, Asyla, N. J., Walter W. Sharpley
North County Community Hospital, Glen Cove, L. I., N. Y.,
Wilson, Peabody & Brown
State Hospital Buildings, Morris Plains, N. J., Allan B. Mills
Crawford-Allen Memorial Hospital, North Kingston, R. I.,
York & Sawyer

Schools and Churches

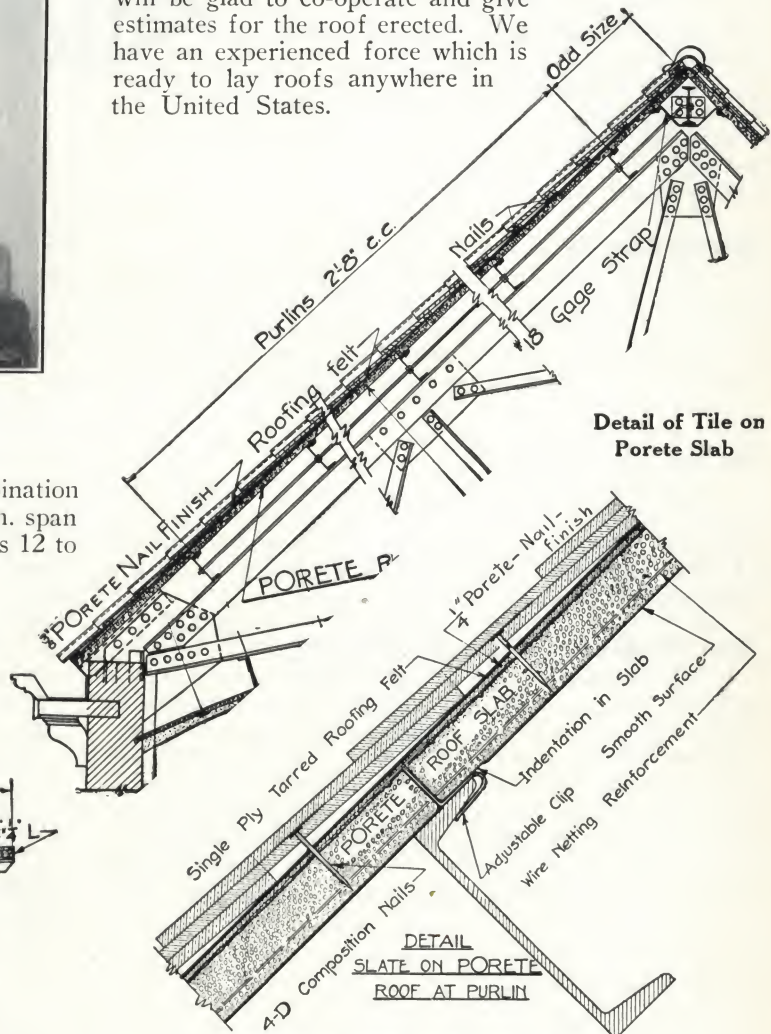
Wm. Penn High School, Harrisburg, Pa., C. Howard Lloyd
Andover Academy, Andover, Mass., Chas. A. Platt
Yale University, New Haven, Conn., James Gamble Rogers
Chapel, Princeton University, Princeton, N. J., Cram & Ferguson
Temple and Synagogue, Brooklyn, N. Y., Simeon B. Eisendrath
St. Mary's Church, Jersey City, N. J., Robt. J. Beily
Art Museum, Montclair, N. J., Goodwillie & Moran
Duke University (11 buildings) Durham, N. C., Horace Trumbauer
Public School, New Haven, Conn., Brown & Van Beren
St. Nicholas Church, New York, N. Y., O'Connor, Delany & Schultz

recommend this roof where high insulating value is required.

For Longer Span Up to 10 Ft. we erect sub-purlins on 2 ft. 8-in. centers—either channels, I-beams, rails or other sections bolted or welded to the main beams and which support the 2 ft. 8-in. slabs.

Co-operative Service

Our Engineering and Estimating Departments are at the service of engineers and architects. It is advisable to consult us when laying out the roof steel. We will be glad to co-operate and give estimates for the roof erected. We have an experienced force which is ready to lay roofs anywhere in the United States.



Detail of Slate on Porete at Purlin

Theaters, Hotels, Banks and Residences

Strand Theater, Atlantic City, N. J., Hoffman-Henon Co.
Theater, Worcester, Mass., Thomas W. Lamb
Berkshire Theater, Brooklyn, N. Y., Harrison G. Wiseman
Essex County Trust Co., East Orange, N. J., Dennison & Hiron
Keith's Theater, Jamaica, L. I., N. Y., Thos. Short
New Netherlands Hotel, New York, N. Y., Shultz & Weaver
Shore Road Theater, Brooklyn, N. Y., M. W. DelGaudio
Y. M. C. A., Schenectady, N. Y., Helmle & Corbett
Savoy-Plaza Hotel, New York, N. Y., McKim, Meade & White
Residence, Plandome, L. I., N. Y., F. A. Godley
Residence, Rumson, N. J., J. R. & F. B. Hinchman

Industrial Buildings, Power Plants and Garages

Power Plants, Atlantic City, N. J., Scranton, Pa., Rockford, Ill., American Gas & Electric Co., Engineers
Virginian Railway Power Plant, Narrows, Va., Gibbs & Hill
Radio Corporation of America, Skinner & Cook
Fulton Water Works, Fulton, N. J., Hazen & Whipple
Nazareth Cement Company, Ford, Bacon & Davis
Ward Baking Co. Garage, Cambridge, Mass.

ANCHOR FIREPROOFING COMPANY

101 Park Avenue
NEW YORK, N. Y.

2210 Park Avenue
DETROIT, MICH.

101 Marietta Street
ATLANTA, GA.

Products and Services

The furnishing and erection complete in the building of:

AFCO REINFORCED GYPSUM NAILING ROOF TILE.

AFCO COMBINATION PLASTER BOARD GYPSUM ROOFS.

AFCO SUSPENSION SYSTEM GYPSUM FLOORS and ROOFS.

GYPSUM TILE PARTITIONS.

Construction Service

All above constructions are installed in the building by our own organization consisting of country-wide crews of mechanics, especially trained in these types of work and available anywhere on short notice. Immediate service, correct and rapid installation are assured.

Engineering Service

A complete engineering department is at your service for consultation and assistance in design and construction. Architects' specification folders covering any of above and giving complete design information, and details will be sent upon request.

Afco Reinforced Gypsum Nailing Tile

Description—Solid precast, lengths of 30 in. by widths of 12 in., thickness of 3 or 4 in., consisting of calcined gypsum and wood fibre reinforced with electrically welded galvanized wire mesh. The wood strips are anchored in the tile and beveled to give additional security. These strips provide a positive nail-holding base to which the slate or ornamental tile may be nailed direct or to wood cross sleepers attached as shown in cut below. We recommend the use of cross sleepers. This



tile provides an absolutely positive nailing base even under excessive moisture and circumvents the trouble previously encountered in ordinary types of plain gypsum roof tile, which possesses little nail-holding power when dry and practically none when damp.

Steel Framing—Owing to the light weight of Afco Gypsum Nailing Tile, 16 lb. per sq. ft., a material economy in structural steel framing is permitted.

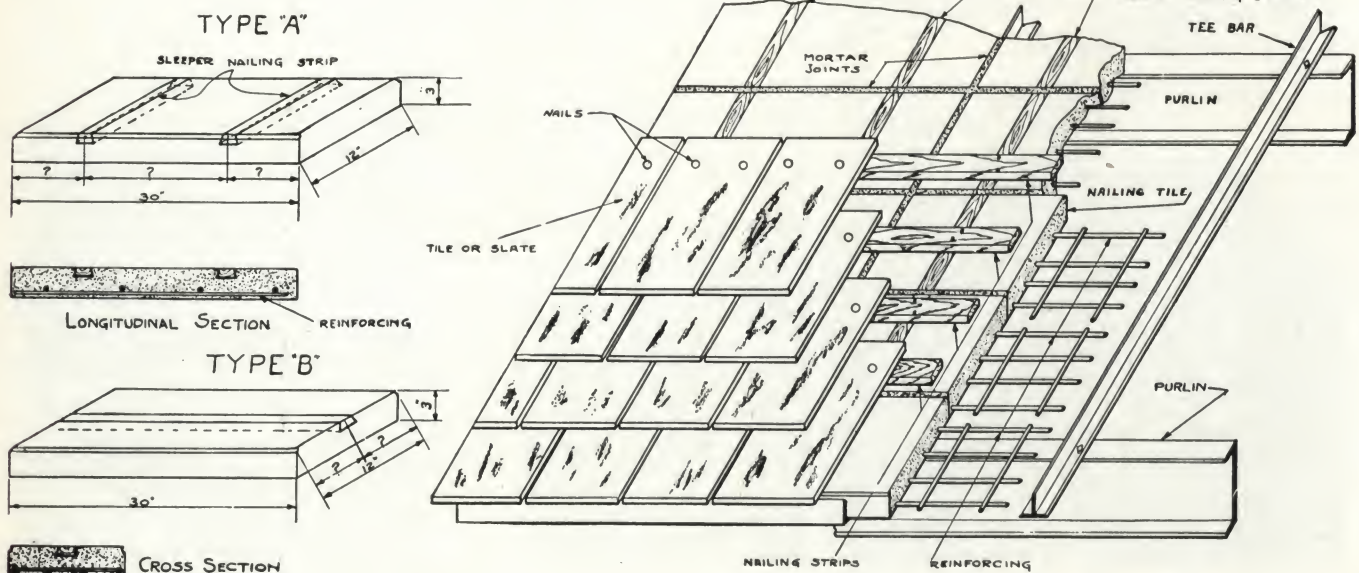
Insulation—Gypsum has the lowest conductivity of any structural fireproof building material, and heat penetration in summer and heat loss in winter are reduced to a minimum.

Strength—The Detroit Testing Laboratory reports show that Afco Nailing Tile develops strength withstanding ultimate uniform loads of from 488 to 520 lb. per sq. ft. or, using the factor of safety of 4, safe working loads of from 122 to 130 lb. per sq. ft.

Specifications—All roofs, as shown on plans, unless otherwise noted, shall be constructed of 3x12x30 in. solid Afco Gypsum Nailing Tile. Tee irons (see schedule for proper sizes) shall be laid directly on and securely fastened to the purlins. Tee irons shall be spaced 30 $\frac{3}{4}$ in. on centers and shall be furnished and erected by this contractor. The tile shall be laid tightly together on tee irons without mortar and after placing tile, all joints shall be filled with gypsum mortar mixed in accordance with the manufacturer's specifications. The entire surface shall be left true and even for installation of finish roof covering.

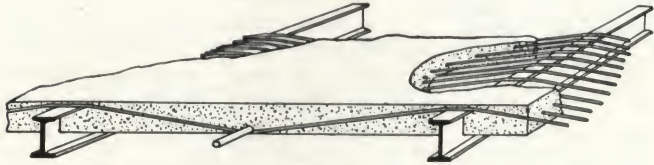
TEE IRONS REQUIRED FOR VARIOUS PURLIN SPANS

Purlin span	Size of tee	Weight
Up to 5 ft. 3 in.	2 $\frac{1}{4}$ x 2 $\frac{1}{4}$ x $\frac{1}{4}$ in.	4.1 lb.
5 ft. 3 in. to 6 ft. 0 in.	2 $\frac{1}{4}$ x 2 $\frac{1}{4}$ x $\frac{1}{8}$ in.	4.9 lb.
6 ft. 0 in. to 6 ft. 6 in.	2 $\frac{1}{2}$ x 2 $\frac{1}{2}$ x $\frac{1}{8}$ in.	5.5 lb.
6 ft. 6 in. to 8 ft. 0 in.	3 x 3 x $\frac{1}{8}$ in.	6.7 lb.



Afco Suspension System Gypsum Floors and Roofs

Description—This construction employs a principle of proven value and is practical for any type of building. Load is carried by cables in suspension, gypsum fill being used only to hold the cables rigidly in place. Cable section is constant, variations in purlin spacing and in floor or roof loads being provided for by cable spacing. Compressive strength of gypsum is disregarded and cable stresses are figured by standard formulae.

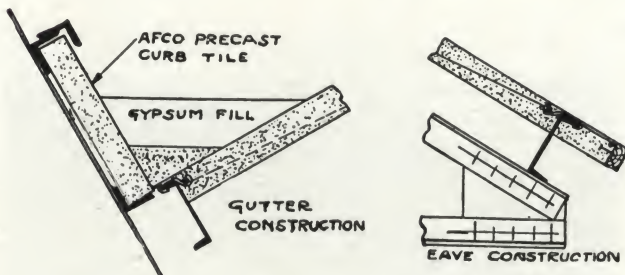
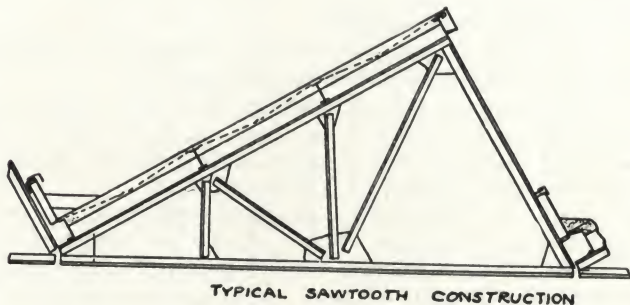


Rapid Erection—Fill sets in 15 minutes and the centering, which is of simple type wood form construction, may be removed within an hour. Other trades follow immediately with their work.

Insulation—Fill, principally calcined gypsum, eliminates condensation on undersurface, provides against heat loss in winter and penetration of heat in summer.

Economy—Light weight permits economy in structural steel, insulation qualities reduce amount of heating equipment required and cost of operating same.

End Bay Bracing—To take cable tension which exerts a pull on the end bay beams, it is necessary to include light truss bracing in structural steel contract. Our architect's folder gives full information—sent on request.

**Afco Combination Plaster Board Gypsum Roofs**

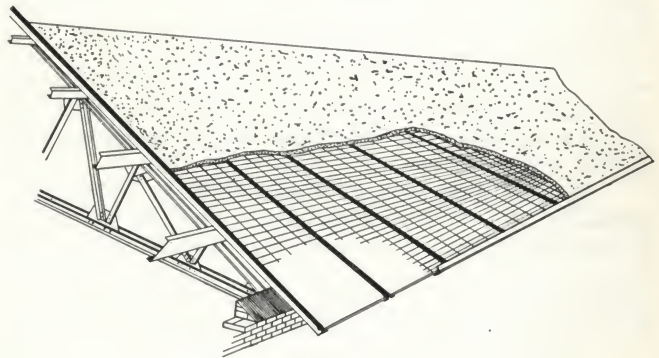
Description—Construction consists of subpurlins, either tee irons or light rail sections, spaced 32½ in. on centers, and clipped to main purlins. Heavy duty ½-in. plaster board is laid on and supported by bottom flanges of rails. Galvanized electrically welded reinforcing mesh of No. 11 main wires on 4-in. centers, and No. 12 spacer wires on 8-in. centers, is laid on top of the plaster board. Fill, consisting of standard gypsum mix, is poured, screeded and troweled to an even surface to receive waterproof covering. It is suitable for roofs with a pitch not greater than 45°.

Economy—This construction makes a definite saving in structural steel, due to its light weight. Insulating value of the roof reduces initial cost of heating equipment and reduces fuel bills.

Appearance—Undersurface presents true and uniform paneled appearance, showing neither form marks nor nailheads, and may be plastered or decorated in any color scheme, if desired.

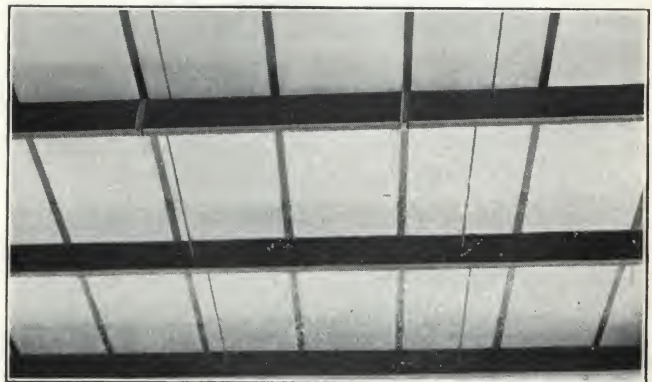
Rapid Erection—These roof decks can be poured as fast as steel and masonry walls are completed. They set in 15 minutes and finish roof covering may be applied immediately.

Insulation—Same advantages as other roof types on this and preceding page.



Fireproofing—The construction comprises only materials whose fire-resisting qualities have long been established.

Strength—Columbia University tests of Afco Plaster Board Gypsum Decks reveal strengths that afford a factor of safety far in excess of standard practice—this factor of safety being much greater than that of the ordinary design of the structural steel framework of the building.



Undersurface of American Can Co. Warehouse,
Brooklyn, N. Y.

TURNER CONSTRUCTION CO., General Contractors

AMERICAN CEMENT TILE MFG. CO.

INCORPORATED FEBRUARY, 1902

Manufacturers of Cementile Roofing

Oliver Building, PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK, N. Y., 50 Church Street
PHILADELPHIA, PA., 1827 Arch Street

BIRMINGHAM, ALA., 2700 North 23rd Street
ATLANTA, GA., 1007 Candler Building

WORKS: WAMPUM, PA.; LINCOLN, N. J.; BIRMINGHAM, ALA.

Products

Manufacturers of BONANZA "CEMENTILE"—a reinforced cement tile roofing.



TRADE-MARK

Description of Bonanza "Cementile"

Bonanza "Cementile" are very large, light, steel reinforced cement roofing tile furnished in three distinct types; namely, Interlocking, Flat, and Channel, besides such necessary fittings as ridge tile of various types, skylight or glass insert tile, flashing tile, collar tile, etc., all factory made and cured—a specialized product, brought to its highest state of development.

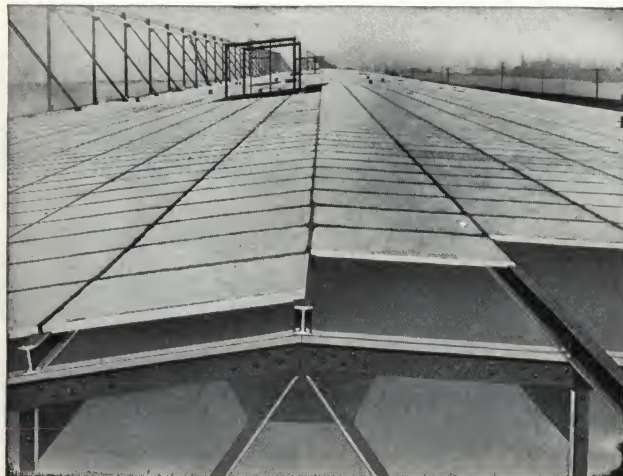
The tile are laid directly on open steel roof purlins (which are spaced on a span suitable for the type of tile selected).

In no case is sheathing or other base support required. This eliminates excessive weight and insures greatest economy in design of the supporting structure.

All in all, Bonanza "Cementile" roofs are roofs of economy and quality, speedily laid, with guaranteed results backed by our established reputation as manufacturing and contracting engineers over a period exceeding 25 years.

Bonanza Interlocking "Cementile" are designed for pitched roofs. Laid directly on purlins spaced approximately 4 ft. apart, they are fireproof and waterproof, the finished surface having a particularly pleasing red Spanish tile effect. Like Bonanza Flat "Cementile" and Bonanza Channel "Cementile" they are very strong and light.

Bonanza Flat and Bonanza Channel "Cementile" are designed for flat roof construction, or for pitched roofs where it is desired to waterproof with composition covering. These tile are laid directly on purlins; the 1½-in. Bonanza Flat "Cementile" for standard spacing of 5 ft., and the Bonanza Channel "Cementile" standard 8-ft. spans, are a combination of tremendous strength and lightness that eliminates all form work and assures speed in erection with positive results.



Lehigh Valley R. R. Co. Pier Shed, Jersey City, N. J.
110,000 sq. ft. of Bonanza Flat "Cementile" ready for waterproof covering

Advantages of Bonanza "Cementile"

Economy—Being laid directly on the roof purlins, the absence of roof boarding, nailing strips and other forms of fastenings makes the initial cost reasonable. Maintenance charges are eliminated, thus making the first cost usually the last.

Weight—These tile are designed along economical lines, reducing the dead load on the steel structure to a minimum.

Strength—In conformity with the standard purlin spacing, Bonanza "Cementile" roofs will sustain such roof loads as are usually encountered. Breaking load tests made at Columbia University for the New York Building Department, showed as high as 350 lb. per sq. ft. under a uniformly distributed load on the standard spacing.

Adaptability—Bonanza "Cementile" will be found suitable for any type of roof construction and of any size.

Erection—An experienced and capable field force insures absolute satisfaction. "Cementile" roofs can be laid regardless of temperature or climatic conditions, thus eliminating delays.

Weatherproof and Fireproof—Bonanza "Cementile" are impervious to water and the elements, are proof against fire, and are everlasting under ordinary conditions.

Interlocking "Cementile"

Designed for pitched roofs, forming in itself a finished, watertight and fireproof covering.

Standard tile is 26 in. wide by 52 in. long (24x48 in. exposed surface) and 1 in. thick, properly reinforced with a galvanized steel fabric. It develops an ultimate breaking load capacity of 350 lb. per sq. ft.

The tile are made up as single units with no loose connections. The side "roll" of one tile overlaps the "rabbet" of the adjacent tile. All joints are properly sealed with "Lastik" Cement. A 4-in. lap is provided on each row of tile by the row above, which is staggered.



Watertown Arsenal, Watertown, Mass.
Finished Bonanza Interlocking "Cementile" Roof with Bonanza Glass Insert "Cementile." This is part of a total installation of ten buildings with an area of 470,000 sq. ft.

The tile are hooked in place on purlin flanges by means of a continuous 1-in. offset at top of each tile. The Bonanza Wire Glass Insert Interlocking "Cementile," which interchange with the standard tile, provide any lighting effect demanded.

Guaranteed to carry a uniformly distributed load of 250 lb. per sq. ft. over a 4-ft. span.

DIMENSIONS AND WEIGHTS OF INTERLOCKING "CEMENTILE"

Size of tile	26x52 in.
Thickness of tile	1 in.
Surface exposed	24x48 in.
Weight per sq. ft.	14 lb.
Weight per sq. ft. of finished roofing	16 lb.
Number of tile per square of roof (100 sq. ft.)	12½

Roof Design—Minimum pitch desirable for slope of roof is $\frac{1}{5}$, which is $4\frac{1}{8}$ in. to 1 ft.

In order to arrive at the proper purlin spacing always start at the eaves; then use standard spacing of 3 ft. 10 in. to 4 ft. $\frac{1}{2}$ in., as conditions call for. Any short spacing should be placed at the ridge; should this spacing be less than 1 ft. 4 in., special 60-in. tile should be used at the eaves. Steel channel purlins should be provided, held in alignment by sag rods.

Flat "Cementile"

Designed for both flat and pitched roofs; the application of a standard composition roofing is required to make roof watertight.

Standard Bonanza Flat "Cementile" are $1\frac{1}{2}$ in. thick, 24 in. wide, and 60 in. long, and are always carried in stock for immediate shipment. Where necessary, special tile are made to order for spacing over or under 60 in.

Ends have an offset which is laid on flange of I-beam purlins, after which joints are properly pointed, preparatory to application of composition roofing. Bonanza Flat "Cementile" are properly reinforced.

Guaranteed to carry a uniformly distributed load of 200 lb. per sq. ft. over a span of 5 ft.

DIMENSIONS AND WEIGHTS OF FLAT "CEMENTILE"

Thickness of tile	1½ in.
Size of standard tile	24x60 in.
Surface exposed	24x60 in.
Weight per sq. ft.	17 lb.
Weight per square of roof	1700 lb.

Channel "Cementile"

Designed to meet the demands of the present tendency to use extra wide spans in flat roof construction. Also used extensively on sawtooth roofs.

Standard Bonanza Channel "Cementile" is 18 in. wide and 96 in. long; channels are $1\frac{3}{8}$ in. thick at flanges and 1 in. thick at web. Special tile are made to order for spans over or under 96 in.

Ends are laid directly on flange of I-beam purlins, joints are then properly pointed and entire roof deck covered with some form of composition roofing. Bonanza Channel "Cementile" are properly reinforced.

DIMENSIONS AND WEIGHTS OF CHANNEL "CEMENTILE"

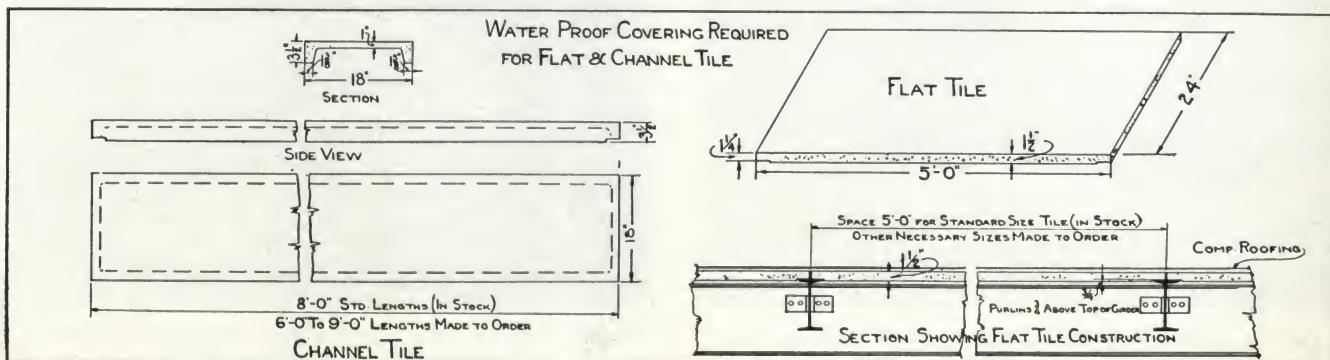
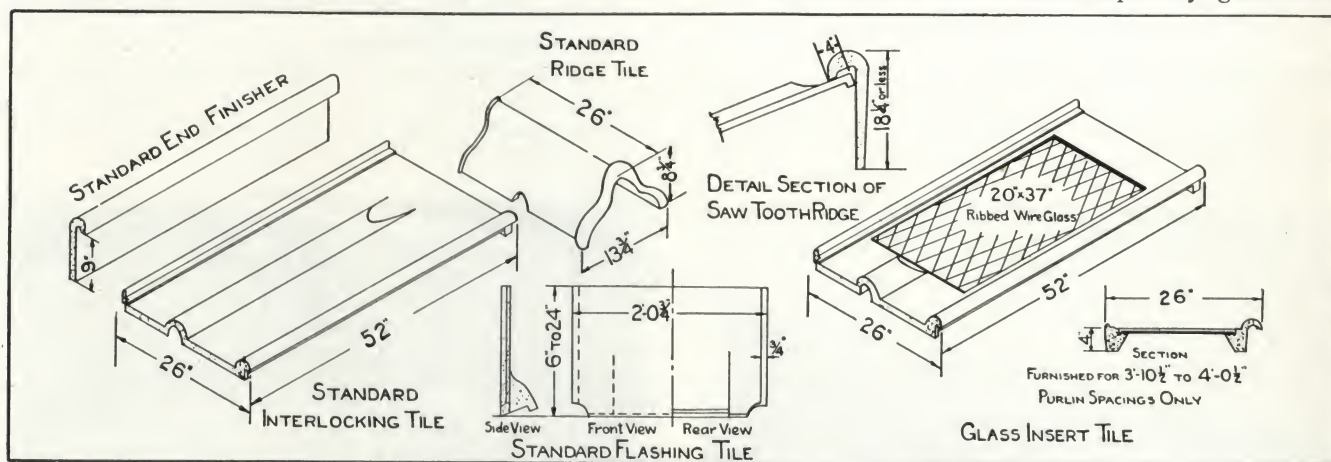
Depth of tile	3½ in.
Thickness of tile	Flanges $1\frac{3}{8}$ in., web 1 in.
Size of standard tile	18x96 in.
Surface exposed	18x96 in.
Weight per sq. ft.	19 lb.
Weight per square of roof	1900 lb.

Service

Our engineering department renders free service to owners, engineers, architects and contractors whenever desired. Send your problems and preliminary plans during the early stages of the work. Our experience of 25 years allows us to offer suggestions as to the most economical purlin layout. Upon receipt of preliminary or finished drawings, either approximate or definite proposals will be furnished, as may be desired.

Bonanza "Cementile" roofs are erected preferably by experienced and efficient crews maintained by the company.

All materials and workmanship fully guaranteed.



FEDERAL CEMENT TILE COMPANY

Fireproof Roofs

608 South Dearborn Street

CHICAGO, ILL.

Federal Interlocking Tile for Pitched Roofs

Form a complete waterproof roof, entirely eliminating composition covering.

Their attractive red color enhances appearance of building.

Federal Glass Tile

When used in combination with Federal Interlocking Tile for top lighting form an ideal "daylight roof." Can be so distributed as to admit light over entire floor space, or concentrated on any technical or exacting operation. Glass embedded in concrete during manufacture in such manner as to prevent cracking of glass.

Federal Flat and Channel Deck Slabs

Designed for flat and pitched roofs. These types require some form of composition covering. Their light weight and long span effect a structural steel saving, and they eliminate costly labor and materials incidental to roofs poured or plastered on the job.

Federal Cork Insulated Slabs

Afford a splendid super-insulation. The cork is entirely encased on all sides with impervious concrete.

Federal Nailing Concrete Tile

Form a concrete deck to which can be readily nailed slate, small tile or other ornamental roofing. Made of fireproof and waterproof concrete.



Federal Interlocking and Flat Slabs on Ford Motor Co. Assembly Plant, Memphis, Tenn.

The Roof for Permanence

Federal Tile are made of the most indestructible of all materials—reinforced stone-concrete. They are not affected by heat, cold, ice, snow, fire, water, acid fumes, gases, or any other destructive forces. They actually grow stronger with age. Laid directly on structural steel, they make a light weight, fireproof construction. They require no painting, repairing or other maintenance. They last as long as the structure. The tile are properly reinforced and tied together with wire mesh to carry a load well above the building code requirements of the larger cities. The unit system, with plastic cement at the joints, makes every slab free to come and go with vibration, contraction and expansion. Federal Cement Tile are the most economical of all roofs when the cost is figured over a period of years.

A list of representative installations will be furnished on request.

Service and Structural Details

All Federal roofs are installed and fully guaranteed by the manufacturer. Federal engineers are structural experts and will assist architects and engineers in laying out steel work to carry Federal Tile. This service involves no charge or obligation.

Federal Concrete Cribbing

These pre-cast, reinforced concrete units form an economical and ideal construction for retaining walls and embankments. The installation cost is moderate and once installed, they will last indefinitely.



Federal Channel Slabs Forming Roof Deck and Ceiling on Union Station Concourse, Chicago

Standard Specifications

General—All tile to carry approximately 300 lb. per sq. ft. breaking load, uniformly distributed when resting on supports spaced the same as the purlins. No cracked or broken tile or tile with broken corners or warped tile will be permitted to be placed in the roof. All tile to be as nearly perfect as good workmanship will permit.

All tile to be natural water and air cured under cover where a constant temperature is maintained of not less than 60° F.

This contractor shall make up and submit for approval pre-cast slab details based on the steel fabricator's shop drawings as well as the architect's design drawings, before starting manufacture of material.

All tile are to be erected by the manufacturer furnishing the material in a thorough workmanlike manner.

Interlocking Tile—The pitched roof is to be Pre-cast Reinforced Concrete Tile, Interlocking Type, with the necessary trimmings, to make a complete and satisfactory job.

All tile to be composed of an approved brand of portland cement and the highest grade of washed torpedo sand, in a mixture of 1 part of cement to 2¾ parts of sand accurately graded and thoroughly mixed and mechanically tamped and kneaded, so as to obtain the greatest possible density and watertightness. Each slab is to be reinforced with a sheet of galvanized cold drawn wire mesh, the longitudinal wires spaced not more than 2 in. apart and cross wires woven around the longitudinal wires.

The sheet of mesh reinforcing shall be mechanically straightened before being placed in the slab so that it can be accurately centered in a plane and be protected by ½ in. of dense, impervious concrete.

The exposed surface of the tile to present a permanent red color and this color, a mixture of iron oxide and cement, to penetrate the top half of the slab. The top surface to be thoroughly troweled, giving same a smooth and uniform finish.

The longitudinal joints to be of plastic made with a high grade oil cement and a weather cap coat of highest grade elastic compound. The joint to conform to detail shown on the drawings.

The lap or cross joint to be formed of a high grade oil cement. Butter the upper end of each course of tile as laid, then install course above producing a squeeze joint as overlap.

Special tile to be furnished where necessary; these tile to be detailed and manufactured to interlock and fit in with adjacent tile without field cutting.

Glass Tile—Top lighting shall be provided by Pre-cast Reinforced Concrete Tile with Glass Inserts. Locate as shown on the drawings. These tile are to be made so as to be interchangeable with the standard 52-in. interlocking tile.

The mix, material and workmanship of these tile shall be the same as the standard interlocking tile. A sheet of ¼-in. wire glass 21x35 in. is to be embedded in the concrete during the process of manufacture of the tile, thus becoming an integral part thereof.

The four edges of the glass are to be triple dipped in a special asphalt compound, forming a cushion on all four sides, to allow for expansion and contraction.

A condensation gutter and weep hole formed in the concrete at the lower edge of glass is to be an integral part of the glass tile.

Flat Slabs—The flat roof decks and gutters are to be Pre-cast Reinforced Concrete Flat Slabs, 24 in. wide, of a length to fit purlin spacing and not less than 1½ in. thick for the standard 5-ft. slabs, composed of an approved brand of portland cement and the highest grade washed torpedo sand in a mixture of 1 part of cement to 2¾ parts of sand accurately graded, thoroughly mixed, tamped and kneaded so as to obtain the greatest possible density.

Each slab is to be reinforced with a sheet of cold drawn wire mesh, the longitudinal wires of which shall be spaced not more than 2 in. apart and cross wires woven around the longitudinal wires.

The under side of the tile shall present a smooth surface free from cracks or form marks, and shall be of a uniform natural gray cement color.

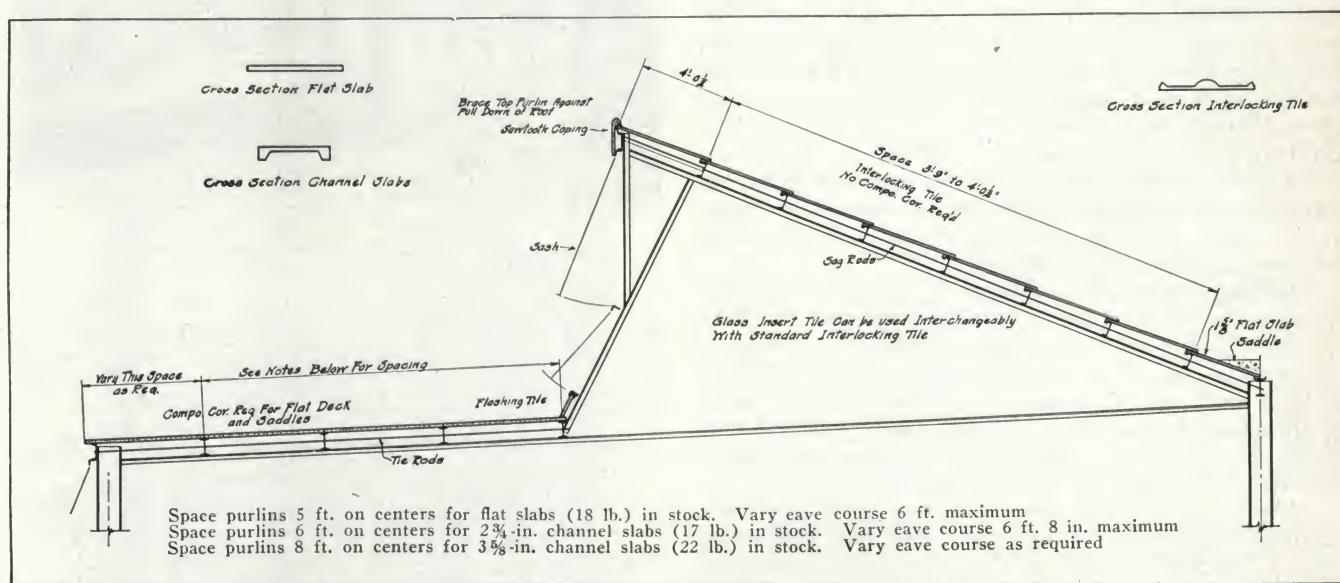
All joints of the flat slabs are to be cemented on the upper side with an approved brand of asphaltic cement and present a smooth surface ready for the application of the composition covering.

Channel Slabs—The flat roof decks are to be Pre-cast Reinforced Concrete Channel Slabs composed of an approved brand of portland cement and the highest grade of washed torpedo sand in a mixture of 1 part of cement to 3 parts of sand accurately graded and thoroughly mixed and vibrated so as to obtain the greatest possible density. Each leg is to be reinforced with one deformed bar accurately centered so as to have at least ½ in. of dense, impervious concrete on all sides. The web of the slab is to be reinforced with a sheet of triangular cold drawn wire mesh accurately centered.

All joints of the channel slabs are to be cemented on the upper side with an approved brand of asphaltic cement and present a smooth surface ready for the application of the composition covering.

The Federal Blue Print Book "Roof Standards"

The Federal Blue Print Book "Roof Standards," containing 28 pages of details of roof construction, will be sent on request. The drawing below is a typical illustration.



Combination Flat Slab and Interlocking Tile on Inverted Monitor Roof

STRUCTURAL GYPSUM CORPORATION

Manufacturers and Erectors of Gypsum Floors and Roofs

Dodge Building, 53 Park Place, NEW YORK, N. Y.

BRANCH OFFICES

ALLENTOWN, PA., 444 Union Street
BALTIMORE, MD., 617 Lexington Building
BOSTON, MASS., 65 Franklin Street
BUFFALO, N. Y., Jackson Building

EASTON, PA., 31 No. Fourth Street
PHILADELPHIA, PA., Real Estate Trust Building
PITTSBURGH, PA., 1006 Benedum Trees Building
RICHMOND, VA., 202 Davis Building

SCRANTON, PA., Board of Trade Building
SYRACUSE, N. Y., 301 Comstock Avenue
WASHINGTON, D. C., 916 Fifteenth Street, N. W.

FACTORIES: AKRON, N. Y. AND CARTERET, N. J.

Product

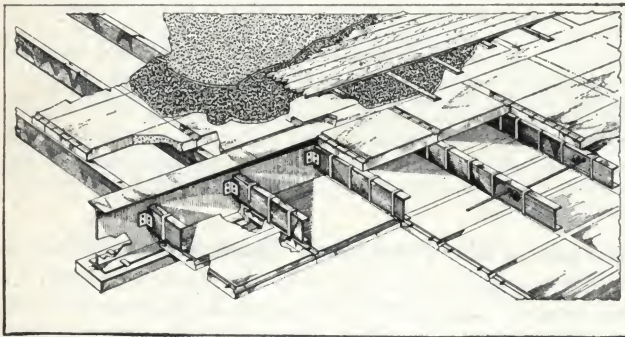
Manufacturers and erectors of "GYPSTEEL"
PRE-CAST and POURED-IN-PLACE FLOORS and
ROOFS.

Also, "Ribrock" Partition Blocks.



"Gypsteel" Pre-cast Long Span Floors (Patented)

"Gypsteel" pre-cast floors economically combine the calculable strength of structural steel with the unequalled fire protection and lightness of gypsum. This floor construction consists of *standard sections of rolled steel channels*, spaced 30 in. on centers, on which are laid pre-cast gypsum floor slabs $2\frac{1}{2}$ in. thick, and from which are suspended ceiling slabs of the same material, 2 in. thick.



"GYPSTEEL" PRE-CAST FLOOR

These channels, being of structural steel, are designed for the required loads in accordance with the usual practice, and may be used for any spans between supporting girders or walls up to 24 ft. They are supported at girders by means of standard web connections. These channels are *not coped*, but are framed with their top flanges 2 in. below the top flanges of the girder.

Where columns and girders are not required, these channels may be supported by the exterior and interior walls, their ends being built into the walls as the latter are erected, in the usual manner.

Ceiling Slabs—The ceilings consist of "Gypsteel" pre-cast slabs 2 in. thick, 2 ft. 6 in. in length and 2 ft. in width, composed of the highest grade, scientifically calcined gypsum, with which is incorporated a small percentage of binder that imparts to the slab a peculiar toughness and elasticity. These slabs perform the double function of providing a flat ceiling underneath and completely *fireproofing* the channels.

These ceiling slabs are reinforced with steel bars running lengthwise through the slabs and projecting from either end. When erected, these projecting bars pass through slots in heavy steel hangers clamped to the top flanges of the channels, suspending the slabs and yet holding them tightly against the soffits of the channels. Generous slots are formed where the slabs abut each other, at both sides and ends, by means of rabbets, which slots are filled solidly with gypsum grout, completely

sealing them and preventing the passage of any heat through the joints.

The ceiling is then immediately ready for brown and finish coats of plaster—*no scratch coat* being necessary as required

for metal lath and other materials.

Floor Slabs—
"Gypsteel" floor slabs consist of the same composition as the ceiling slabs. Like the latter, they are pre-moulded at the factory and shipped to the job ready to erect. They are $2\frac{1}{2}$ in. thick, 2 ft. in width and 2 ft. 6 in. in length.

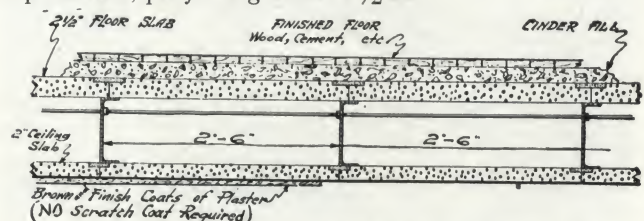


ERECTION OF "GYPSTEEL" CEILING SLABS
Grouting to follow



"GYPSTEEL" PRE-CAST FLOOR
Christopher Columbus High School, Binghamton, N. Y.
TIFFANY & KALEY, Architects

These slabs are reinforced with $\frac{3}{16}$ -in. cold drawn wire rods (uniformly and accurately located in accordance with accepted engineering formulae), which emerge from the ends of the slab within $\frac{1}{2}$ in. of the top surface, projecting about $2\frac{1}{2}$ in.



CROSS SECTION "GYPSTEEL" PRE-CAST FLOOR

When these slabs are set in place upon the steel channels, the projecting ends of the opposite rods in

abutting slabs are tied together by a mechanical device which draws them up taut at these connections, *making the reinforcement continuous.*

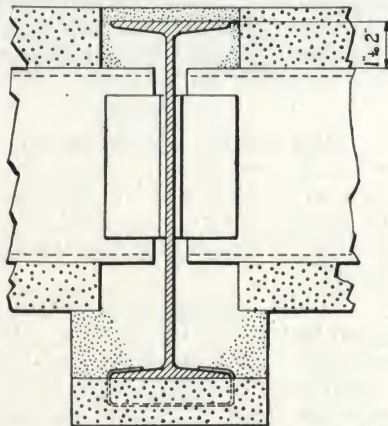


"GYPSTEEL" PRE-CAST FLOOR
Erecting floor slabs

As the ends of the slabs are rabbetted where the rods emerge, these ties lie in a depression which is filled with a gypsum grout, firmly embedding the ties and smoothed off flush with the top surface of the slabs. The floor is then ready to receive cinder fill and cement finish, or wood sleepers and wood floor, as desired.

Girder Fireproofing—

Where the floor channels are supported by girders, the projecting webs and flanges of the latter are fireproofed by means of "Gypsteel" pre-cast slabs, 2 in. in thickness, applied to the soffits of the girders. These slabs have embedded in them $\frac{3}{4} \times \frac{1}{8}$ -in. flats, the ends of which project through the upper surfaces and are clamped over the girder flanges. Plastic gypsum is then deposited in space between top surfaces of these soffit-slabs and adjacent ceiling slabs, and is troweled off square and flush with outside edges of soffit-slabs.



CROSS SECTION AT GIRDER "GYPSTEEL"
PRE-CAST FLOOR
Showing girder fireproofing in place



"GYPSTEEL" PRE-CAST FLOOR

First National Bank and Northampton Trust Co., Easton, Pa.
HOGGSON BROTHERS, New York, N. Y., Architects

Principal Advantages of "Gypsteel" Pre-cast Floors

Economy—They are the most economical type of first class fireproof floor construction which can be employed where flat ceilings are required.

Strength—Their load carrying capacity is accurately calculated upon the strength of the supporting rolled steel channels, spaced 30 in. on centers. The ability of the "Gypsteel" pre-cast floor slabs to transmit the load to these channels was conclusively proven by tests conducted by Columbia University Testing Laboratory for the Bureau of Buildings, New York City, in which *concentrated loads* were applied by machine at the *third points* of one of the 2 ft. 6-in. spans for the full width of the slab. Failure did not occur until the load had reached *1482 lb. per sq. ft.*, equal, approximately, to 2000 lb. per sq. ft. uniformly distributed. These floors may, therefore, be safely designed for total loads up to 250 lb. per sq. ft. *with a factor of safety of 6 on the third-point loading*, or a factor of safety of approximately 8, based upon a uniform loading.

Fire Resistance—"Gypsteel" pre-cast floors have successfully passed the standard fire, load and water tests required by the principal cities of the United States for first class fireproof floor construction. These tests consist of the subjection of the floor to a fire for 4 hours at 1700° F., carrying a live load of 150 lb. per sq. ft., followed by the application, for 10 minutes, of a hose stream from a $1\frac{1}{8}$ -in. nozzle at 60-lb. nozzle pressure. The following is quoted verbatim from the official report of the Columbia University Testing Laboratory to the Bureau of Buildings of New York City, viz.:

"The floor slabs proper were not affected by the heat. The maximum temperature reached during the test on the underside of these slabs (the space between the floor and ceiling slabs) was about 315° F. A short piece of wood, 1x2 in. in cross section, found between the floor and ceiling slabs, and which had been there during the entire test, was only blackened in part, giving further proof of the low temperature during the test directly above the 2-in. ceiling."

The maximum deflection recorded during this test, at the center of the 18-ft. floor span was .82 in. Fifteen minutes after the water was applied, this had recovered to .62 in. After the removal of the load of 150 lb. per sq. ft. the final deflection was .19 in.

Lightness—"Gypsteel" pre-cast floor construction (including channels) is usually not only lower in first cost than any other type of fireproof floor with flat ceiling underneath for a given span and load, but its extreme lightness in weight invariably permits of a substantial saving in the tonnage of girders and columns.

TABULATION OF DEAD LOADS

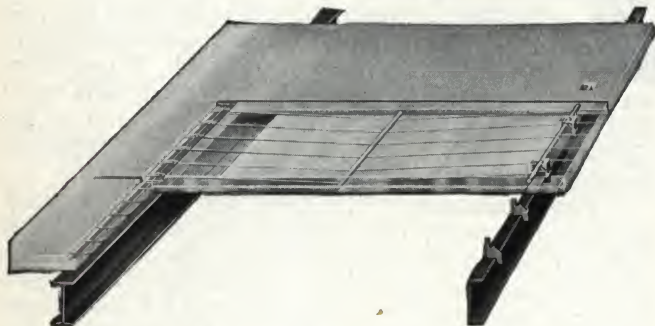
	Lb. per sq. ft.
Channels (average)	5
"Gypsteel" floor slabs	12
"Gypsteel" ceiling slabs	9
2-in. cinder fill	10
Wood floor	4
Plastering (no scratch coat)	4
Total	44

Note: If cement finish instead of wood floor is used add 8 lb. per sq. ft.

Time Saving—The "Gypsteel" floor and ceiling slabs being in standard sizes, are carried in stock at the factory and arrive at the job dry and ready to erect. There is *no form work*. As the slabs are dry when set, the *ceiling could be plastered the same day*, if desired. And as there is *no water entering into the construction* (except the small amount used in the grouting), there is *no drying out to delay the finishing of the building*.

"Gypsteel" Pre-cast Roofs (Patented)

"Gypsteel" pre-cast roof construction is designed upon the suspension-bridge principle. It is, in effect, a monolithic roof after the erection is completed. The slabs are moulded in steel forms, into which the steel cables are placed and put into uniform deflection and tension by means of deflection rods restrained at the sides of the moulds. The cables are securely anchored to the moulds at points beyond the ends of the slabs, being removed from this anchorage when the gypsum has set, each cable emerging from the ends of the slab within $\frac{1}{2}$ in. of the top surface, and projecting about 2 in.

**"GYPSTEEL" PRE-CAST ROOFS**

Details of design, cable ties, anchorage, grouted end and side joints and anchor slots

**"GYPSTEEL" PRE-CAST ROOFS**

Showing perfect mechanical anchorage of steel in slabs to the steel framework of building, independent of the gypsum

When these slabs are set in place on the purlins, with their ends abutting, the projecting ends of the opposite cables in each slab are tied together by a mechanical device which draws them up taut at these connections; and as the ends of the slabs are rabbetted where the cables emerge, these ties lie in a depression filled with a grout of the same composition, firmly embedding the ties and troweled off flush with the top surface of the slab.

Innumerable load tests which have been made on "Gypsteel" pre-cast roof construction have shown in every instance, that it will develop more than the factor of safety of 4 upon which the supporting steel cables are designed, the cable ties holding firmly until the ultimate strength of the steel in tension has been reached.

SAFE TOTAL LOADS PER SQUARE FOOT, PRE-CAST ROOF CONSTRUCTION

Slab width, in.	Cable spac., in.	Number cables per slab	Distance between supports center to center, ft.-in.													
			4-0	4-3	4-6	4-9	5-0	5-3	5-6	5-9	6-0	6-3	6-6	6-9	7-0	
24	4	6	136	122	108	98	88	80	72	66	61	57	54	50	46	
	3.43	7	159	142	126	114	102	93	84	78	72	67	63	59	55	
21	4.2	5														
	3.5	6														
18	3	7														
	2.62	8														
	3.6	5														
	3	6														
	2.57	7														

$W = 1152 Td \div bL \sqrt{L^2 + 16d^2}$ where W = safe load in lbs. per sq. ft.
 T = cable strength = 0.0274 (area of $\frac{3}{8}$ -in. cold drawn steel-wire rods) \times 20,000 (unit working stress) = 552 lb.; d = deflection of wires in inches;
 b = cable spacing in inches and L = clear span in inches.

Slab thickness in all cases, 3 in., weight 14 lb. per sq. ft.

Note: While this table is not extended beyond the usual range of roof loads, slabs will be designed and furnished for any greater load capacities which may be desired, in order to meet special conditions. This is accomplished by decreasing the cable spacing for any given span.

**"GYPSTEEL" PRE-CAST ROOF**

Part of half million feet of "Gypsteel" roof at new plant of Western Electric Company, Kearny, N. J.

Advantages of "Gypsteel" Roof Construction

Economical First Cost—Its extreme lightness in weight and adaptability to wide purlin spacings effect substantial savings in the total steel tonnage of the purlins, trusses and columns, making it the most economical of any first class type of roof construction.

Saving in Heating—The "Gypsteel" composition used in the slab is the most remarkable non-conductor of heat of any known structural material. It thus minimizes heat loss through the roof, *reducing the consumption of coal annually*, and effecting a further saving in the initial cost of the heating plant.

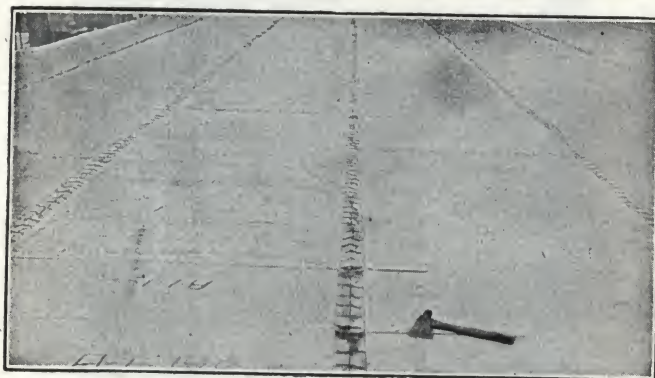
Preventing Condensation—"Gypsteel" roof construction pre-insures against the forming of condensation on the underside of the roof; and as the full depth of the slab (3 in. minimum) *passes over the tops of the purlins*, it also thoroughly insulates the supporting steel work.

Time Saving—"Gypsteel" pre-cast slabs are manufactured at the factory. Being ready for shipment when the erection of the steel work begins, the speed of installation is limited only by the progress of the steel erection ahead of it, and the slabs being dry the water-proofing follows the slab erectors just as closely.

Elasticity—"Gypsteel" successfully resists the most severe vibrations without cracking.

Corrosionproof—"Gypsteel" composition has been proved by more than 20 years' experience to be a perfect preservative of the incased steel against corrosion.

Non-expansive—"Gypsteel" roofs will neither expand nor contract, and are therefore free from cracks, spalling and internal stresses which frequently occur from this cause in concrete and other similar materials.

**"GYPSTEEL" PRE-CAST ROOF**

Close up view of cable ties. Note that grouting is used in the side as well as end joints, giving in effect, a monolithic slab construction

Attractive Appearance—"Gypsteel" roofs give a much more attractive appearance underneath than any other type of roof remaining unplastered, since the slabs are factory moulded on rubber mats, leaving a smooth, even surface underneath.

Replacement of Old Roofs—The replacement of old roofs is readily accomplished by the use of "Gypsteel" pre-cast construction with a minimum of annoyance to the work in process below. Its lightness in most cases renders increased steel work unnecessary over that which would be required for the support of wood, etc.

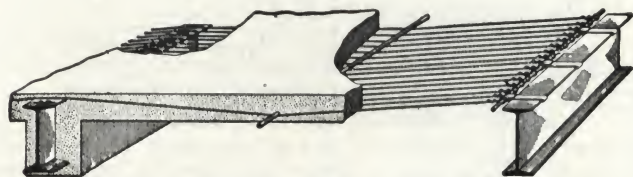


"GYPSTEEL" PRE-CAST ROOF
Girard Pier No. 3, Philadelphia, Pa.

Philadelphia's modern fireproof piers are roofed with "Gypsteel"

Poured-in-place Construction

Where flat ceilings are not required and floor or roof beams may be spaced not to exceed 8 ft. on centers, "Gypsteel" poured-in-place floor and roof construction combines the highest degree of fire resistance with economy. Its lightness (12 to 16 lb. per sq. ft.) permits of a substantial saving in the tonnage of steel. The design of "Gypsteel" poured-in-place construction is based upon the *principle of the suspension bridge*. Cables of cold drawn steel wire are spaced from 1 to 3 in. apart (depending upon the spans and loads) and are securely anchored at both ends of a series of beams by means of bars and anchors of a section of metal sufficiently heavy to develop the ultimate strength of the cables in tension. The cables are put into uniform deflection and tension between each pair of beams by means of continuous steel deflection rods.



TYPE 2. POURED-IN-PLACE FLOOR OR ROOF

"Gypsteel" composition is then poured-in-place between the beams, upon wood forms or centering, and is brought to a level surface about $\frac{1}{2}$ in. above the top flanges of the purlins. It is then ready to receive the fill and finished floor on top. The projecting webs and flanges of the beams and girders are also incased in the same composition poured at same time as the floor slab.

This "Gypsteel" composition consists of the highest grade, scientifically calcined gypsum with which is incor-

porated wood fiber or chips to serve as a binder and impart to the slab its peculiar toughness and elasticity.

The strength of a "Gypsteel" poured-in-place floor or roof can be proved by accepted engineering formulae, as the desired live and dead load capacity of the slab is calculated upon the structural value of the securely anchored steel cables, in suspension, under a factor of safety of 4.

Installation

"Gypsteel" construction is installed by our own field organization under competent foremen and superintendents of many years' experience. When desired, however, contracts will be taken for furnishing "Gypsteel" pre-cast slabs f.o.b. cars factory, with freight allowed to destination—we loaning one of our experienced working foremen to the contractor or owner to supervise the erection, for which no charge is made other than his actual time and expenses.

Estimates and Designs

Complete proposals for furnishing and installing "Gypsteel" floors and roofs will be promptly furnished on request. When it can be done conveniently, we suggest sending plans to our nearest sales office. This permits our Engineering Department to go over all of the details of the steel design and incorporate in our proposal an estimate of the total tonnage of steel which can be saved by reason of the lightness in weight of "Gypsteel."

Where plans have not yet been drawn, our Engineering Department will gladly co-operate in the preparation of the steel design to develop the maximum economy by the use of "Gypsteel" construction. This service is gratis, and imposes no obligation whatsoever upon the architect, engineer or owner.

Bulletins

Complete bulletins, containing full designing details, will be gladly sent on request.

References

The following is a brief list of representative "Gypsteel" installations:

FLOORS

Bryant Park Building, New York, N. Y., York and Sawyer, Architects
First National Bank, Easton, Pa., Hoggson Bros., New York, N. Y., Architects
Hotel Stratfield (Addition), Bridgeport, Conn., Monks & Johnson, Boston, Mass., Architects
Hotel Suburban, East Orange, N. J., E. V. & C. F. Warren, Newark, N. J., Architects
Mt. Mercy Hospital, Buffalo, N. Y., Henry L. Spann, Architect
Museum of Natural Sciences, Buffalo, N. Y., Eisenwein & Johnson, Architects
Saks & Co.—Herald Square, Department Store (Addition), New York, N. Y., Starrett & Van Vleck, Architects
Sibley, Lindsay & Curr, Department Store (Addition), Rochester, N. Y., J. Foster Warner, Architect
State & City Bank & Trust Company, Richmond, Va., Clinton & Russell, New York, N. Y., Architects

ROOFS

American Radiator Co.	24 contracts
American Car & Foundry Co.	17 contracts
Bethlehem Steel Corporation	25 contracts
General Electric Co.	13 contracts
International Paper Co.	11 contracts
United Gas Improvement Co.	7 contracts
U. S. War and Navy Departments	23 contracts
Western Electric Co.	5 contracts
Youngstown Sheet & Tube Co.	14 contracts

UNITED STATES GYPSUM COMPANY

Reinforced Roof Tile and Monolithic Floors and Roofs

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see page B1359

Products

Manufacturers and erectors of GYPSUM ROOF and FLOOR CONSTRUCTION; PYROBAR REINFORCED ROOF TILE (made of "Structolite") for roof decks; PYROFILL MONOLITHIC FLOOR and ROOF CONSTRUCTION.

For Acoustical Plaster, see page A19; for Structolite Cement, see pages A44-45; for Floor Voids, see page A114; for Dry Fill Insulation, see page A200; for Partition and Furring Tile, Beam and Column Covering, see pages A382-383; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Service

Our mills, located at advantageous points, insure prompt delivery for any quantity.

An Engineering and Construction Department is maintained to assist engineers and architects in designs and estimates without obligation. We will gladly submit erected bids on Pyrobar or Pyrofill roofs for new jobs, re-roofing jobs or on placing an insulation deck on your present roof.

Gypsum Roof and Floor Construction

Description—We have several types of gypsum construction for floors and roofs, which divide into two general forms—precast Pyrobar roof tile, and poured-in-place Pyrofill floor and roof construction.

Pyrobar roof tile are made of "Structolite," a specially prepared dense structural gypsum, reinforced with electrically welded, galvanized steel mats. Manufactured in two general types: long span hollow and 30-in. types, either solid or hollow.

Pyrofill consists of gypsum stucco to which is added as a binder or aggregate a small percentage of fibre, usually soft wood shavings. The two general types of Pyrofill construction are: (1) Pyrofill monolithic construction, which is poured on wood forming similar to that used for concrete construction and reinforced as a "suspension" system with twisted wire cables. (2) Sheetrock Pyrofill construction, which is poured on permanent Sheetrock forms or centering resting on light rail or other steel framing and reinforced with a welded wire mat.

Advantages—Strength—Pyrobar roof tile are designed to carry 50 lb. per sq. ft. total uniform load with a minimum factor of safety of 4. Pyrofill roof and floor constructions are designed to carry any specified load by varying the size and spacing of the reinforcement and the depth of slab.

Fireproof—Gypsum is acknowledged to be one of the best fireproofing materials known. Gypsum will not support combustion or conduct heat; neither has it appreciable contraction nor expansion; consequently, it will not warp, buckle, or spall under severe fire.

Minimizes Condensation—Superior insulation is

a dominant quality in gypsum roof construction. Tests give the following units of B.t.u. transmitted per square foot per hour per degree Fahrenheit difference in temperature for various roof deck materials:

3-in. Gypsum (Pyrobar or Pyrofill).....	.25
3-in. Solid Concrete Slab 1:2:4 mix.....	.75
1-in. Cement Tile.....	.99
Corrugated Iron.....	1.50

Less heat is transmitted through gypsum than through any other structural material. On account of its low conductivity the undersurface of a Pyrobar or Pyrofill roof deck remains at practically the same temperature as the interior of the building, regardless of outside temperature. Except under saturated air conditions, no sweating or dripping will occur and condensation is eliminated.

Heat Saving—The superior insulation value shows a decided saving in heat and heating equipment as compared to a concrete slab. This means an accumulating saving in fuel cost as well as a saving in initial cost of heating plant installation.

Light Weight—Are more than 50% lighter than concrete per square foot of surface for equal thickness, which results in considerable saving in steel framing, supporting members and material throughout the building.

Adaptability—Our roof decks in both the poured-in-place and precast types are very flexible in their adaptation to any form of roof design, whether flat or pitched with simple or complicated framing, or of large or small area.

Quickly Erected—The light weight materials or units are very speedily placed. No waiting for slabs to cure or forms to be removed. Re-roofing may be accomplished with Pyrobar or Pyrofill without interference to plant operation.

Light Diffusion—The undersurface is smooth and white (except for Sheetrock Pyrofill, which is light gray) and affords excellent light reflection without painting. Is admirably adapted for painting if desired.

Permanency—Established through years of use.

Not affected by deteriorating action of fumes from sulphurous acids or by chemical action of smoke. Maintenance cost is reduced to a negligible minimum.

Special Constructions—Extreme conditions of temperature, humidity or use of chemicals often require special consideration. For best results, secure our recommendations for type or treatment of the roof deck.

Pyrobar Roof Tile, 30-in. Type

All short span roof tile are manufactured 12 in. wide and 30 in. long, in thickness either of 3-in. solid or 4-in. hollow. The 3-in. solid is recommended particularly for nailing purposes because its design assures maximum penetration and, therefore, maximum nailing power. The 4-in. hollow fills all requirements for a light weight tile of high insulation value on which a built-up roof covering is to be applied. This tile is not recommended for nailing purposes. Both types are

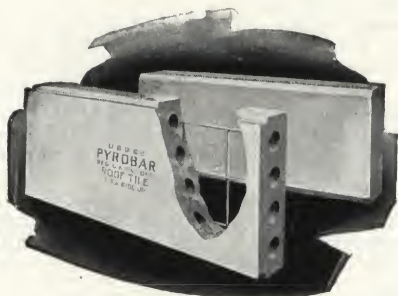
easily cut to fit intricate design of steep pitched roofs, or those with dormers and difficult intersections.

Short span, or 30-in. roof tile, require subpurlin supports, usually tees, or light structural shapes, such as I-beams or channels, may also be used with economy on spans from 7 ft. 6 in. to 12 ft. Where trusses or main supports do not exceed 12 ft., a notched 30-in. tile laid directly on light I-beam purlins spanning directly between steel trusses or main supports has proven economical.

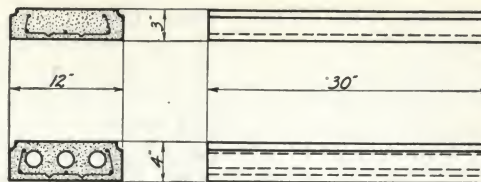
This type of construction is by far the most flexible of any precast system. It can be used with economy on any type of factory or industrial building, power plant, school, etc., and, in addition, is particularly well adapted to steep pitched roofs, or roofs that are badly cut up with dormers, hips, valleys and difficult intersections.

Curb or wall for monitors and sawtooth sash are built of 3-in. solid Pyrobar curb tile. End walls of monitors and sawtooth are similarly built, the roof covering being extended to cover curb and end walls.

Pyrofill drainage system may be used when drainage fill is required.



30-in. Pyrobar Roof Tile



30-in. Pyrobar Roof Tile

DESIGNING DATA

Spans for various T-irons spaced 30 3/4 in. on centers

Span.....	Up to 5' 3"	5' 3" to 5' 10 1/2"	5' 10 1/2" to 6' 5 1/2"	6' 5 1/2" to 8"
Size T-Iron...	2 1/4"x2 1/4"-4.1 lb.	2 1/4"x2 1/4"-4.9 lb.	2 1/2"x2 1/2"-5.5 lb.	3"x3"-6.7 lb.



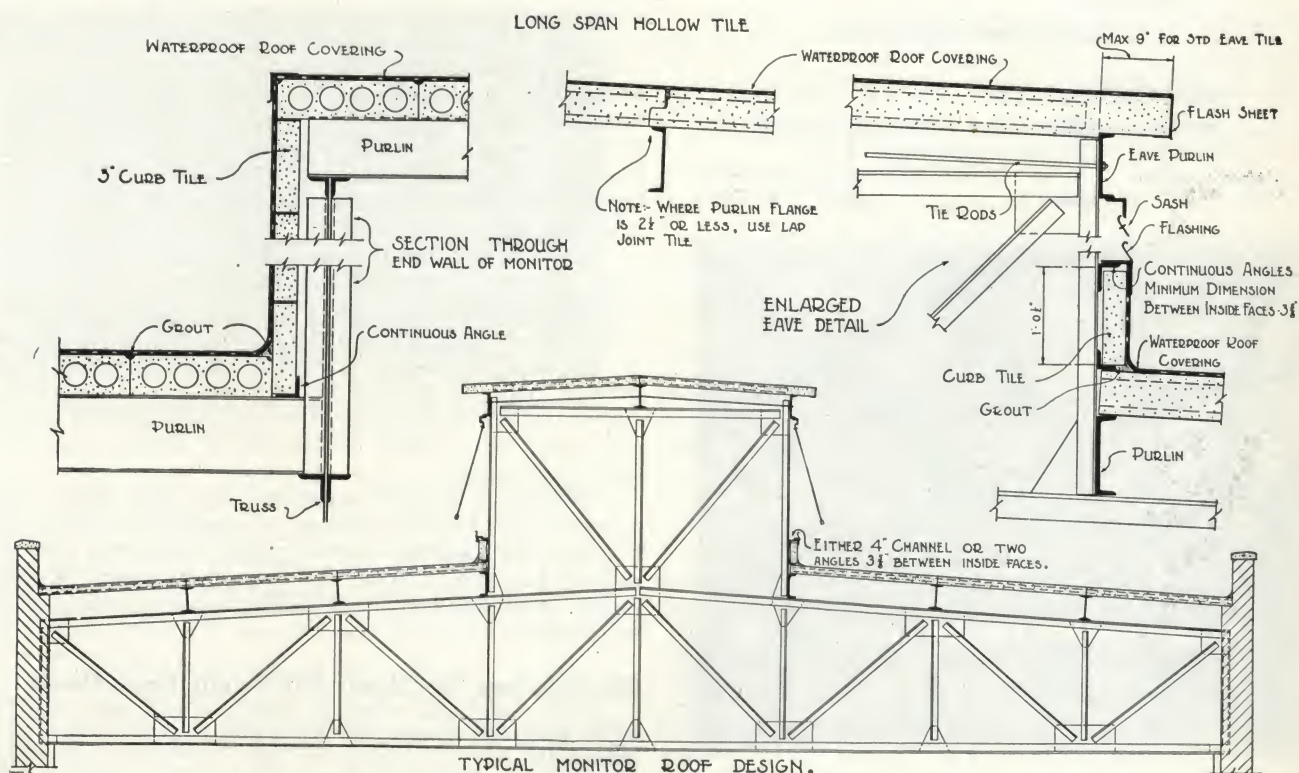
A Typical 30-in. Pyrobar Roof Under Ornamental Tile, Masonic Home, Bloomington, Minn.

Insulating Tile

Pyrobar insulating tile are 3x12x30 in. solid, of a specially prepared gypsum mixture non-reinforced, weighing 10 lb. per sq. ft. Extremely low coefficient of conductivity, will be found particularly well suited to the correction of faulty roof insulation, of power plants, turbine rooms, wet process plants, etc.

Old roofs of concrete, cement tile, etc., may be successfully insulated with this special tile without interruption of manufacturing processes.

	Solid 3"	Hollow 4"
Depth	30"	30"
Length	15 lb.	13 lb.
Weight, sq. ft.....		



Construction Details Showing Typical Designs of Pyrobar Roof Tile

Pyrobar Long Span Hollow Roof Tile

This type of tile meets the demand for a precast roof unit which eliminates the use of T-iron subpurlins. It is manufactured in 4-ft. to 6 ft. 6-in. lengths and the tile are laid directly on the steel framing. The tile are furnished either with or without a lap joint depending on the bearing afforded. Lap joint tile should be used whenever channel purlins are used. Long span hollow tile weigh 20 lb. per sq. ft. for the 5-in. depth and 25 lb. per sq. ft. for the 6-in. depth. Where plant conditions are severe or maximum insulation is desired, the 6-in. depth of tile is to be preferred.

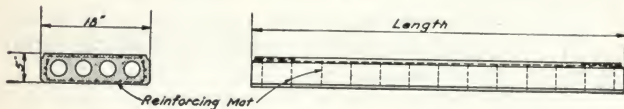
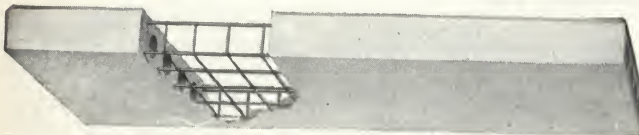
Specifications for Pyrobar Roof Tile

Short Span 30-in. Type Roofs—All roofs as shown on drawings, unless otherwise noted, shall be constructed of Pyrobar (state type of tile, whether 3-in. solid or 4-in. hollow) Roof Tile, as manufactured and erected by the UNITED STATES GYPSUM COMPANY, laid on subpurlins of size and spacing as indicated on drawings.

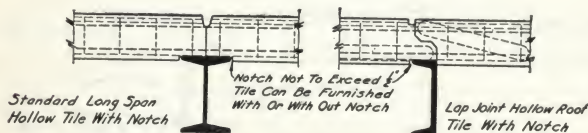
Note: Where it is desired to nail composition or shingle roofing, copper or tin sheathing, or other light roof covering directly to the Pyrobar roof deck, we recommend 3-in. solid Pyrobar and a square cut nail having not less than 1½-in. penetration into the tile. For rough slate, Spanish tile, etc., a square cut nail having not less than 2-in. penetration into the tile is recommended.

Nailing strips or bolting through the slab should be used on roofs of extreme pitch, or where special extra heavy slate or tile roofing is used.

Erection—Tile to be placed directly on supports without mortar and with sides tight together, bearing at each end upon subpurlins to be not less than ¼ in. All joints on top surface only of roof are to be pointed with gypsum mortar composed of 1 part of unfibred gypsum cement plaster and not more than 2 parts of clean, sharp sand. All steel work to be furnished and erected by the steel contractor.



LONG SPAN HOLLOW TILE



Undersurface Long Span Roof Tile on International Harvester Tractor Plant, Ft. Wayne, Ind.

PURLIN TABLE FOR LONG SPAN HOLLOW TYPE TILE OR 30-IN. TILE ON TEES

Total uniform dead load of 50 lb. per sq. ft.

PURLIN SPAN	8'0"	10'0"	12'0"	14'0"	16'0"	18'0"	20'0"	22'0"	24'0"
SHAPE	I	C	I	C	I	C	I	C	I
DEPTH INS.	3	4	4	4	5	6	7	7	8
WT. PER FT. LB.	5.7	5.4	7.7	5.4	7.7	6.7	10	9.8	12.5
DEPTH INS.	3	4	4	5	5	6	7	7	8
WT. PER FT. LB.	5.7	5.4	7.7	6.7	10	8.2	10	9.8	12.5
DEPTH INS.	4	4	4	5	5	6	7	7	8
WT. PER FT. LB.	7.7	5.4	7.7	6.7	10	8.2	12.5	9.8	12.5
DEPTH INS.	4	4	4	5	5	6	7	7	8
WT. PER FT. LB.	7.7	5.4	7.7	6.7	10	8.2	12.5	9.8	12.5
DEPTH INS.	4	4	4	5	5	6	7	7	8
WT. PER FT. LB.	7.7	5.4	7.7	6.7	10	8.2	12.5	9.8	12.5

Notes: When desired, the UNITED STATES GYPSUM COMPANY will contract for the furnishing and erecting of the necessary T-iron or rail subpurlins.

Specifications for curbs, end walls, completion and covering, same as for Long Span Roof Tile.

Long Span Hollow Type Roofs—All roofs as shown on drawings, unless otherwise noted, shall be constructed of Pyrobar (state type and size) Long Span Hollow Roof Tile as manufactured and erected by the UNITED STATES GYPSUM COMPANY.

Erection—Tile are to be placed directly on roof supports without mortar and with sides tight together bearing at each end upon purlins to be not less than 1¼ in. All purlins to be drawn into true alignment with sag rods by the structural steel contractor before any tile are placed. All joints on top surface only of roof are to be pointed with gypsum mortar composed of 1 part unfibred gypsum cement plaster and not more than 2 parts of clean, sharp sand.

Curbs—Curbs under monitor and sawtooth sash shall be constructed of 3-in. solid Pyrobar Curb Tile (or gutter tile), set in gypsum cement mortar, joints to be well bedded and struck.

End Walls—All end walls of monitors, A-frames, etc., shall be constructed of 3-in. solid Pyrobar Curb Tile. Steel contractor to provide sufficient steel framing to allow for proper anchoring of wall.

Completion and Covering—All Pyrobar Roof Decks to be left with as smooth a finish as practical to receive the roofing contractor's covering, which shall be applied within 20 days after completion of the roof deck.

Sheetrock-Pyrofill Roof Construction

Sheetrock-Pyrofill construction consists of a reinforced gypsum slab poured on permanent Sheetrock forms. ⅜-in. Sheetrock, in lengths equal to the purlin spacing, is supported on the bottom flanges of light rail or T-iron subpurlins, which are spaced 32½ in. on center and clipped to the roof purlins. A gypsum slab of required thickness, reinforced with electrically welded steel fabric, is poured directly on the Sheetrock. All joints being concealed by the purlins, the underside of this roof has more the appearance of a finished ceiling than a roof deck. This system eliminates the end bay bracing required for the poured suspension system, and the Sheetrock undersurface is dustproof and can be painted readily if desired.

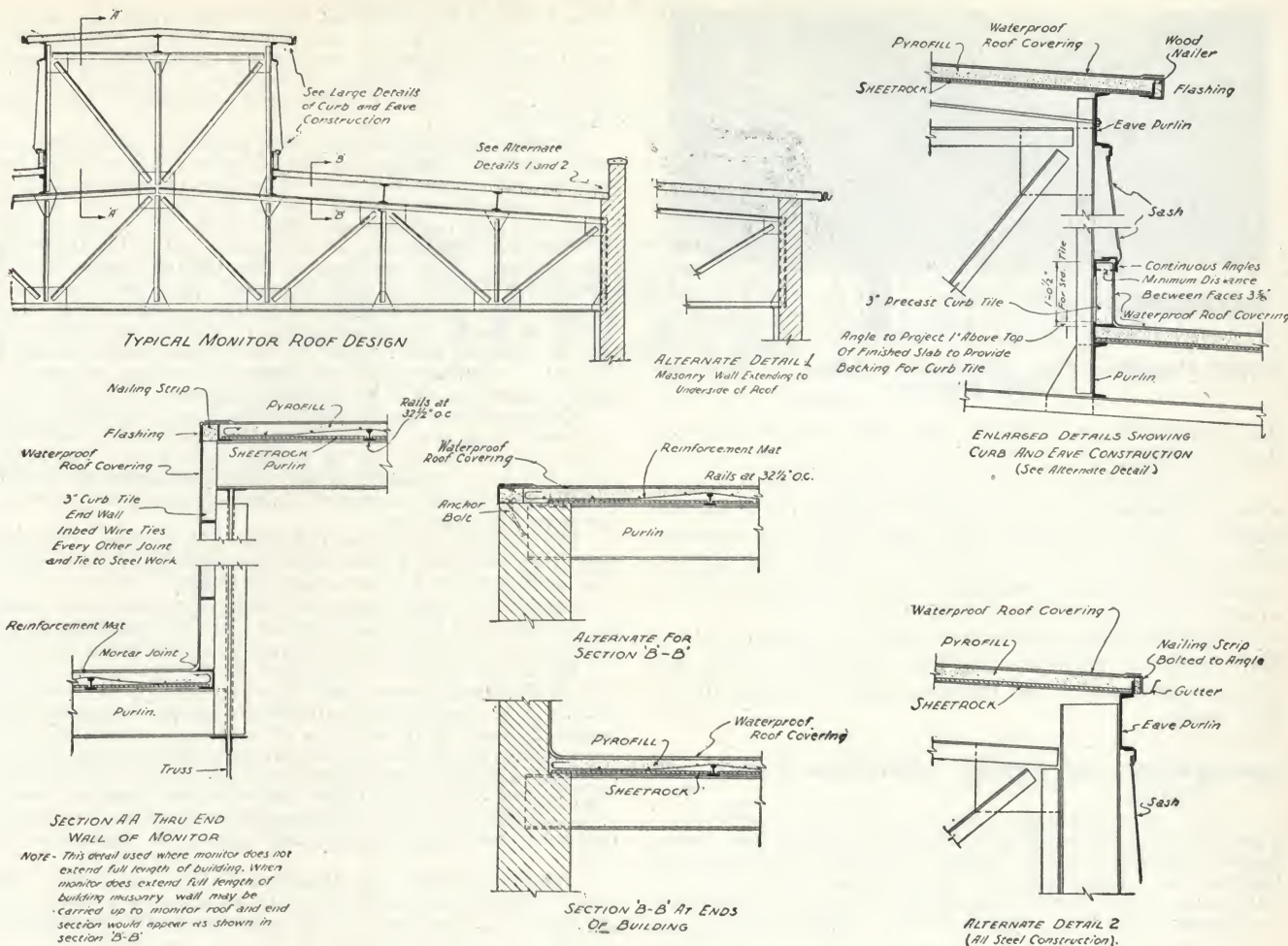
Sheetrock-Pyrofill construction can be economically used on practically any sized structure and is better adapted to small variations in purlin spacing than any other type of gypsum roof deck. By increasing the size of the rail subpurlins, spans to 12 ft. 6 in. or even greater may be accommodated, spanning directly between trusses if desired. For ordinary framing conditions, however, a span of 8 to 10 ft. will be found the most economical.

Sheetrock-Pyrofill construction particularly well adapts itself to the decking of auditoriums, garages, theaters, gymnasiums, power plants, industrial plants—in fact, any steel framed building where a light weight, highly insulative roof deck with a finished ceiling effect is desired.

Specifications for Sheetrock-Pyrofill Roof Decks

Unless otherwise shown or noted, all roof slabs shall be of the thickness shown on plans and shall be constructed according to the UNITED STATES GYPSUM COMPANY'S system of Sheetrock-Pyrofill Construction. This contractor shall provide all Sheetrock, subpurlins, reinforcing material, Pyrofill and all

Continued on next page



CONSTRUCTION DETAILS SHOWING TYPICAL DESIGNS OF SHEETROCK-PYROFILL ROOF CONSTRUCTION



Smooth Undersurface of Sheetrock-Pyrofill Roof Construction, Hall Printing Co., Chicago, Ill.

labor required for his work. Light rails or T-iron subpurlins shall be laid and fastened to the main purlins by clips. The subpurlins shall be so spaced as to accommodate the size of Sheetrock used. The Sheetrock shall be laid on and supported by the bottom flange of the subpurlins and on the boards shall be laid an electrically welded galvanized steel reinforcing mat of the proper sectional area to carry the specified roof load. The main reinforcing wire of this mat shall run at right angles to the subpurlins.

The Pyrofill composition used shall consist of a uniform mixture of calcined gypsum and water into which is stirred not over 12% by weight (12 lb. by weight) of wood planer shavings to every 100 lb. of calcined gypsum and shall be poured directly on the Sheetrock to the required thickness and screeded to as smooth a surface as practicable. The roofing contractor shall lay thereon the waterproof roofing covering.

All openings in slabs for down-spouts, soil pipes, vents, etc., shall be accurately located by the purchaser before the slab is poured. All curb walls, and ends of monitors, etc., shall be constructed of 3-in. Solid Pyrobar Curb Tile, neatly laid up in gypsum mortar.

The waterproof roofing covering shall be applied as soon as possible after the slab is erected, preferably within 20 days.

Pyrofill Monolithic Roofs and Floors

This type of construction is the suspension type of gypsum construction wherein the loads are carried by steel wire cables. These cables are anchored at both ends to the steel framing and are brought into tension in the center of each span between the purlins by means of rods nailed to the wood forming. The gypsum composition acts mainly as a filler to transmit the load to the "catenary" thus formed. The spacing of the cables varies from 1 to 3 in. and the depth of slab from 3 to 5 in. to meet the requirements of load and span. 3 in. for roofs and 4 in. for floors are the generally used depths of slab and the most economical spacing of supporting purlins is from 5 to 7 ft. on centers. The weight of the slab is 4 lb. per sq. ft. per inch of thickness—i.e., a 3-in. slab weighs 12 lb. per sq. ft.

Wood forming is used for the slabs and, if desired, forms may also be built around the supporting beams and girders to give monolithic fireproofing of the steel with the gypsum composition. (See also Pyrobar Beam and Girder Fireproofing on page A383.) Forms are built of dressed and matched lumber and, due to the light weight of gypsum, do not require the extensive shoring needed



Pyrofill Monolithic Floor Construction Forms in Place and After Stripping

for concrete forms but are hung and braced from the steel framing.

The suspension type of gypsum floor and roof construction has been in use for over 30 years under various names. With the supporting steel encased in gypsum, this construction enjoys the highest insurance rating and is recommended for buildings with combustible content where insurance rates will be a factor.

The Pyrofill monolithic system best adapts itself to floor slabs of multistory steel framed office, hotel and similar buildings and to the roof decks of large industrial plants.

Specifications for Pyrofill Monolithic Roofs and Floors

Unless otherwise shown, all slabs shall be constructed of Poured Gypsum in accordance with the system of the UNITED STATES GYPSUM COMPANY known as Pyrofill Monolithic Slab Construction. This contractor shall provide necessary forms, reinforcing cables, Pyrofill and all labor required for his work.

Forms—The forms shall be made in workmanlike manner,

of suitable material, and shall be carefully leveled up so as to insure a uniform depth of slab. Forms shall be cleaned before each re-use. All openings in slabs for down-spouts, soil pipes, vents, etc., shall be located by purchaser before the slab is poured, as no cutting of cables will be permitted after slabs are poured.

Reinforcing—Reinforcing shall consist of galvanized steel cables made by twisting two No. 12 wires. These cables shall be calculated to take the entire slab load and shall be fastened at their ends in such manner as to develop the full strength required. In no case shall the stress in the cables exceed 20,000 lb. per sq. in. The spacing of these cables and the depth of slabs shall conform to the standards of the UNITED STATES GYPSUM COMPANY. The cables shall be drawn tight and fastened to suitable anchors and brought to uniform tension. Care shall be used in placing the tension rods to see that the cables shall not be brought closer than $\frac{1}{2}$ in. to the undersurface of the slab. After cables are in place all workmen of this and other contractors shall be prohibited from walking thereon.

Composition—The Pyrofill composition used shall consist of a uniform mixture of calcined gypsum and water, into which is stirred, not over 15 lb. by weight, wood planer shavings to every 100 lb. of calcined gypsum. The top surface of the slab shall be screeded to as smooth a surface as possible to receive the waterproof covering.

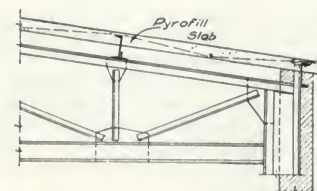
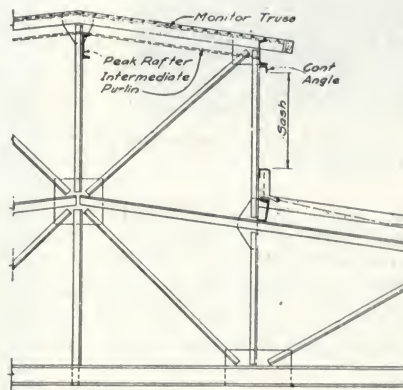
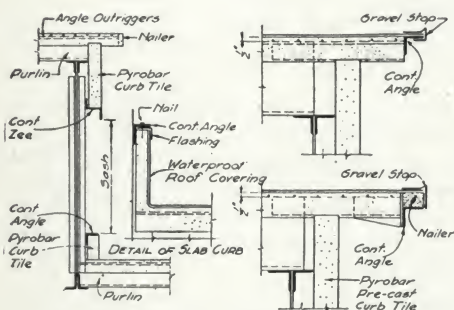
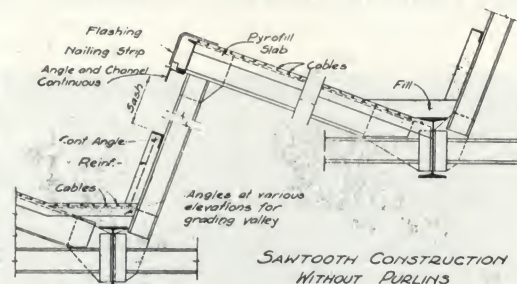
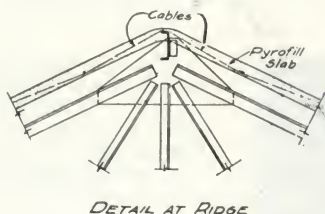
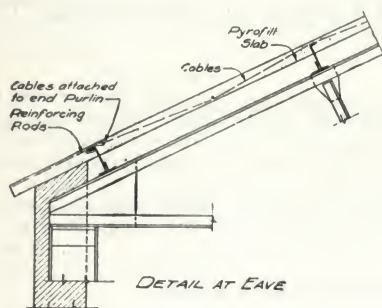
If the underside of the slab is to be plastered or painted, such work shall not be done until the waterproof covering has been applied and the slab is thoroughly dry.

Curbs, etc.—All curb walls, ends of monitors, etc., shall be constructed of 3-in. Solid Pyrobar Curb Tile, neatly laid up in gypsum mortar, or of poured construction similar to the roof slabs.

Openings—The steel contractor shall provide steel framing around all openings more than 12 in. in diameter, and such steel bracing as is required to take the horizontal pull of cables where anchored, such as at end bays of buildings and all openings.

Covering—The waterproof covering shall be applied preferably within 20 days after completion of roof slab. Plank runways shall be laid on the slab before any wheeling whatever is done. Plank supports shall be laid from purlin to purlin to take any heavy or concentrated loads which may be applied to the slab.

Insert in Steel Specifications—Steel contractor shall submit drawings to the UNITED STATES GYPSUM COMPANY for checking, to insure that all details are properly taken care of.



CONSTRUCTION DETAILS SHOWING TYPICAL DESIGNS OF MONOLITHIC ROOF CONSTRUCTION

TRUSCON STEEL COMPANY

Manufacturers of Steeldeck Roofs

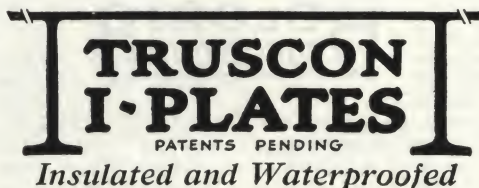
YOUNGSTOWN, OHIO

For Branch Offices, see Local Telephone Directory

Product

STEELDECK ROOFS.

For Concrete Reinforcement, see pages A134-135; for Steel Joists, see page A578; for Steel Windows and Doors, see pages A1082-1085; for Metal Lath, etc., see pages B1306-1307.



They have prongs that are bent around the supporting members (usually purlins), and hold the I-Plates securely.

Advantages of I-Plates Construction

- (1) *Light weight*—not over 5 lbs. per square foot including insulation and waterproofing.
- (2) *Incombustible*—fabricated complete from copper-alloy steel.
- (3) *Expansion and contraction difficulties eliminated*. Expansion joints are provided in two directions at the sides and ends of each I-Plate. There can be no accumulation of appreciable movement.
- Insulation and waterproofing is positively free from injury by this usual source of trouble.
- (4) *Any degree of proper insulation* may be easily obtained.
- (5) *Saves time* in completion of buildings, especially in wet and winter seasons.
- (6) *Low final cost*—light weight effects savings in structural supports.
- (7) *Engineeringly correct*—spans to 8 ft. between supports, depending upon the loading requirements.
- (8) *Permanent*—made of copper-bearing steel. Protected from above and below.
- (9) *Adaptability*—best for straightaway, flat, pitched and curved roofs with a minimum radius of 40 ft.
- (10) *Undivided responsibility*. Roofers will furnish roofs complete—deck, insulation and waterproofing.

The Importance of the Right Roof

When choosing a roof design, occupancy conditions, heating, ventilation, humidity—both exterior and interior—and geographic location must be considered. The right roof must be practicable in design and purpose. The right roof must successfully protect against the elements of wind, water and fire. It must be flexible, firm and free from inherent movement caused by expansion and contraction. It must be economical. It must harmonize in its details with the structural supports.

Steeldeck Roofs of Truscon I-Plates are of a broad and general usefulness. They meet all requirements and conditions, and are particularly adaptable to theatres, gymnasiums, auditoriums, public halls and many industrial buildings requiring large floor areas free from supports and obstructions.

Truscon I-Plates Design

The I-Plates type of Steeldeck is a roof deck so formed that each plate is a unit capable of carrying the specified loads between the members of the roof structure.

I-Plates are manufactured from Nos. 18 and 20 gauge copper-bearing steel with I-Sections formed on the bottom side longitudinally. On one edge a complete I-Section is formed, on the other edge a turned down flange of about 1/2 in. is provided, to fit into the edge I-Sections of adjacent I-Plates when laying the Steeldeck. At one end the I-Sections of the I-Plates are flush with the top surface, at the other end the I-Sections are cut back about 3/4 in. so that when laid, the end joints are lapped tight.

I-Plates are applied directly over the members of the roof supporting structure and are fastened by sleeve "purlin clips" that telescope over alternate I-Sections.

Descriptive Data

Standard width of I-Plates: 2 ft.

Length of I-Plates: standard, 10 and 8 ft.; special as required, 10 ft. maximum.

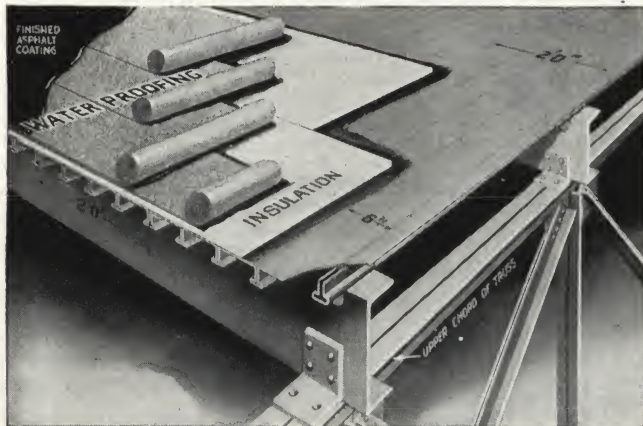
Dimensions of I-Sections: spaced, 6-in. centers; depth, 1 in.; bottom flange width, 5/8 in.

The dead load of I-Plates Steeldeck Roof and insulation and waterproofing is approximately 5 lb. per sq. ft.

LIVE LOADS AND SPANS

(The dead load is provided for in this tabulation)

Live loads, lbs. sq. ft.	Spans (purlin to purlin)	
	No. 18 Ga. ft. in.	No. 20 Ga. ft. in.
45	6 9	5 8
40	7 0	6 0
35	7 6	6 4
30	8 0	6 10
25	8 8	7 6
20	9 6	8 2



Truscon I-Plate Roof Construction



Laying Steeldeck Roof with Truscon I-Plates

HOLORIB INCORPORATED

Manufacturers of Holorib Steel Sheets for Use in Roof and Floor Construction
1515 Fairfield Avenue, CLEVELAND, OHIO

PHILADELPHIA OFFICE, 1015 Chestnut Street
DETROIT OFFICE, 2-163 General Motors Building
SYRACUSE OFFICE, 136 Walton Street
MIAMI OFFICE, 313 Shoreland Arcade

CHICAGO OFFICE, 53 W. Jackson Boulevard, Suite 741
DALLAS OFFICE, 410 Construction Industries Building
ST. LOUIS OFFICE, 1811 Morgan Street
DENVER OFFICE, 1735 Stout Street

Product

Holorib, a permanent copper-bearing steel roof deck self-reinforced by hollow triangular ribs with apex nearly closed, each rib a complete girder beam. Built in sheets of various lengths of 26, 24, 22, and 20 gauge copper-bearing steel dip painted and oven baked after fabrication. Lead treated or galvanized sheets are formed also. The upper surface of the deck is unbroken and continuous, and is thereby especially adapted to the application of insulation and waterproofing. [Holorib is also used in concrete floor systems by inverting the sheet and permitting the ribs to act as reinforcing members. It is capable of supporting normal loads over wide spans, and in many instances, wood forms may be eliminated. Special descriptive data on request.]



The outstanding advantage of Holorib insulated construction over many others is that the decking, insulation and the roofing are cemented together, forming an airtight blanket; there are no cracks to permit leakage of air.

Plank decks after drying and decks of various other materials are reduced in efficiency by leakage of air through cracks. Unprotected metal decks have practically no heat insulating value, and are not permanent.

Dry insulation is a perfect base for the application of waterproofing—Complete and permanent adhesion invariably results, and by eliminating condensation there can be no rust or corrosion.

Holorib Principle

The Holorib Insulated Roof brings a comparatively new but thoroughly tested principle to the industry. The complete unit consists of the following three component parts:

(1) A steel supporting member of Holorib construction fabricated by an exclusively controlled process. A permanent light weight roof deck reinforced by closed triangular ribs, each rib a complete girder beam.

(2) This fire resistive supporting member is insulated with any standard pressure-resisting insulating material meeting Government conductivity tests, the thickness of the insulation varying with the particular conditions to be met.

(3) Over the insulated steel supporting member is applied built-up waterproofing such as asphalt, asbestos, slag or gravel surface construction.

Advantages

The Holorib Insulated Roof is highly fire resistive from below and also from above when waterproofed with proper materials.

The Holorib Insulated Roof is one of the lightest permanent decks in existence, thus allowing for minimum weights of structural members.

The shape of the rib allows for ample expansion and contraction so that all danger from cracks in the waterproofing is eliminated.

The Holorib Insulated Roof provides a perfect base for the application of insulation, thus performing, apart from its waterproofing value, a definite yearly saving in the amount of fuel which is consumed, and providing for a reduction in the amount of radiation required.

The Holorib Insulated Roof can be applied with safety at any season of the year, and on any day when it is not actually snowing or raining.

Holorib Insulated Roofs are reasonable in price and, when the savings in structural steel are taken into consideration, may frequently be installed at a lower initial cost.

With the Holorib Insulated Roof, condensation is entirely eliminated, and with a field coat of paint on the ceiling, there is no opportunity for rust or corrosion since the steel deck itself is subject only to the same atmospheric conditions as affect filing cabinets, steel desks, etc., within the building.

Thermal Conductivity of Holorib

The following table gives the thermal conductivity of Holorib roofs, including in each case a standard composition roofing.

Roof Construction	B.t.u.
(1) Holorib without insulation	0.96
(2) Holorib and ½-in. insulation	0.39
(3) Holorib and 1-in. insulation	0.23 to 0.25
(4) Holorib and 1½-in. insulation	0.18
(5) Holorib and 2-in. insulation	0.14

Insulation referred to above may consist of such pressure resisting materials as Cork, Celotex, etc. The values of the thermal conductivity are in terms of B.t.u. (British thermal units) per square foot per hour, per degree difference between inside and outside temperature. They are computed from data published by the American Society of Refrigerating Engineers, in "Heat Transmission of Insulating Materials."

Specification for the Holorib Roof Unit

Material—(1) Holorib Sheets—The Holorib sheets shall be manufactured with crimped or tapered ends to form interlocking and telescoping shingle laps, and turned flange to form a side lap, from 26, 24, 22, or 20-gauge copper-bearing steel, by HOLORIB INCORPORATED. The material shall be rolled at the factory and all sheets shall be given one shop coat of good quality paint.

(2) Insulation—The insulation shall be of the pressure resisting type, approximately 1 in. thick and, preferably, of ½-in. sheets with broken joint



24-Gauge Holorib Steel Sheet

Standard lengths up to 10 ft. 3 in.

construction. It shall have conductivity of not to exceed 8 B.t.u.'s per 24 hours, per degree difference in temperature per square foot, by the flat plate method.

For those situations which are not unusual the following may be used with reasonable assurance that no condensation will occur.

For buildings having only normal atmospheric moisture, one or two layers of ½-in. or one layer of 1-in. approved insulation on Holorib.

For buildings in which there is a moderate amount of steam leakage, such as powerhouses, or evaporation from open tanks at atmospheric temperature, three layers of ½-in. or one layer of 1½-in. approved insulation on Holorib.

For buildings in which are conducted manufacturing processes liberating considerable quantities of steam, but where occasional condensation on the underside of the roof in extreme conditions will not cause serious harm, four layers of ½-in. or two layers of 1-in. approved insulation on Holorib.

For conditions more severe than the one just mentioned, the case should be worked out by a heating and ventilating engineer as above recommended.

(3) Cementing Agent—(A) On roof surfaces having a pitch less than 3 in. in 12 in. the insulation shall be mopped to the Holorib Deck and to itself with hot asphalt equal to U. S. Government Master Specification No. 88.

(B) On roof surfaces having a pitch exceeding 3 in. in 12 in., if asphalt is to be used as the cementing agent, it shall first be mechanically stiffened by the addition of 10 lb. of short asbestos fibre to each 100 lb. of asphalt to avoid slipping or creeping.

(C) On roof surfaces having a pitch exceeding 3 in. in 12 in. silicate of soda, equal to S-4 grade, as manufactured by the Grasselli Chemical Co., Cleveland, Ohio, may be used to cement insulation to the Holorib Deck.

(4) Waterproofing—Shall be of the built-up bituminous type for flat or pitched roofs. On steep pitched roofs, slate, tile or asbestos shingles may be installed.

(A) The built-up bituminous waterproofing material and workmanship shall be first class in every respect, the surface

finish to be either asphalt, slag, gravel or asbestos. Where a built-up asphalt waterproofing is used not less than four plies of all rag felt, equal to U. S. Government Standard Specification No. 86, shall be required.

(B) Where slate, tile or asbestos shingles are used the insulation shall be securely bolted to the Holorib using six bolts to each 18 sq. ft. in addition to being cemented with either mechanically stiffened asphalt, as above described, or silicate of soda. After the insulation is applied, not less than 1 in. thick, a 30-lb. waterproofing felt shall be cemented on with hot asphalt, after which the tile or slate is to be applied, nailing directly into the waterproofing and insulation; or nailed to wood furring strips securely bolted to the insulation and roof deck.

Note: Frequently architects favor Holorib but do not desire to specify it by name. Their specification may be written as follows: "Twenty-four (or twenty-two) gauge copper-bearing steel sheets with self-contained, closed triangular ribs forming a substantially continuous mopping surface with telescoping or interlocking shingled end laps and locking side laps."

Application—(1) The Holorib shall be tightly secured to the purlins by specially designed Holorib clips (or nailed to wood joists). Application shall start as indicated on the Holorib layout which is furnished by their Engineering Department. All sheets shall be properly lapped at both sides and ends in accordance with standard practice of HOLORIB INCORPORATED, as shown on its detailed drawings.

(2) The application of the insulating material shall proceed immediately following the placing of the Holorib. Due care must be exercised in protecting the roof deck from heavy construction loads such as wheelbarrows, ladders, etc. Each sheet shall be embedded solidly in a mopping of asphalt. If two plies of insulation are used it shall be applied in broken-joint construction.

(3) In case the roof deck has a pitch exceeding 3 in. in 12 in., the first ply of insulating material must be secured to the Holorib deck either with two bolts to each sheet of insulation, bolted through the steel deck itself, or by means of clips specially fabricated for this purpose by HOLORIB INCORPORATED. The asphalt shall be mechanically stiffened to avoid creeping and slipping.

(4) After the insulating material is in place the surface shall be waterproofed as previously described and according to specifications of the manufacturer whose materials are used.

(5) Flashings and edgings may be put in as shown in Holorib detailed drawings. All gutters, in sawtooth construction, shall be reinforced with at least one extra ply of felt carried to the waterline.

(6) Any saddles necessary to properly carry water to outlets are to be formed with a material satisfactory for this purpose. The saddles to be formed after the insulating material is in place, but prior to application of roofing. The insulating material under saddle area to be waterproofed with one ply of felt or one heavy mopping of asphalt.



Channel or Angle

I-Beam, Gabriel Joist or Junior Beam



Massillon Bar Joist



Metal Lumber

24-Gauge Standard Holorib Clips

Note: We stock clips for all well-known light weight joists

"Wide-Span" Holorib Clips

"WIDE-SPAN" Holorib clips are designed to clamp rigidly to standard structural shapes and are used only in connection with Holorib 22 or 20-gauge steel deck. They do not pierce the steel deck itself.

Over light weight joists special clips are furnished for 24-gauge Holorib, piercing the sheets and forming a riveted connection.

Special clips to be used in connection with 26-gauge Holorib, when inverted and used as a concrete form support, are de-

signed to clamp tightly to standard structural shapes and joists.

Holorib decks have been tested for *reverse* loads and will support 100 lb. per sq. foot—double the requirements for cyclone and hurricane insurance.

Sizes of Sheets and Quantities for Holorib Roof Decks

Holorib sheets are furnished in the following stock lengths:

4 ft. 3 in.	8 ft. 3 in.
5 ft. 3 in.	9 ft. 3 in.
6 ft. 3 in.	10 ft. 3 in.
7 ft. 3 in.	

Any lengths up to 12 ft. 3 in. can be furnished for special orders, provided definite lengths are ordered in ample time to permit securing the special length sheets from the rolling mills.

Standard widths measured in place are 16½ in. on 26 and 24 gauge, and 18 in. on 22 and 20 gauge. These widths cannot be varied, but the odd widths required for making up a fixed dimension of roof can be made by splitting standard sheets.

The recommended practice is to allow a minimum of 2 in. end lap. For ordering give the number of sheets of each length required, or send dimensioned plan showing area to be covered, the spacing of purlins, and bearing allowed on parapet walls. Shipping weights of materials are as follows:

26 gauge—	135 lb. per square
24 gauge—	170 lb. per square
22 gauge—	230 lb. per square
20 gauge—	280 lb. per square

Minimum carload 36,000 pounds. Freight classification, "Iron and Steel Roofing—N.O.I.B.N."

Load Carrying Capacities

Load carrying capacities of Holorib are as follows:

Gauge		Purlin spacing ft. in.	Total load per sq. ft.	Factor of safety
24	Holorib	4 0 4 6	60	4
22	Wide-span	4 6 5 6	60	4
22	Wide-span	5 6 6 3	50	4
22	Wide-span	6 3 7 0	40	4
20	Wide-span	7 0 8 0	45	3

The Holorib steel sheet has several inherent advantages over any other type of steel deck:

(1) The hollow triangular rib is the strongest shape used in building construction.

(2) The rigidity and load carrying capacity of the Holorib steel roof deck on purlin spacings up to 8' is superior to other competing decks, and its stiffness imparts a decided feeling of security.

(3) The unbroken and continuous upper surface of the Holorib deck offers a solid mopping on which to lay insulation.

(4) In the Holorib triangular rib construction the ribs are *fully* painted on all surfaces. No metal is left bare.

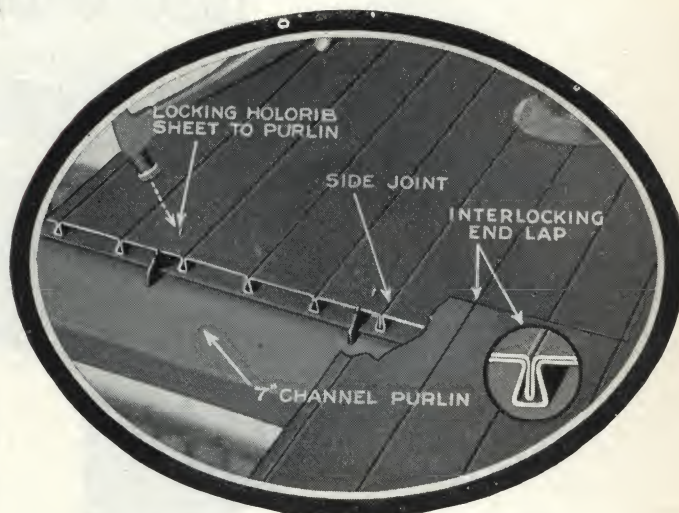
(5) The crimped or tapered ends of the ribs lock tightly into those of the adjacent sheets, thus doing away with the necessity of any sleeves or other fastenings at this point, and due to this method, a rigid continuous construction is maintained whether on or off purlins.

(6) There is absolutely no chance for asphalt or pitch drippage.

(7) The underside of the Holorib deck presents an unbroken and symmetrical ceiling of metal.

(8) In case of fire, fluid asphalt will run down to the eaves of the building unobstructed.

(9) Holorib carries the same insurance rating as cement tile, concrete or metal lath or gypsum, over unprotected steel with or without suspended ceilings.



24-Gauge Holorib Interlocking Features

Detail shows Holorib interlocking features, side and end and to purlins. Advantages—strength, continuous flat mopping surface for asphalt, etc.

PAN METAL ROOF DECK CO.

AKRON, OHIO

Product

PAN METAL ROOF DECK.

Description

The Pan Metal Roof Deck is an improved metal form designed especially for roof construction, which has earned the approval of architects, engineers and builders everywhere.

It consists of pressed metal units as illustrated in the sectional details herein shown, and has no sharp folded members to take on rust. Consulting engineers agree with us, when we claim that no stronger sheet of light metal can be formed that will carry an equal load.

It provides long life, strength and perfect fitting joints. The sheets are formed under a powerful press, insuring uniform pans that will rest neatly, and they are made to lay 24-in. centers up to 12 ft. 2 in. long.

Insulation made in 12, 24, 36 or 48-in. widths will center on the wood cleats in pans. These cleats are placed in position and fastened at the factory. All sheets are laid from above and no underneath scaffold is required.

Galvanized sheets cost slightly more than painted (black) steel sheets but are more enduring. Sheets can be painted with acidproof asphalt paint for foundries and factories where gas accumulates.

Safe load without deflection at 50 lb. per sq. ft., while 2x4 ft., 8-sq. ft. test shows 75 lb. per sq. ft.

Layout plans will be furnished by us from blue prints, insuring proper spacing.

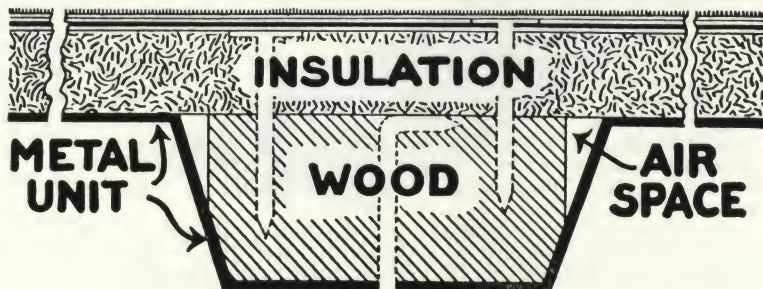
Factory Sawtooth Construction

For factory sawtooth construction, the heavy steel frame can be eliminated and light metal joists with the pan deck substituted at greatly reduced cost.

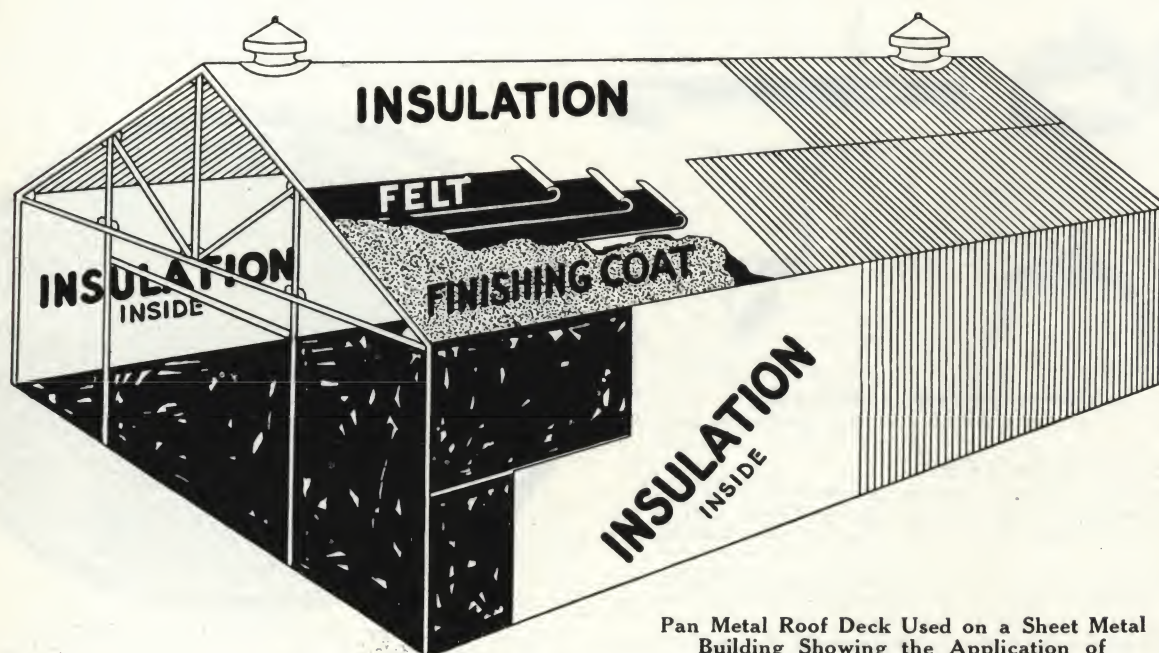
Sheet Metal Building

There are tens of thousands of sheet iron buildings in use in the United States that are not insulated, because of the difficulty of connecting the insulation to the sheets. Without this insulation they are cold in winter and extremely hot in summer.

With the Pan Metal Deck and its method of wood cleat anchorage, any form of insulation can be nailed securely to the metal sheets. The sleepers provide air circulation through the slots at every purlin, as illus-



Construction Details Showing Shape of the Pan Deck and the Location of Wood Cleat, etc.



Pan Metal Roof Deck Used on a Sheet Metal Building Showing the Application of Insulation and Roofing Material

trated. These are made of wood that will not split, thoroughly painted with linseed oil paint and they will stay in position.

The seams or joints in this construction are made directly over the purlins, thereby making a neat appearance when a finish underneath is desired.

Advise us of your requirements or your problems, and we will immediately give you all necessary information to enable you to erect a substantial structure at the least expense and trouble. Blue prints, etc., gladly supplied for all requirements.

For Residences

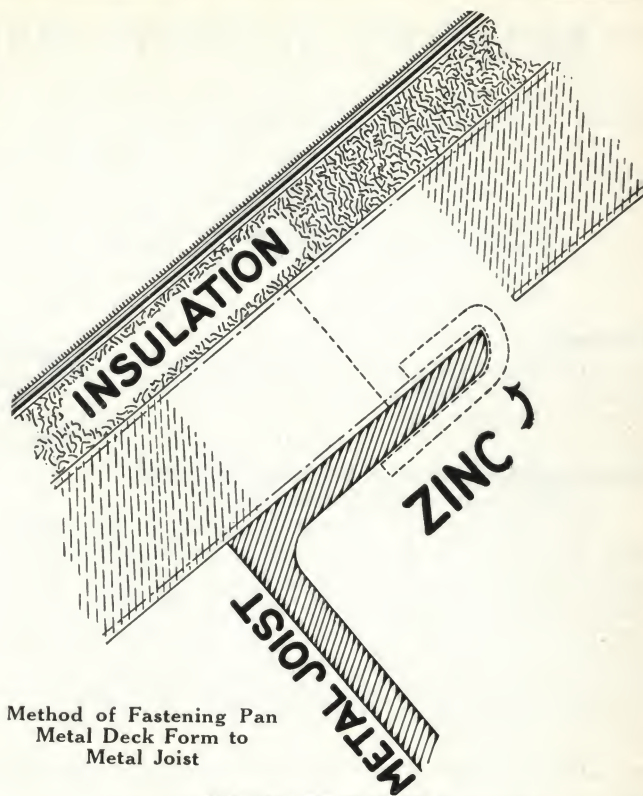
The Pan Metal Deck can be used on residences for pitched roofs when slate, tile or other roofing material is desired, rendering this construction fireproof inside and out.

The rafters are first placed in position and securely nailed. Upon them the purlins are laid and fastened; over these are secured the Pan Metal Deck forms as illustrated. These in turn are covered with insulation, and with roofing material—shingles, tile, or whatever the architect specifies. If built-up roofing is used, it is applied directly to insulating surface. Where asphalt shingles or strip shingles are used, they may be nailed directly to insulation.

Note that the slot at the purlins is locked in $\frac{1}{4}$ in. wide by $\frac{3}{4}$ in. long. The lug is made of $\frac{1}{8}$ in. thick zinc and will not rust. It is so tough that it can be doubled and hammered together without breaking. The slot being $\frac{1}{8}$ in. wider than the lug permits the metal to expand and contract.

Flashing at vertical walls can be securely nailed by placing an extra wood sleeper there.

If necessary to install gutters, a horizontal wood strip $\frac{7}{8}$ x20 in. can be nailed to ends of sleepers at the eaves.



Method of Fastening Pan Metal Deck Form to Metal Joist

SPACING OF PURLINS

Centers, ft.	in.	No.	
2	6	28	
3	0	26	
3	6	24	
4	0	24	
4	6	22	
5	0	20	
5	6	18	4 pans to each 24-in. width, $1\frac{1}{4}$ in. deep
6	0	14	4 pans to each 24-in. width, $1\frac{1}{4}$ in. deep

6 pans to each 24-in. width, $\frac{7}{8}$ in. deep

4 pans to each 24-in. width, $1\frac{1}{4}$ in. deep

4 pans to each 24-in. width, $1\frac{1}{4}$ in. deep

Service and Information

We have placed the sale and erection of Pan Metal Roof Deck in the hands of only reliable roofers and sheet metal concerns in your territory who will give you first class service.



Diagram Showing Light Metal Joist, Wood Cleats and Method of Laying Insulation and Roofing

KEYSTONE GYPSUM FIREPROOFING CORPORATION

Marbridge Building, 34th Street and Broadway
NEW YORK, N. Y.

BRANCH OFFICES

PHILADELPHIA, PA., North American Building
WASHINGTON, D. C., 2525 Pennsylvania Ave., N. W.

TORONTO, ONT., 43 Adelaide St., W.
MONTREAL, QUE., 306 New Birks Building

Products

The erection of the METROPOLITAN SYSTEM of GYPSUM FIREPROOF FLOOR and ROOF CONSTRUCTION.



Metropolitan System of Gypsum Fireproof Floor and Roof Construction

The principle of this system is that of the suspension bridge. It is a gypsum slab poured in place on parallel and uniformly spaced cables, the ends of the cables securely and rigidly anchored to the frame of the building. Enough cables are put in to carry the total load, with a factor of safety of 4, without regard to the compression value of the Metropolitan composition.

The composition is 87½% calcined gypsum, and 12½% wood planer chips.

The practical advantages of the system have been demonstrated over a period of thirty-five years in hundreds of installations throughout the United States and Canada, under a wide extreme of climatic conditions.

Meritorious Features of the Metropolitan System

Safety and Strength—The metal construction makes the Metropolitan system one of the safest types of roof and floor construction. Stresses are calculated by approved engineering formulae. The cables carry all the load. The Metropolitan composition is used merely to protect the wires and structural framework against fire and corrosion and to distribute the load.

Economy of First Cost Due to Light Weight and Rapidity of Construction

Metropolitan composition weighs less than 5 lb. per sq. ft. per inch of thickness. For floors, minimum thickness is 4 in.; for roofs, 3 in. The light weight permits lighter beams and wide spacing, thus saving tons of steel. This feature makes it particularly advantageous in additional story work. In existing structures, this extreme lightness permits the replacing of less sturdy floors with-

out either strengthening existing frames or overloading them.

The fact that Metropolitan gypsum composition sets within 30 minutes after the slab is poured, and forms can be dropped within 60 minutes, leaving slab good for calculated loads, makes for rapid construction—a prime factor in construction economy. The Swarthmore Apartments in Philadelphia, Pa., stand as a monument to the speed with which the system may be installed. This job was put up, 12 floors and roof, in fourteen working days.

Non-conductivity, Insulation and Fire Resistance—The high insulating value of Metropolitan gypsum composition as a roof material effects a saving in cost of the heating plant. Condensation of moisture on the undersurface is eliminated.

It is a fire resistant of the highest quality. Complete reports of fire tests conducted for the New York and Toronto building bureaus gladly furnished.

Sound Deadener—Gypsum has excellent sound deadening properties. In the Metropolitan composition full advantage is taken of this characteristic.

Durability—Metropolitan floors and roofs have been in active service, under severe conditions, for over thirty-five years and are today, without exception, in as good a condition as when installed. Frequently sections have been cut out of Metropolitan floors which have been installed for many years and, in every case, the embedded beams and girders, as well as the steel cables, have been found in perfect condition.

Low Maintenance—Elasticity is necessary to good roof and floor construction. Shocks, vibrations and unequal stresses are likely to crack an inelastic construction. The wood filler in the Metropolitan composition provides elasticity and Metropolitan roofs and floors remain intact under the severest conditions, thus eliminating the annoyance and expense of constant repairs.

Service—This company contracts for the entire installation of both floor and roof arches. They regard each contract as a sale of service in addition to the sale of material and workmanship. Nor is the delivery of service completed with acceptance of the contract. It is a service, in other words, which is rendered not only *during* the work but *before* and *after* its execution.

Guaranteed Construction—The KEYSTONE GYPSUM FIREPROOFING CORPORATION guarantees every square foot of floor or roof construction they install against failure from any cause, under the conditions for which it was designed.

Where the Metropolitan System Is Used

The Metropolitan system is being used with utmost satisfaction mainly in hotels, clubs, schools, hospitals, churches, apartment houses, theaters, office buildings, etc. Fully 72% of the orders booked yearly have been repeat orders.



Colton Manor Hotel, Atlantic City,
N. J.

Twelve Metropolitan floors and roof

Information for Designing

Services of Engineering Department—Our Engineering Department should be consulted before steel design of building is completed. We will gladly send our engineers to confer with you without expense or obligation.

Economical Spans—The construction can be installed between supports spaced up to 9 ft. in clear. Our experience has shown that under average conditions a spacing of 6 ft. 6 in. to 7 ft. is the most economical.

Waterproof Roofing—Any standard type of waterproof roofing may be successfully applied to our metropolitan system. The form most generally applied, however, is a 3-ply built-up roofing.

Specifications

Fireproof Floors and Roofs—After forms or centers have been placed in proper position, cables, each composed of two No. 12 (or equivalent) galvanized wires twisted, shall be carried over the tops of the beams or purlins to outside wall beams or end purlins and be secured to them by strong hooks or anchors. These cables shall be laid parallel, 1 to 3 in. apart, according to spans and loads, and shall pass under round iron bars, midway between the purlins, so as to cause the cables to deflect uniformly. The Metropolitan composition shall then be poured-in-place, and brought to an even surface about $\frac{1}{2}$ in. above the top of the beams, forming a slab ready to receive [sleeper fill or grading] [finished roofing or grading] and with the underside left as smooth as practicable. The slab shall be designed to carry safely the live load with a factor of safety of 4.

Note: For fireproof floors, fireproofing beams and girders (not trusses) shall be used, according to the local building laws.

Cables composed of 2-No.12 Cold Drawn Galvanized Steel Wires Twisted
Cable = 2 x .00874 @ 20000#* = 3.50#
W = .1152 in.
DLT 1164

20000 #0* **NO. 12.**

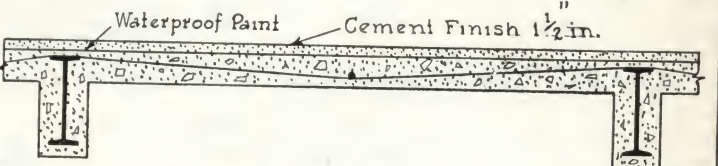
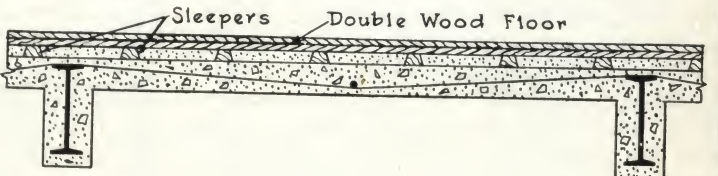
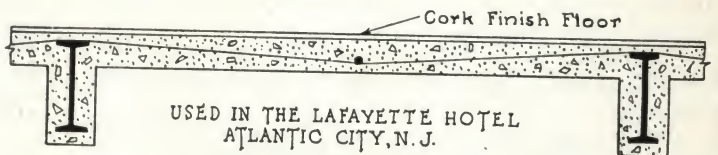
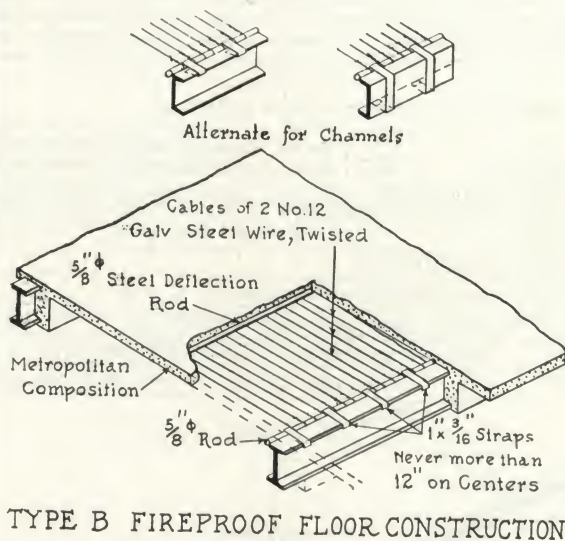
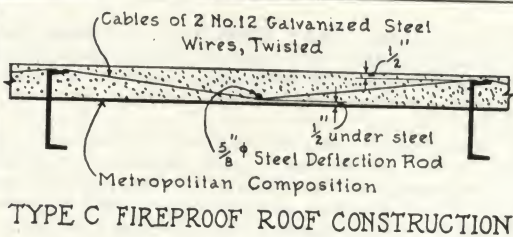
SLAB THICKNESS	CABLE SPACING	CLEAR DISTANCE BETWEEN FLANGES OF BEAMS													
		3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
3	1/4	450	345	273	221	183	154	131	114						
	1/2	360	276	218	177	147	124	105	91						
	3/4	258	197	156	126	104	88	76	65						
	2 1/4	225	172	137	110	92	77	65	57						
	2 3/4	180	138	109	88	74	61	53	46						
3 1/2	1/4	350	265	212	172	142	120	102	87						
	1/2	270	205	164	134	112	95	82	71						
	3/4	210	165	130	105	88	75	64	55						
	2 1/4	180	138	109	88	74	61	53	46						
	2 3/4	164	125	100	80	67	57	49	41						
4	1/4	440	338	267	215	177	147	124	105	91					
	1/2	370	285	226	184	152	128	110	95	82					
	3/4	270	205	164	134	112	95	82	71	62					
	2 1/4	247	191	150	123	102	85	73	63	54					
	2 3/4	222	171	136	110	91	77	66	57	50					
4 1/2	1/4	440	338	267	215	177	147	124	105	91					
	1/2	360	276	218	177	147	124	105	91						
	3/4	258	197	156	126	104	88	76	65						
	2 1/4	225	172	137	110	92	77	65	57						
	2 3/4	180	138	109	88	74	61	53	46						
5	1/4	435	333	262	210	172	142	120	102	87					
	1/2	355	270	212	172	142	120	102	87						
	3/4	255	195	156	126	104	88	76	65						
	2 1/4	225	172	137	110	92	77	65	57						
	2 3/4	185	143	113	92	76	64	55	47						

ROOFS

SLAB THICKNESS	CABLE SPACING	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
4	1/4	658	508	403	330	270	230	195	169	148	129	115	102	93	83
	1/2	527	406	322	264	216	184	156	135	118	103	91	82	74	64
	3/4	438	338	268	220	180	153	130	112	98	86	77	69	62	56
	2 1/4	376	290	230	190	156	131	111	97	84	74	66	59	53	48
	2 3/4	328	254	201	165	134									
4 1/2	1/4	626	486	381	312	255	216	181	155	134	117	103	93	84	74
	1/2	505	384	300	245	200	170	144	123	107	94	83	74	66	57
	3/4	432	334	266	218	179	151	129	111	99	86	77	69	61	54
	2 1/4	378	292	233	192	157	132	113	97	85	76	67	60	54	48
	2 3/4	336	260	207	169	140									
5	1/4	658	508	403	330	270	230	195	169	148	129	115	102	93	83
	1/2	527	406	322	264	216	184	156	135	118	103	91	82	74	64
	3/4	438	338	268	220	180	153	130	112	98	86	77	69	62	56
	2 1/4	376	290	230	190	156	131	111	97	84	74	66	59	53	48
	2 3/4	328	254	201	165	134									

FLOORS

SLAB THICKNESS	CABLE SPACING	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
4	1/4	658	508	403	330	270	230	195	169	148	129	115	102	93	83
	1/2	527	406	322	264	216	184	156	135	118	103	91	82	74	64
	3/4	438	338	268	220	180	153	130	112	98	86	77	69	62	56
	2 1/4	376	290	230	190	156	131	111	97	84	74	66	59	53	48
	2 3/4	328	254	201	165	134									
4 1/2	1/4	626	486	381	312	255	216	181	155	134	117	103	93	84	74
	1/2	505	384	300	245	200	170	144	123	107	94	83	74	66	57
	3/4	432	334	266	218	179	151	129	111	99	86	77	69	61	54
	2 1/4	378	292	233	192	157	132	113	97	85	76	67	60	54	48
	2 3/4	336	260	207	169	140									
5	1/4	658	508	403	330	270	230	195	169	148	129	115	102	93	83
	1/2	527	406	322	264	216	184	156	135	118	103	91	82	74	64
	3/4	438	338	268	220	180	153	130	112	98	86	77	69	62	56
	2 1/4	376	290	230	190	156	131	111	97	84	74	66	59	53	48
	2 3/4	328	254	201	165	134									



VARIOUS TYPES OF FLOORING AND FLOOR COVERING
USED WITH THE METROPOLITAN SYSTEM

DETAILS SHOWING ADAPTABILITY OF THE METROPOLITAN SYSTEM

A Few Representative Installations of the Metropolitan System

State Office Building, Richmond, Va.
Richmond Trust Co., Richmond, Va.
Marywood College, Scranton, Pa.
Title Guarantee and Trust Co., New York, N. Y.
42 Broadway Building, New York, N. Y.
60 Wall Building, New York, N. Y.
Colton Manor Hotel, Atlantic City, N. J.
Lafayette Hotel, Atlantic City, N. J.
Levin Apartment Hotel, Atlantic City, N. J.

Thalheimer Store, Richmond, Va.
Sauvegarde Life Insurance Building, Montreal, Que.
Technical High School, Toronto, Ont.
Elks Club, Scranton, Pa.
Germantown Hospital, Germantown, Pa.
Overbrook Apartments, Overbrook, Pa.
Corcoran Art Gallery, Washington, D. C.
General Electric Building, Buffalo, N. Y.
Wesleyan Building, Boston, Mass.

LATHROP-HOGE GYPSUM CONSTRUCTION CO.

Gypsum Floors, Roofs and Partitions

Neave Building, CINCINNATI, OHIO

BRANCH OFFICE, 105 West Monroe Street, CHICAGO, ILL.

Products

MONOLITHIC GYPSUM FLOOR and ROOF CONSTRUCTION:

Standard Suspension Type.

Hoge Rail Type (U. S. Pat.—1464711, Can. Pat.—241477).

Enclosed Rail Type (U. S. Pat. Pending, Can. Pat.—254632).

Preformed Rail Type Floor and Roof Slabs (Patent Pending).

Construction Service

This company, backed by 13 years' experience in gypsum construction, is at your service for advice and estimates for the above types of construction installed complete in any part of North America.

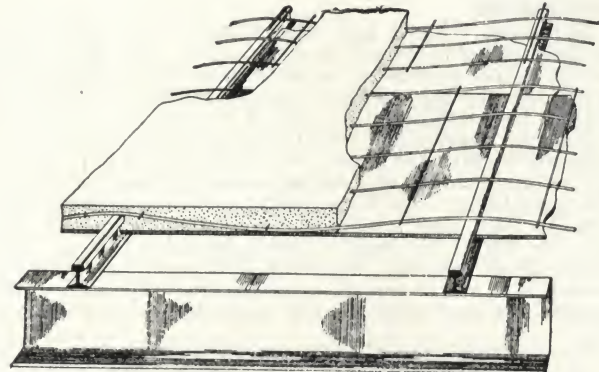
Rail Type of Monolithic Gypsum Floor and Roof Construction

The Standard Suspension type of gypsum slab construction was the only type of poured-in-place or monolithic roof and floor slab construction extensively used until the rail types were originated and developed by this company a few years ago.

Specifications and list of representative installations of the Standard Suspension type of construction sent on request.

While this company is prepared to install the Suspension type where specified or on rare occasions where it fits special conditions, the approval of architects, engineers, and owners throughout the United States and Canada is convincing proof that the Hoge and the Enclosed Rail Types are best suited to the great majority of conditions, and conform more readily to the standards of design and appearance required by architects.

Hoge Rail Type—In the Hoge Type small A.S.C.E. rail sections are laid about 32 in. apart on the top of walls, beams or purlins spanning the distance between beam or wall supports). On the lower flanges of the rails are supported $\frac{3}{8}$ in. standard gypsum board, Celotex or Insulite composition board, with joints over purlins to form a solid under surface, paneled by the lower flanges of the rails. The rails are designed to carry all loads, which are transferred to them by continuous mesh reinforcement running across and resting on top of the rails. Standard gypsum composition is poured in place over the gypsum board, Celotex or Insulite, and finished smooth $\frac{1}{2}$ -in. or more above the tops of the rails, ready to receive the roof or floor finish. The under surface can be decorated as desired or a finished plaster ceiling can be applied.



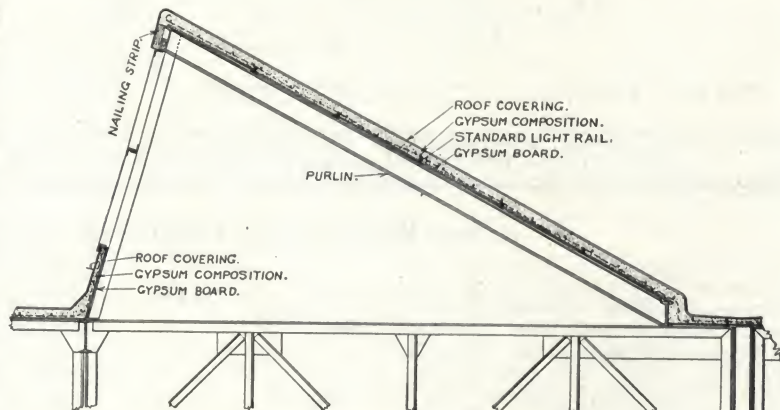
Hoge Type of Monolithic Gypsum Floor and Roof Construction

Specifications Hoge Type Monolithic Gypsum Construction—The floors and roofs named herein shall be the Hoge Type Monolithic Gypsum Board and Rail Construction as furnished by the LATHROP-HOGE GYPSUM CONSTRUCTION CO., Cincinnati, Ohio.

A.S.C.E. rail sections designed to carry all loads between supports shall be laid on the top of walls, beams, or roof purlins at sufficient spacing to receive $\frac{3}{8}$ -in. standard gypsum board carried on the lower flanges; gypsum board shall be butted tightly to form an even undersurface and braced in place if necessary to prevent buckling; galvanized mesh reinforcement of a minimum area per foot of the slab cross section of .026 in. shall be stretched over the tops of rails and allowed to sag to the top of gypsum board, forming a continuous reinforcement.

SAFE LOAD FOR RAIL TYPE SLABS

RAIL SECTION	Rails 32" o.c. S-10000 lb per sq. in.															
	4"0	4"6	5"0	5"6	6"0	6"6	7"0	7"6	8"0	8"6	9"0	9"6	10"0	10"6	11"0	11"6
8"	119	94	77	63	53	46	39									
12"			153	126	107	90	78	68	60	53	47	40				
16"					167	141	122	107	93	83	74	67	60	55	49	44
20"	Slab Weight 14 7/8" a'															
	197	169	148	130	115	103	91	83	76	69	63	58	54	50	46	
25"	Slab Weight 15 1/8" a'															
					186	164	144	130	115	106	97	87	79	72	67	62
30"	Slab Weight 16 1/8" a'															
								192	165	150	137	124	113	105	97	89
														82	76	71
															66	62
																59



Typical Sawtooth Construction

Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency and poured into place, forming a solid reinforced slab $2\frac{1}{2}$ in. thick, including the gypsum board. The top surface of slab shall be left ready to receive the finish desired, such as fill, grading or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

Curbs, walls, mullions, etc., shall be constructed with gypsum board facing and gypsum composition poured or plastered to regular thickness on the outer surface; or such curbs, walls, mullions, etc., may be constructed of precast gypsum blocks, all joints to be struck and outer surfaces on roofs left ready for waterproofing or other finish.

Typical Installations Hoge Type—

John Van Realty Co., Cincinnati, Ohio, 130,000 sq. ft.
Cinchfield Railroad Co., Erwin, Tenn., 93,000 sq. ft.
Pullman Car Co., Pullman, Ill., 300,000 sq. ft.
University of Illinois, Urbana, Ill., 85,000 sq. ft.
Bessemer Gas Engine Co., Grove City, Pa., 44,000 sq. ft.
Fraser Co., Ltd., Madawaska, Me., 107,000 sq. ft.
White Motor Co., San Francisco, Calif., 35,000 sq. ft.

Installations of the Hoge type may be found in practically every section of the United States.

Enclosed Rail Type—Where fireproofing or greater insulation value is desired, wooden forms are hung so as to cover the bottom of the rails with $\frac{3}{4}$ in. of gypsum composition, leaving a solid, even paneled gypsum under surface as in our Standard Suspension type slab.

Typical Installations Enclosed Rail Type—

Port Alfred Pulp & Paper Co., Port Alfred, Que., 135,000 sq. ft.
Newfoundland Power & Paper Co., Corner Brook, N. F., 43,000 sq. ft.

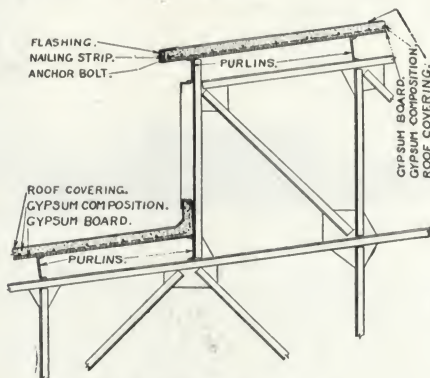
Southern International Paper Co., Bastrop, La., 98,000 sq. ft.
Southern International Paper Co., Camden, Ark., 85,000 sq. ft.
United Paperboard Co., Lockport, N. Y., 46,000 sq. ft.
E. B. Eddy Co., Hull, Que., 35,000 sq. ft.

Specifications, Enclosed Rail Type Monolithic Gypsum Slab Construction—The floors and roofs named herein shall be the Enclosed Rail Monolithic Gypsum Slab Construction as furnished by the LATHROP-HOGE GYPSUM CONSTRUCTION CO., Cincinnati, Ohio.

Standard rail sections designed to carry all loads between supports shall be set on walls, beams, or roof purlins at proper elevation to provide at least $\frac{3}{4}$ -in. covering of gypsum under their bottom flange. Across these rails shall be stretched galvanized mesh reinforcement, having .026 in. minimum area per foot of slab cross section, and allowed to sag to within $\frac{3}{4}$ -in. of temporary wood or other forms, making a continuous reinforcement at right angles to the rail subpurlins.

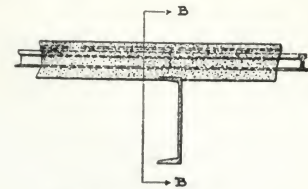
Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency, and poured into place on the forms, completely enclosing the rails to form a slab 3 in. thick (or more where specified). The top surface of slab shall be left ready to receive the finish desired, such as fill, grading, or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle, with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

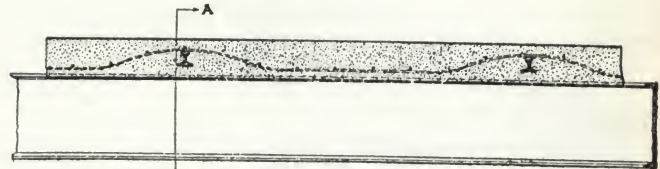


Typical Monitor Construction

Curbs, walls, mullions, etc., shall be constructed with gypsum composition as above, sufficient steel reinforcement being provided to stiffen against wind pressure or other loading. Or such curbs, walls, mullions, etc., may be constructed of gyp-

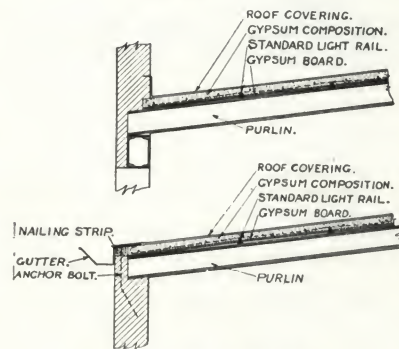


SECTION A-A.



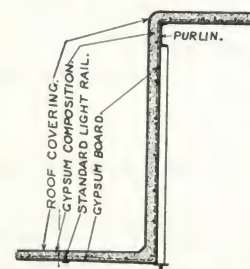
SECTION B-B.

Details of Enclosed Rail Monolithic Gypsum Slab Construction

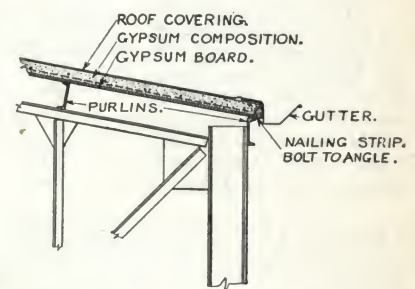


Typical Details at Wall

sum composition blocks laid up in gypsum mortar, all joints to be struck, and outer surfaces on roofs left ready for waterproofing.



Typical Section Through End Wall of Sawtooth



Typical Details of Eave Purlin

Advantages of Rail Types

The rail types of construction have all the advantages of light weight, time saving construction, high insulation properties, fire resistance, vibration resistance, permanence and strength of the standard suspension type and eliminate the special steel designs required for that type.

It is readily applied to framing designs not laid out for the standard slab, in replacement of old roofs and floors where applications to framing are difficult, or where a uniform paneled under surface is desired.

The simplicity of the above designs permits adaptation to any layout of supports by varying the size of rails. No steel supports are required at the walls.

H. E. MARKS CORPORATION

Marks Systems of Gypsum Construction

115-121 Federal Street
PITTSBURGH, PA.

901 Schaff Building
PHILADELPHIA, PA.

AGENCIES

BALTIMORE, MD., SEAGER & BRADY, 61 Gunther Building
BOSTON, MASS., EDW. A. TUCKER Co., Converse Building
BUFFALO, N. Y., JAMES M. HAWKINS Co., Inc., 885 Ellicott Square
CHICAGO, ILL., INTERSTATE FIREPROOFING Co., 844 Rush Street
HARTFORD, CONN., FAY ENGINEERING Co., 38 Lewis Street
HOUSTON, TEX., CHAS. E. WASHBURN Co., 703 Keystone Building
LOUISVILLE, KY., F. W. MAURY & Co., 128 E. Main Street

DETROIT, MICH., INTERSTATE FIREPROOFING Co., 3000 Grand River Avenue
ST. LOUIS, MO., F. A. CAMMANN BUILDERS SERVICE Co., 927-28 Century Building
TORONTO, ONT., ELMER B. COGSWELL & Co., 73 Adelaide Street, West
MONTREAL, QUE., D. A. WHITE, 1011 New Birks Building

Products

Manufacturers and Erectors of "MARKS SYSTEMS"
of POURED-IN-PLACE ROOF and FLOOR CONSTRUCTIONS:
T System Rail System
Beam System Suspended System

Marks Poured-in-Place Gypsum Roofs

The Marks T System of Poured-in-Place Gypsum Roofs was designed primarily to eliminate the necessity of erecting temporary wooden forms for roof and floor slabs required in this type of construction. In the Marks T System the centering is composed of steel tees and gypsum board, and not only does this material act as a centering, but it remains in the roof construction and eliminates the dripping which is unavoidable in other forms of poured construction. The steel tees act as an additional load bearing factor and the gypsum boards become a part of the total thickness of the roof slab; so that this material, though acting as a form temporarily, actually becomes a part of the roof structure.

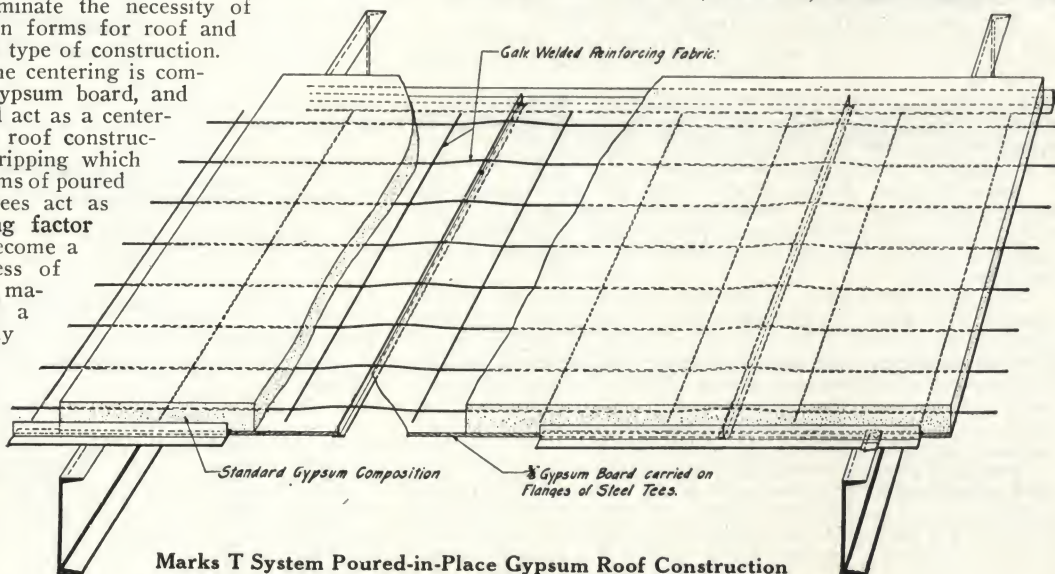
The galvanized welded wire reinforcement, in which the longitudinal members are spaced 4 in. apart and cross members 12 in. apart, is made in rolls of the same width as the space between the longitudinal

tees, and is continuous from one side of the roof to the other.

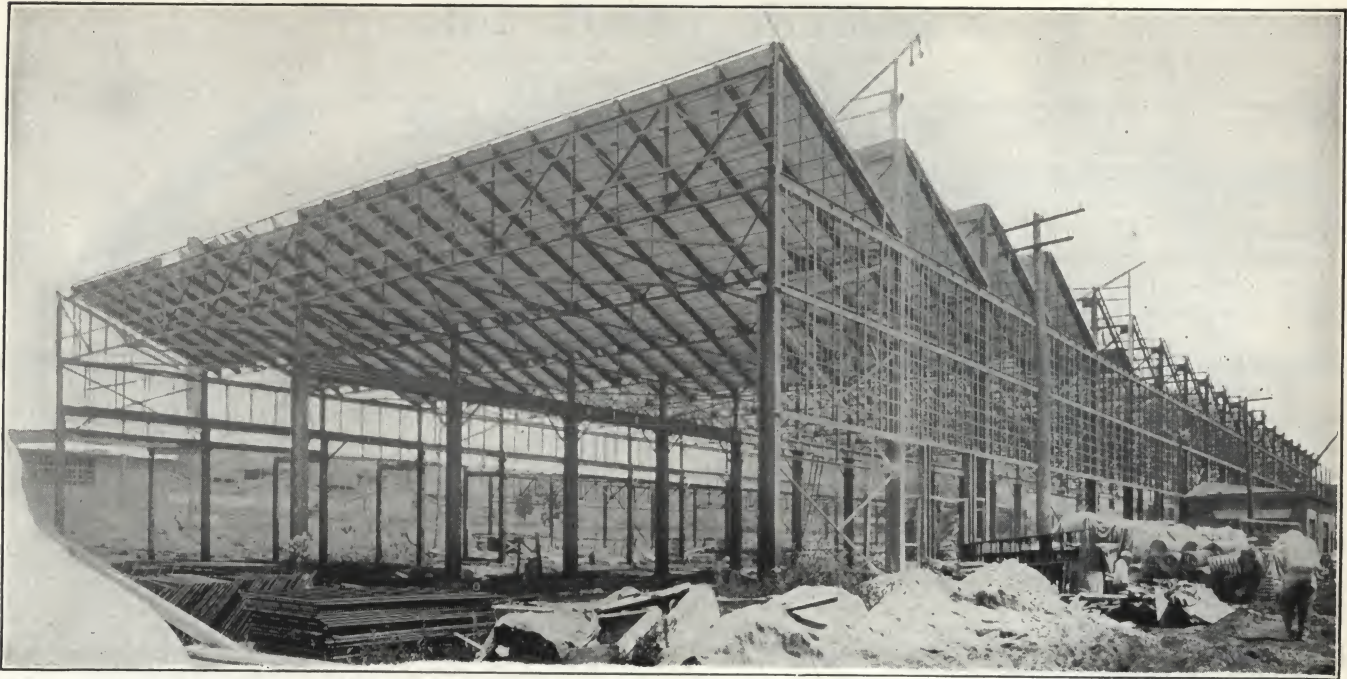
Advantages of This Construction—There are many:

Very frequently a considerable sum of money can be saved on account of its light dead load, especially if the Marks engineers are consulted before the steel columns, trusses, etc., have been designed.

The centering is practically tight and the aggregate poured does not drip through the slab, thereby keeping the interior of the building clean. There is, therefore, no inconvenience to any



Marks T System Roof in Process of Construction



E. G. Budd Manufacturing Co., Philadelphia, Pa.
 THE BALLINGER Co., Engineers
 WARK Co., General Contractors

other work going on in the interior of the building. Especially is this a very important factor in re-roofing old buildings where continuous operation is required.

In the Marks T System the underside is perfectly clean. All of the companies for whom the Marks T System Roof has

In the Marks T System the steel reinforcement, the important factor in the load bearing capacity of the roof, has a minimum protection of $\frac{3}{8}$ -in. thickness of gypsum board. No end bay bracing or tie rods are required with the Marks T System.

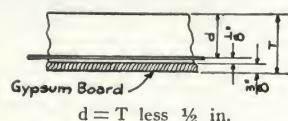
The combination of structural tees and reinforced gypsum on the Marks T System eliminates the possibility of sag between purlins. This construction is entirely above the purlins, and is adapted to meet any standard design of framework without changes or additions. Everything is furnished, including tees, materials and labor, completing the work ready for waterproofing.

Specifications for Marks T System Poured-in-Place Gypsum Roof

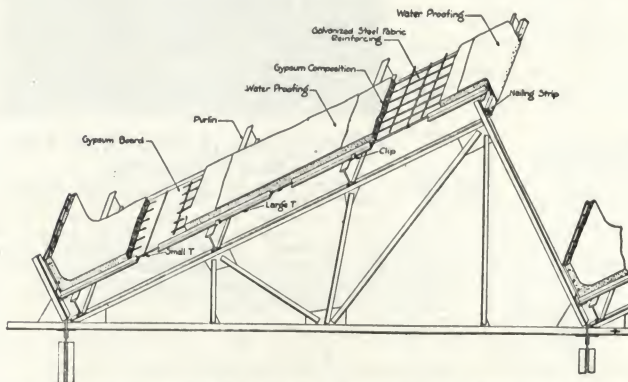
The roof decks shall be constructed of thickness of the Marks T System of Reinforced Gypsum in accordance with the details of construction as shown in the Marks catalogue. This work to be installed by the H. E. MARKS CORPORATION, Pittsburgh, Pa.

SAFE LOADS POURED-IN-PLACE CONSTRUCTION

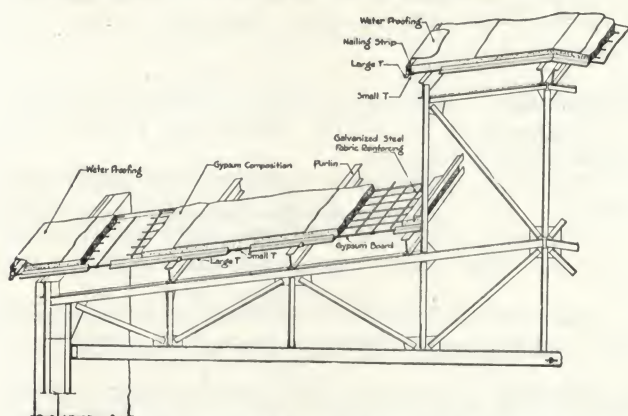
Thickness of slab, in. = T	Weight of slab, lb. per sq. ft.	Galvanized welded-wire reinforcement				Span of slab in feet (center to center of purlins)											
		Gauge	Diam-eter, in.	Spacing in.	As	4	4½	5	5½	6	6½	7	7½	8	8½	9	
						Safe superimposed loads in pounds per sq. ft. (weight of slab has been deducted)											
2½	11	8	0.1620	4	0.0618	68	52	40	31	24	...	...	...	...	...	...
		73				56	43	34	27	...	...	...	...	...	...
		78				60	46	36	29	23	...	...	...	...	...
		83				63	49	39	31	24	...	...	...	...	...
3	13	8	0.1770	4	0.0738	101	77	60	48	38	30	24	...	...	...	...
		109				83	65	51	41	33	27	...	...	...	...	...
		116				89	70	55	44	36	29	24	...	...	...	...
		123				95	74	59	48	39	31	26	...	...	...	...
3½	15	7	0.1920	4	0.0869	131	101	79	63	51	42	34	28	...	...	...
		150				115	90	72	58	47	39	32	26	...	...	...
		...				123	96	77	63	51	42	35	29	24
		...				131	103	83	67	55	45	37	31	26
4	17	6	0.2070	4	0.1010	...	139	110	88	72	59	49	41	34	28	...	
		...				161	127	102	83	68	56	47	39	33	27
		135	109	89	73	61	51	42	36	30
		144	116	95	78	65	55	46	39	33
4½	19	5	0.2253	4	0.1196	...	...	...	137	112	93	77	65	55	46	39
		3				...	...	...	147	120	100	83	70	59	51	43
			0.2437		0.1399	...	...	...	157	128	107	89	75	64	55	47



Note: The load capacities as shown herewith are based on reinforced slab figures only. An additional factor of safety is obtained in this system by the use of the structural tees in the permanent form.



Construction Details Marks T System on Sawtooth Roof



Construction Details Marks T System on Monitor Roof

been built are very much pleased with the underside finish. It is not only a roof, but a finished ceiling.

The gypsum board finish absolutely prevents all dusting and discoloration of the gypsum on the underside.

SAMUEL CABOT, INC.

Building Insulation

141 Milk Street, BOSTON, MASS.

For Branch Offices and Agencies, see page B1614

Products

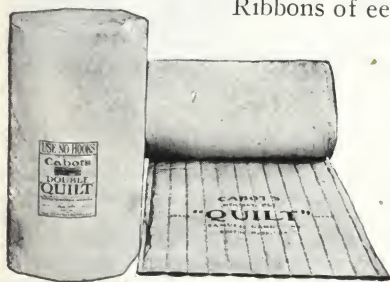
HEAT-INSULATING and SOUND-DEADENING "QUILT."

For Stained Shingles, see page A406; for Paints, Stains and Wood Preservatives, see pages B1614-1615.

Cabot's Heat-insulating and Sound-deadening "Quilt"

Purposes—For insulating houses and other buildings to make them warm in winter and cool in summer; for insulating cold storage and icehouses, breweries, refrigerators, etc., and for deadening sound in floors and partitions of apartments, schools, hospitals, lodges, etc.

Description—"Quilt" is a felted matting of eel grass stitched between two layers of very strong Kraft paper. It will sustain a pull of almost 900 lb.



Rolls of Quilt

Rolls of 250 sq. ft., 1 yd. wide
Divides into 18 in. strips

Ribbons of eel grass cross each other at every angle, making small cells of dead air. Quilt is a cushion of these air spaces. These give perfect conditions for insulating heat and deadening sound. Dead air can not circulate, preventing heat conduction; and sound waves are broken up and absorbed.

Grades—"Quilt" is regularly made in 5 grades, as follows:

Grade	Thickness, in.	Weight, lb. (per roll of 250 sq. ft.)
Single-ply	About $\frac{1}{8}$	About 40
Single-ply waterproof	About $\frac{1}{8}$	About 50
Double-ply	About $\frac{1}{4}$	About 60
Double-ply waterproof	About $\frac{1}{4}$	About 70
Triple-ply	About $\frac{3}{8}$	About 85

Efficiency—Tests by Prof. G. B. Wilkes of Massachusetts Institute of Technology give the following heat conductivities of Cabot's Quilt:

Single-ply	0.41
Double-ply	0.26

Prof. Wilkes shows, in the following table, the conductivities of standard wall and roof construction un-insulated and insulated with Cabot's Quilt, and the percentage heat saving effected by the Quilt insulation.

RELATIVE HEAT CONDUCTIVITY OF STANDARD WALL AND ROOF CONSTRUCTIONS—WITH AND WITHOUT CABOT'S QUILT INSULATION—SINGLE-PLY

Construction	Conductivities		Heat saving, per cent
	Not insulated	Insulated	
Standard Wall Construction			
Clapboard, sheathing, studding, lath, plaster.	0.28	0.16	43
8-in. bricks, furring, lath, plaster	0.27	0.16	41
4-in. tile, stucco outside, plaster inside	0.40	0.20	50
Corrugated iron.	1.50	0.32	79
12-in. stone.	0.49	0.22	55
12-in. concrete, furring, lath, plaster	0.40	0.20	50
Stucco, studding, plaster	0.45	0.21	53
Standard Roof Construction			
Tar and gravel on 4-in. concrete.	0.60	0.24	60
Tar and gravel on 2-in. wood plank.	0.26	0.16	39
Metal on tongue and groove sheathing.	0.42	0.20	52
Corrugated iron on wood frame	1.80	0.32	82
Tile or slate on wood sheathing.	0.82	0.27	67
Shingles, sheathing, studding, lath, plaster.	0.30	0.17	43
Shingles on shingle lath	0.64*	0.24	63

*Average value from Jones Tables, The Heating and Ventilating Magazine.

One layer of double-ply Quilt (less than $\frac{1}{2}$ in. thick) is a better insulator than 12 in. of solid brick-work and far better than 12 in. of concrete or stone.

Sound Deadening

Thousands of apartments, schoolhouses, hospitals, etc., have been successfully deadened in partitions and floors with Cabot's Quilt. It breaks up and absorbs sound waves. Most exhaustive practical tests made by Prof. C. L. Norton of the Massachusetts Institute of Technology for the New England Conservatory of Music showed Quilt far superior to all other methods tested.

Permanency

Insulators and sound deadeners should be as permanent as the building itself.

Cabot's Quilt is made of cured eel grass, which will not get foul or rot, nor harbor insects or vermin. (See old Pierce House below.) Quilt has been in use over 35 years without deterioration.

Fire Resistance

Quilt will not burn, and has proved its fire resistance in many buildings.



**Old Pierce House, Dorchester, Mass.
Built About 1635**

The walls of the old Pierce House, Dorchester, Mass., were stuffed with eel grass when the house was built about 1635, and the grass is still in a perfect state of preservation. We have a sample of this 290-year-old eel grass in our office

Flexibility

Quilt is flexible and will fit any surfaces, corners, projections or jogs.

Application

Quilt" can be applied in any way that any common felt or paper can be at the lowest labor cost.

The drawings shown on the following page are merely suggestions of a few methods of heat insulation in dwellings, etc., and of sound deadening in floors and partitions.

Adaptability

Single-ply is for lining houses and for all other ordinary heat insulation.

Double-ply is for house insulation and sound deadening.

Triple-ply is the best for cold storage and for deadening and other work where unusual conditions prevail.

Waterproof "Quilt" is covered with waterproof paper, for use under stucco and brick.

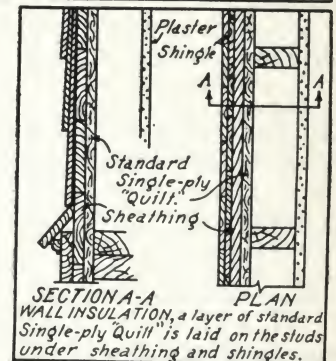
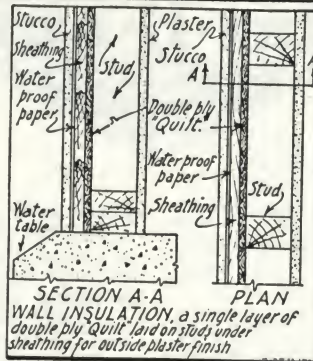
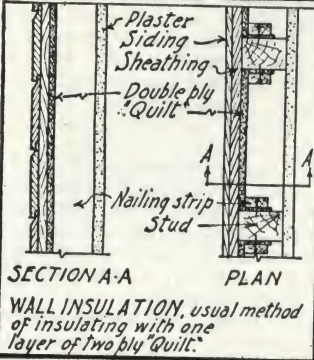
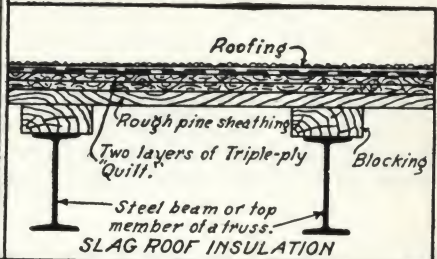
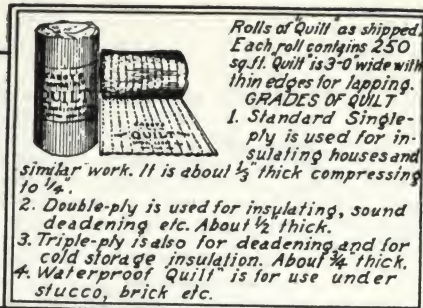
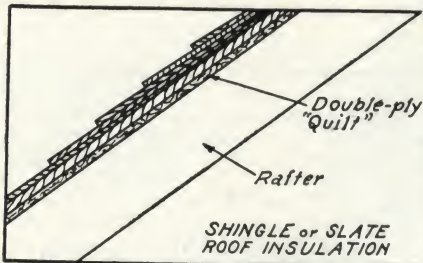
Specification

Specify Cabot's "Quilt" [Trade Mark], and state what grade shall be used.

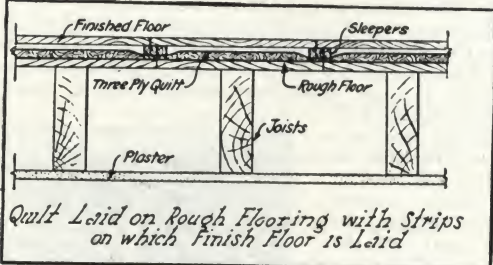
Samples

Samples of all materials, with full information, promptly furnished on request.

HEAT INSULATION

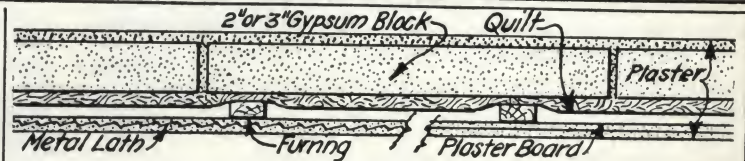
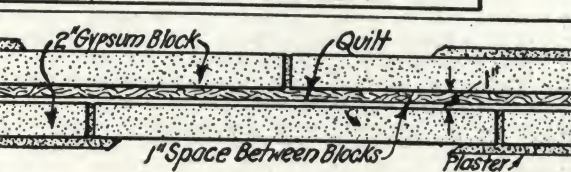
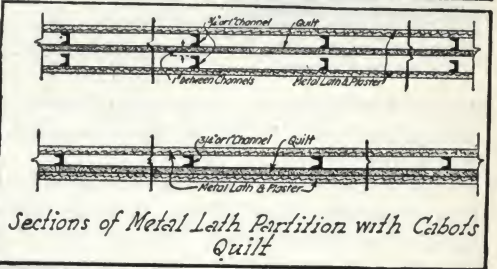
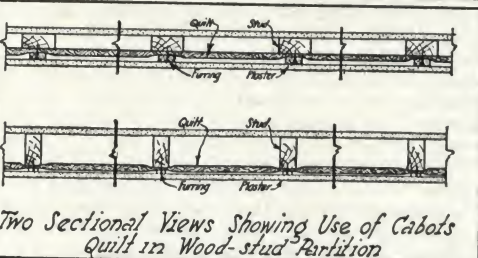
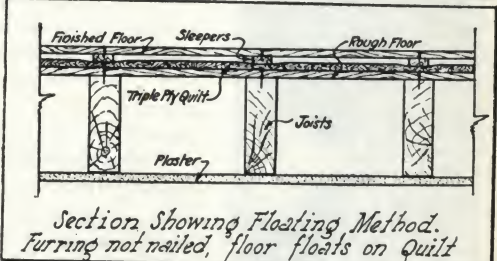
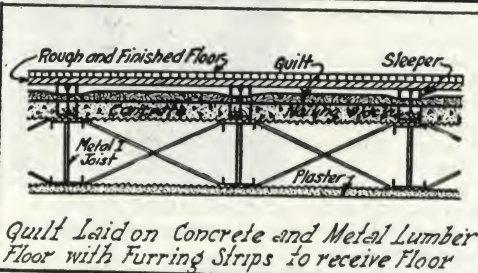
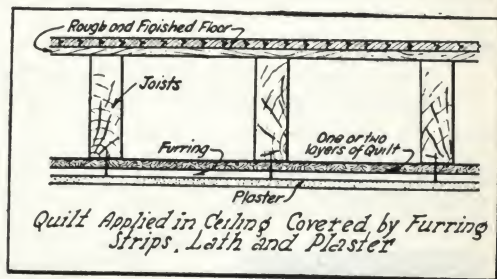


SOUND DEADENING-FLOORS AND PARTITIONS



CABOTS
HEAT INSULATING
AND
SOUND DEADENING
QUILT

"QUILT"
TRADE MARK



Details Showing Application of Cabot's "Quilt" for Heat Insulation and Sound Deadening

FLAX-LI-NUM INSULATING COMPANY

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FLAX-LI-NUM IS RETAILED BY LUMBER DEALERS

Products

FLAX-LI-NUM INSULATION, for stopping heat losses through walls, floors, ceilings and roofs; for the insulation of refrigerators, railway refrigerator cars, refrigerating and cooling rooms, iceless shipping containers, fireless cookers, etc.

FLAX-LI-NUM for SOUND DEADENING floors and party walls in apartment and office building construction and acoustical treatment in halls, churches, studios, auditoriums and radio stations.

FLAX-LI-NUM KEYBOARD, an Insulating Plaster Base made up of sheets of Flax-li-num covered with waterproof paper, to which are stitched beveled white pine lath, to be used for outside sheathing under stucco or inside for plaster base.

Flax-li-num

Flax-li-num is used for the following purposes:

Building Insulation—Used as an insulating material, Flax-li-num stops the passage of heat and cold, resulting in cooler interiors in summer, and so reducing heat losses in winter that fuel costs are lowered 25% to 30%, smaller heating plants are required and less radiation is needed.

Correcting Condensation

—In factories, mills and warehouses where excessive condensation, due to extreme temperature differences and high humidity, is encountered. See Specifications 2-A and 14-A.

Refrigeration—In the construction of refrigerators and refrigeration equipment, Flax-li-num has many advantages that recommend it for this work. It is used extensively in a number of the better known refrigerators, and many hundreds of refrigerating and cooling rooms built with Flax-li-num bear out our claims that Flax-li-num is the correct insulation for this purpose.



Application of Flax-li-num to Sidewalls

Standard specifications on this type of construction are practically impossible to compile, since each job requires special treatment. The services of the Engineering Department are at the command of architects and engineers interested in this phase of Flax-li-num application.

Sound Control—Used to control sound, Flax-li-num effectively stops the transmission of noise through floors and walls. In correcting acoustical difficulties Flax-li-num is unexcelled for theaters, lecture and music halls, churches and broadcasting stations.

Advantages of Flax-li-num

Efficiency—An insulating material's efficiency depends upon



the number of minute dead air cells contained within its structure. Not only does flax fiber contain millions of such cells within its structure, but millions of additional air cells are formed between the fibers when they are felted into sheets. Hence, in Flax-li-num there is a maximum of air cell capacity.

Surface Resistance to Passage of Heat

—This is developed to its greatest extent in the methods of Flax-li-num application. Flax-li-num is designed for installation between the inner and outer surfaces of exterior walls. Thus surface resistance to passage of heat and cold is fully developed in addition to the well-known insulating superiority of Flax-li-num itself.

Correctly Made—No binder of any kind is used in Flax-li-num. The flax fiber is compressed to the correct density to provide maximum caged air capacity and still produce a semirigid sheet of sufficient strength to be self-supporting and at the same time making the sheets easy to handle and install.

Permanency—Flax being the basic material of linen, Flax-li-num fibers have the toughness, strength and long life of this material. Flax-li-num will not warp, tear, buckle, crack, bulge or break. Flax fiber does not rot, therefore Flax-li-num can not deteriorate. Because of its semi-flexible nature, when installed in a building, it will adjust itself to any changes developed in the building due to drying out of the timbers, or to settling or other causes. Flax-li-num will remain in place under the most adverse conditions.

These facts prove the permanency of Flax-li-num in building construction.

Vermiproof—The flax fiber going into the manufacture of Flax-li-num is chemically treated to resist attack by vermin and rodents. The material is thus rendered distasteful to vermin and they positively will not nest in it.

Stays in Place—Flax-li-num is guaranteed to stay in place during the life of the structure in which it is installed. In refrigerator cars, in service so long that the car sills had rotted away, Flax-li-num was found to be so well preserved that it was used over again. Flax-li-num is the standard insulation used in the majority of refrigerator cars on American railways.

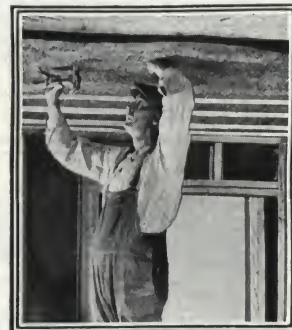
Fits All Shapes—Flax-li-num is sufficiently flexible so that it easily fits around uneven or oddly shaped places, making tight joints.

Easy to Handle—Flax-li-num need not be handled carefully, consequently it saves time for the men installing it. Coming in convenient sized sheets, it is easily stored, handled with no fear of breakage or tearing and is installed rapidly.

Sizes—One-half inch thick Flax-li-num is made in sheets 16½ or 24½ in. wide, 8, 9 and 10 ft. long, flanged to fit between studs. ¾ and 1-in. thick Flax-li-num come in flat sheets 32 in. wide, 8 or 9 ft. long. ½-in. Flax-li-num can also be furnished flat same size sheets as the 1-in.

Flax-li-num is also made in special sizes for "headers" to be set between floor joists, pads for placing under partition walls at floor and ceiling levels and as joist pads.

No Fillers Required—No overlapping of sheets or fillers are required with Flax-li-num. Closely butted together, the flax fibers join or interweave to form what is practically a continuous sheet of material.



Application of Flax-li-num to Ceilings

The Flax-li-num Method

The Flax-li-num method of application, as recommended in our specifications over more than fifteen years, calls for applying Flax-li-num in the middle of the air space in side-walls and furred down on ceilings, thus giving an air space on each side of the material.

The object in this specification is to increase the efficiency of the insulating material by taking advantage of the added surface resistances.

These Flax-li-num specifications are the only insulation specifications recognizing the value of these air spaces in contributing additional surface resistances to the passage of the heat.

The United States Bureau of Standards in its recently published Circular Letter No. 227, says:

"If a layer of material (insulation) is placed in the middle of a wide air space such as that between the studs in a frame wall, greater additional insulating value is obtained than if the material is placed in contact with the sheathing, or as a plaster base. ***** The addition of a half-inch layer of insulation in the middle of the air space in a frame wall is therefore the equivalent of adding about a 3/4-inch layer at some other place in the wall."

Flax-li-num Keyboard

Flax-li-num Keyboard is composed of 1/2-in. Flax-li-num overlaid with one thickness of heavy saturated and coated asphalt paper upon which is wire-stitched No. 1 white pine beveled lath.

Keyboard is made for magnesite or portland stucco or plaster in sheets 48 in. by 3 ft. or 32 in. by 3 ft.

Specification Suggestions

Specify the exact places where Flax-li-num is to be used, bearing in mind that heat insulation is most effective when placed half-way between inner and outer surfaces of exterior walls, and between studs from sill to top plate. For sidewalls use 1/2-in. Flax-li-num. Sheets should be notched and flanged top and bottom, and form continuous contact all around. Nail lath over flanged edges at top, bottom and sides. In gables, blocks of studding dimension should be inserted between studding, flush with bottom edge of ceiling joists. Insulation should be run to these headers and fastened to them with lath.

Below top story ceiling joists, 1-in. Flax-li-num sheets should parallel the joists so that edges are backed by joists on both sides.

Below the Flax-li-num place 1 by 2-in. furring strips, to receive the lath and plaster.

Where top story is an attic, and it is desired to make this space easily usable, 1-in. Flax-li-num should be applied to underside of rafters and collar beams. At intersection of rafters and collar beams wood headers should be placed between rafters, and Flax-li-num nailed to headers. At all end joints of insulation insert wood headers and nail both sheets to these headers to assure tight joints.

In tile or brick walls, insert lath horizontally into mortar joints every 2 ft. To these nail 1 by 2-in. furring strips vertically on 16-in. centers. Apply Flax-li-num Keyboard (Specification 10-A).

For stucco exteriors, insert horizontal headers every 3 ft. between studding as nailing base for Flax-li-num Keyboard and to form heat and fire-stops in wall. Sheets of Keyboard should be butted tight and vertical joints broken every 3 ft. by using one-half of each standard size sheet of Keyboard (Specification 10-A).

Insulation for a One or Two-story House—Specification No. 13-A

Sidewall Insulation (Detail 3)—Materials—Heat insulation for all outside walls shall be 1/2-in. Flanged Flax-li-num, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Application—1/2-in. Flanged Flax-li-num sheets shall be applied between studding from lower to top plate. Top and bottom of sheets shall be notched and flanged into place. Furring strips (lath) shall be securely nailed through flanged edges and top and bottom of Flax-li-num sheets to studdings and plates (to insure airtight joints). In gables, blocks of studding dimension shall be inserted between studding flush with bottom edge of ceiling joists. Insulation shall be run to these headers and fastened to them with lath.

Roof Insulation (Detail 4)—Materials—Heat insulation for the roof shall be 1-in. Flax-li-num flat sheets, manu-

factured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Application—1-in. Flax-li-num flat sheets shall be applied to the underside of top floor ceiling joists. Insulation shall be furred out with 1x2's under joists to receive lath and plaster. At all end joints of Flax-li-num insert wood headers and nail both sheets to these headers to insure tight joints.

Insulation for Story and One-half Semi-bungalow—Specification No. 4-A (Details 3 and 4)

Sidewall Insulation—Same as Specification No. 13-A.
Roof Insulation—Apply flat sheets under collar beams and rafters. See Specification 13-A.

Heat Insulation for Brick Veneer Houses or Two Flats—Specification No. 8-A

Application for sidewalls and ceilings, same as in Specification No. 13-A, preceding. (See Details 3 and 4.)

Flax-li-num Keyboard Heat Insulation for Brick and Hollow Tile Houses, Bungalows or Two Flats—Specification No. 11-A

Sidewall Insulation (Detail 5)—Materials—Heat insulation for all outside walls shall be Flax-li-num Keyboard, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Millwork—Window and door frames shall be made to accommodate thickness of wall plus 3/4-in. furring strips plus 1/2-in. extra thickness for Keyboard.

Application—In laying tile walls insert lath horizontally into mortar joints every 2 ft. To these lath nail 1x2 furring strips vertically, on 16-in. centers. Apply Flax-li-num Keyboard, breaking vertical joints every 3 ft. Nail each lath on Keyboard into every furring strip with 6d nails. Apply plaster in usual manner, covering lath to a depth of 3/8 in.

Between first and second floors insert small pieces of Keyboard between joists to properly insulate this space.

Roof Insulation (Detail 4)—See Specification 13-A, preceding.

Deadening, Sidewall and Roof Insulation Where Studding Is Broken at Ceiling—Specification No. 3-A

Deadening (Detail 2)—Materials—Shall be 1/2-in. Flax-li-num flat sheets, 1/2-in. Flax-li-num Joist and Plate Pads, and 3/4-in. Flax-li-num flat sheets, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Application—Before placing joists, all top plates shall be covered with 1/2-in. Flax-li-num Plate Pads (the width of the joists).

Flax-li-num Joist Pads 1/2 x 3 in. x 3 ft. are to be placed on top edge of all joists and headers to receive flooring, which is to be laid diagonally and tight.

All lower plates are to be placed on 1/2-in. Flax-li-num Plate Pads, which will project 3/4 in. on each side of the plates on partition walls, and 3/4 in. on the inside of outside walls, to receive grounds for lath and plaster.

Before lathing, ceiling of lower floors shall be covered with 1/2-in. Flax-li-num flat sheets applied to the bottom edge of the ceiling joists, all joints to be well fitted and butted tight (to receive end joints 1x2 headers shall be placed between the joists).

Headers, joist dimensions, shall be placed between the joists over all bearing deafened partitions. Extra joists shall be placed directly over and below where deafened partitions parallel the joists.

Underfloors are to be covered with a continuous thickness of 1/4-in. Flax-li-num fitted tight against the plate pads, and finished floor is to be laid directly over Flax-li-num (no furring strips).

For Party Wall Application—See Specification No. 7-A, following (Detail 2).

Roof Insulation (Detail 4)—See Specification 13-A, preceding.

Sidewall Insulation—Material—Shall be 1/2-in. Flax-li-num flat sheets, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Application—From foundation to top floor ceiling line 1/2-in. Flax-li-num flat sheets shall be applied to the outer side of the sheathing. Flax-li-num shall be covered with a good grade of asphalt saturated paper and furred out over studding with lath. End and side joints are to be butted tight. Above

top floor ceiling line fur outside of sheathing with 1x2's and lay up walls.

For Fireproof Construction—Application details for deadening are shown in Detail No. 1.

Deadening, Sidewall and Roof Insulation Where Studding Is Not Broken at Ceiling Line—Specification No. 7-A

Deadening (Detail 2)—Materials—Shall be ½-in. Flax-li-num flat sheets, ½-in. Flax-li-num Joists and Plate Pads, ½-in. Flax-li-num headers and ¼-in. Flax-li-num flat sheets, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Floor Deadening Application—Flax-li-num Joist Pads ½ x 3 in. x 3 ft. are to be placed on top edge of all joists to receive underflooring which is to be laid diagonally and tight. At ceiling line and at floor line above, on all floors, ½ in. flanged Flax-li-num headers are to be fitted tightly between studdings in such a manner as to completely close openings. Before lathing, ceiling of lower floors shall be covered with a continuous layer of ½-in. Flax-li-num flat sheets nailed to underside of joists. All joints shall be fitted and butted tight against Flax-li-num headers which are between studdings. Over joists, Flax-li-num shall be furred out with 1x2's for lath and plaster.

Party Partition Deadening Application—Lay ½ x 4-in. Flax-li-num pads on plates below partitions before placing floor joists. Cut off corners of joists so that joists from one side of partition will not touch floor on the other side. Place ½ x 6 in. Flax-li-num pads between joists that support floor on one side of partition and joists that support floor on the other side. Insert wood headers, joist dimension, between joists directly under partition, separating headers from the joist with ½ x 3-in. Flax-li-num pad. Lay ½ x 4-in. Flax-li-num pads over these headers and intersections of joists and lay plate directly on pads. Apply ½-in. Flax-li-num sheets to partition on both sides, running Flax-li-num below rough floor and butting it against Flax-li-num pads under plate.

For Sidewall and Roof Applications—See Specification No. 3-A, preceding.

For Fireproof Construction—Application Details for Deadening are shown in Detail No. 1.

Deadening and Roof Insulation Where Outside Walls Are of Brick or Hollow Tile—Specification No. 5-A

Deadening (Detail 2)—Materials—Shall be ½-in. Flax-li-num flat sheets, ½-in. Flax-li-num Joist and Plate Pads and ¼-in. Flax-li-num flat sheets, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn.

Floor Deadening Application—At ceiling line build wall offset 2 in. in from wall line and height of joists, making top of offset full and plumb with top of joists.

Place Flax-li-num Joist Pads ½ x 3 in. x 3 ft. on top edge of ceiling joists, also over the wall projections, to receive underflooring, which shall be laid diagonally and tight.

All ceilings are to be covered with a layer of ½-in. Flax-li-num applied to underside of joists. All joints to be well fitted and butted tight. Fur with 1x2's over Flax-li-num to receive lath and plaster.

Over rough flooring lay ¼-in. Flax-li-num flat sheets fitted tight against plate pads at partitions. Finished floors to be laid directly on ¼-in. Flax-li-num (no furring strips).

Party Partition Deadening Application (Detail 1)—Lower plates in partitions shall be placed on ½-in. Flax-li-num Plate Pads projecting ¾ in. on each side of plate. Upper plates shall be covered with ½-in. Flax-li-num Plate Pads. Both sides of all deadened partitions shall be covered with a continuous layer of ½-in. Flax-li-num, which shall be butted tight to plate pads on top and bottom. Fur out with 1x2's over Flax-li-num to receive lath and plaster. Place wood headers, joist dimension, between joists on all deadened partitions. Place extra joist directly over and below deadened partitions where these parallel the joists.

Roof Insulation (Detail 4)—See Specification 13-A, preceding.

Heat Insulation for Flat Roof Decks—Specification No. 2-A

Concrete Deck—(Detail No. 7)—Roof Deck (Concrete)—Shall be finished smooth, without depressions that could hold water, properly graded to drains, and thoroughly dry and clean.

Materials—Shall be 1-in. Flax-li-num, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn. A

good grade roofing composition or cement shall be used for all moppings. Roofing as specified elsewhere.

Application—Where asphalt roofing composition is used, prime concrete surface, using at least 1 gal. of priming per 100 sq. ft. Where coal tar pitch roofing composition is used, priming not necessary. Mop thoroughly over deck and lay Flax-li-num into hot mopping, pressing down into mopping in workmanlike manner. Butt all ends tightly together to insure proper insulation at joints. Mop over Flax-li-num thoroughly and lay roof over hot mopping.

Important: Flax-li-num must be laid into roofing composition immediately after mopping or composition will become hard before sheets are laid. Do not lay more Flax-li-num than can be covered in a day. All edges or exposed parts of Flax-li-num to be covered with cap sheet mopped to deck, and reopened when work is resumed.

Wood Deck Where Excessive Condensation Is a Factor—Roof Deck (Wood)—Shall be well seasoned, narrow width lumber, properly nailed and free from wide cracks, knots and imperfections. Roof surface shall be smooth, clean and properly graded to outlets, without depressions which could hold water. Cant strips shall be applied at fire walls and elevations.

Materials—Shall be 1-in. Flax-li-num, manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn. An approved roofing composition shall be used for all moppings. A thoroughly saturated waterproof felt shall be used under the Flax-li-num.

Application—Lay one thickness of waterproof felt, overlapping joints at least 4 in. Lay Flax-li-num sheets over waterproof felt, butting ends and sides carefully to insure a continuous sheet of insulation. Run Flax-li-num to all walls and fit tightly around all openings in roof, nailing Flax-li-num every 12 in. along edges with large head roofing nails. Mop entire surface thoroughly, using sufficient roofing composition to waterproof insulation. Lay roof while mopping is hot. Do not lay more Flax-li-num than can be covered in a day. All edges and exposed parts of Flax-li-num to be covered with cap sheet mopped to deck and reopened when work is resumed.

Wood Deck Under Normal Humidity Conditions—Roof Deck—Same as above.

Materials—Flax-li-num mopping and roofing same as preceding roof. Omit waterproof paper under Flax-li-num.

Application—Same as above, except that waterproof paper under Flax-li-num may be eliminated.

Heat Insulation for Steel Deck Roofs—Specification 14A (Detail 8)

Roof Deck—Steel properly graded to drains, and thoroughly dry and clean.

Insulating Material—Shall be 1-in. Flax-li-num manufactured by the FLAX-LI-NUM INSULATING COMPANY, St. Paul, Minn. A good grade roofing cement shall be used for all moppings. Roofing as specified elsewhere.

Application—Mop thoroughly over steel deck with standard grade roof composition and lay Flax-li-num into hot mopping, pressing down into mopping in workmanlike manner. Butt all ends tightly together to insure proper insulation at joints. Run Flax-li-num tight to all walls and butt tightly at all openings in roof. Mop over Flax-li-num thoroughly and lay roof into hot mopping.

Important: See paragraph 4 preceding specification 2-A.

Technical Information and Engineering Service

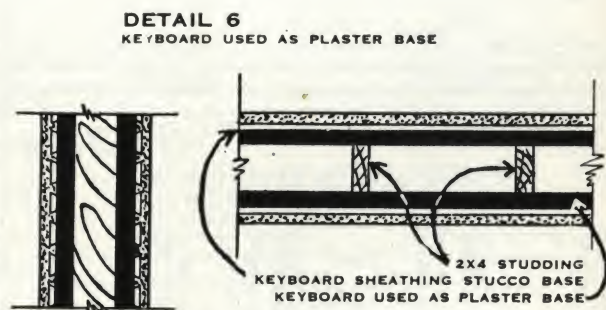
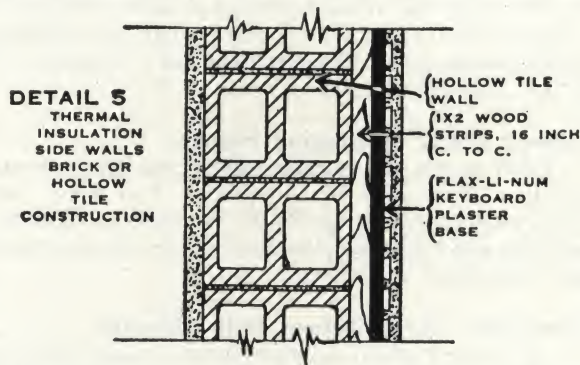
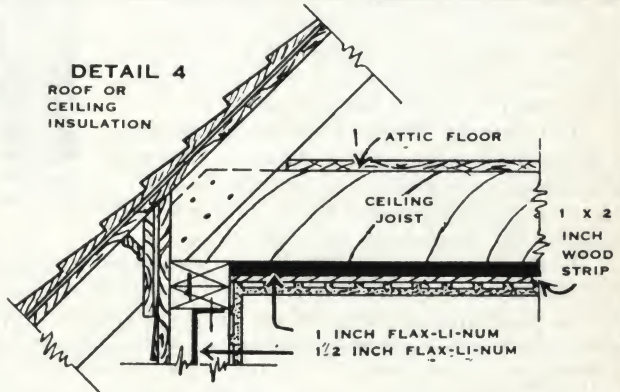
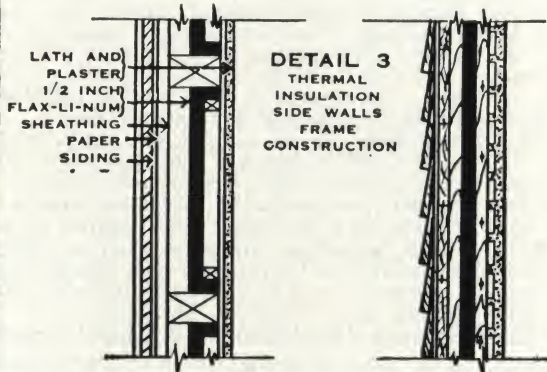
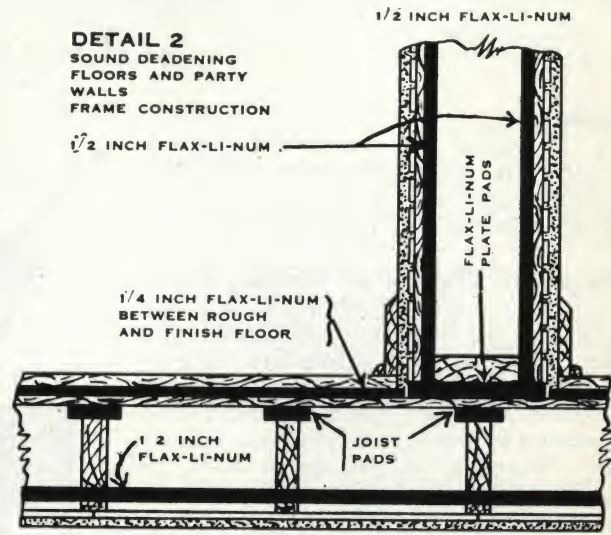
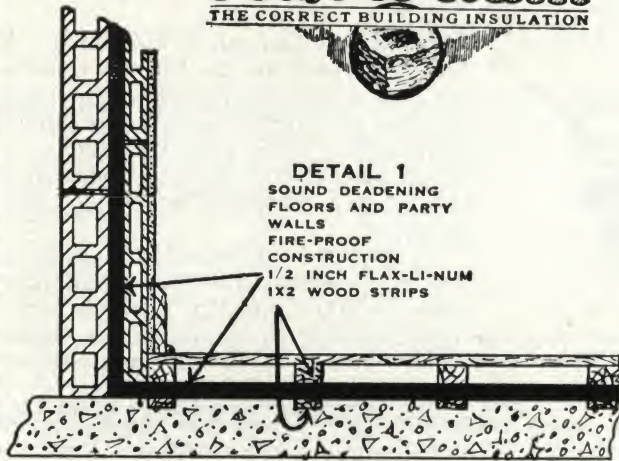
The foregoing specifications briefly review the various applications recommended by the FLAX-LI-NUM INSULATING COMPANY as minimum requirements for taking care of the job in hand. Each of these specifications are completely covered with full and complete detail drawings in our "American Institute of Architects' File No. 37b1," carrying the same specification number as given here. In addition, this company issues a treatise on "Heat Insulation for Houses," which is a compilation of the information gathered by the FLAX-LI-NUM INSULATING COMPANY over a period of eighteen years and covers not only laboratory tests, but the observation of complete practical applications in the field of building insulation.

These files will be gladly sent to architects and engineers on request.

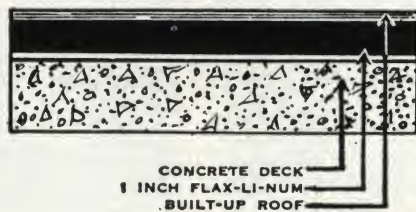
Many jobs, particularly in the refrigeration field and in the field of sound control and acoustics, demand special handling. Here the experience of our own Engineering Department, in applying data and information collected by us, correlated with the best information procurable from noted refrigeration and acoustical engineers, is put at the disposal of architects and engineers who wish to make use of it. Communications addressed to the Engineering Service Department will be given prompt and intelligent attention.

Flax-li-num

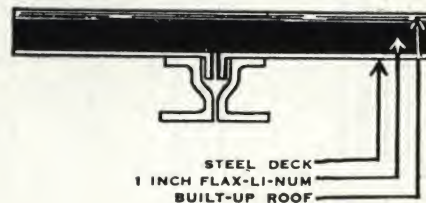
THE CORRECT BUILDING INSULATION



DETAIL 7
ROOF INSULATION—CONCRETE, TILE AND
WOOD DECKS



DETAIL 8
ROOF INSULATION—STEEL DECKS



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"RAWHIDE" WATERPROOF BUILDING, SHEATHING AND INSULATING PAPERS; "LIBERTY BLACK" INSULATING PAPERS; ASPHALT SHINGLES; DEADENING FELT.

"Rawhide" Waterproof Building Paper

The C. S. Garrett "Rawhide" is a high grade rope paper made of old manila rope stock, drawn out with a long fiber to give the best strength to the paper. The paper is treated with the "Rawhide" secret process to procure its waterproof qualities. It is odorless. "Rawhide" is put up in 36-in. rolls.

Made in two weights: No. 200 Buff, weighing 50 lb. per roll, and No. 215 Red, weighing 60 lb. per roll of 500 sq. ft. The No. 200 is the grade generally used for ordinary insulation. It has sufficient body to produce satisfactory results under ordinary conditions; but if the test is exceptionally severe the No. 215 is recommended.

For Use on Frame and Stucco Houses

—When used under slate, clapboards, shingles and stucco, "Rawhide" waterproof building paper is equal to a course of sheathing boards in protecting from cold and dampness.

In the accompanying illustration two types of stucco construction are shown. Type A has been given the only perfect permanency rating in the progress report of the



RAW-HIDE
WATER PROOF
PAPER

TRADE-MARK



Roll of
"Rawhide"

United States Bureau of Standards. No sheathing boards are used in this construction, the windproofing and weatherproofing being provided by waterproof building paper tacked in between the studs. For this purpose there is no better paper made than No. 215 "Rawhide" waterproof building paper.

Type B has furring and lath applied over sheathing, covered with waterproof paper. Either No. 200 or No. 215 "Rawhide" water-

proof paper will give satisfactory results for this purpose.

Specifications—Building or Insulating Paper—All material for insulating exterior walls and roofs shall be C. S. GARRETT & SON CORP. "Rawhide" Waterproof Building Paper. All sloping roof and deck surfaces and all sheathing on exterior walls shall be covered with No. 200 "Rawhide" Waterproof Paper.

Note: Where shingles strips are specified, building or insulating paper should be omitted.

All surfaces shall be completely covered in such manner as to make the building windproof and weatherproof subject to the approval of the architect. All joints of the paper shall be lapped not less than 2 in. and nailed with tin capped nails set not over 6 in. center to center. Carry paper into all window and door openings and under all window sills and exterior trim.

Type A Construction—The interior of all exterior studs shall have No. 215 "Rawhide" Waterproof Paper applied as follows: The paper shall be nailed with tin capped nails, spaced not over 6 in. center to center, to the inside face of the studs and secured to sides of the studs with vertical strips securely nailed to the studs after paper is applied. The paper shall be applied to the interior of all exterior wall surfaces in such manner as to make the building windproof and weatherproof subject to the approval of the architect.

For Cold Storage Insulation—"Rawhide" waterproof papers, on account of being odorless and impervious to dampness and moisture, are especially adapted for the insulation of cold storage houses, refrigerators, refrigerator cars and for all other purposes where a dependable waterproof paper is required. Samples will be sent on request.

"Liberty Black" Insulating Papers

Fiber stock, thoroughly waterproofed and evenly coated on both sides of the sheet. The heavy weighs 35 lb., and extra heavy 50 lb. per roll of 500 sq. ft. Recommended for good service where cheaper material than "Rawhide" is desired.

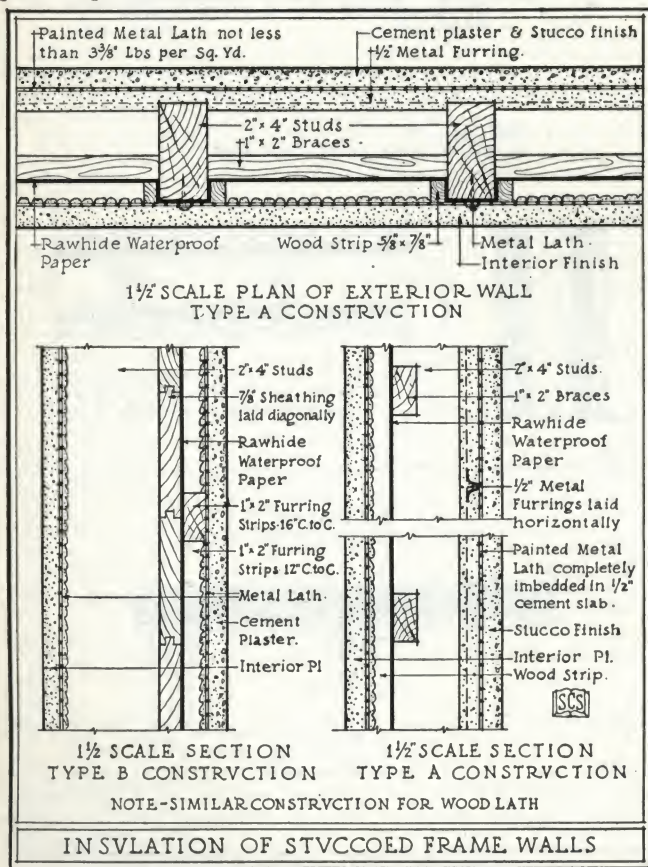
"Garrettite" Slate Surface Strip Shingles

The body of the Garrettite is wool fiber, made under our own formula and special supervision. We guarantee its uniformity. The felt is thoroughly asphalt saturated. It is then coated with a heavy layer of pure Gilsonite Asphalt; into which at high temperature is embedded a heavy coat of red, green and blue-black non-fading crushed slate.

Made in 3 styles: hexagonal, 3 shingles to a strip; octagonal and square butts, 4 shingles to a strip.

"C.S.G." Deadenng Felt

A high grade wool felt for deadening sound. Used between walls and under floors, it not only eliminates sound but acts as an insulator against heat and cold. Made in three weights: No. 18, 1 lb. per sq. yd.; No. 19, 1½ lb. per sq. yd.; No. 20, 2 lb. per sq. yd. We especially recommend the No. 20 for use in schools, churches and lodge rooms.



UNION FIBRE CO., INCORPORATED

All Forms of Insulation for Cold, Heat, Sound, Mechanical Vibrations,
Condensation and Acoustical Corrections

Engineers and Manufacturers

WINONA, MINN.

AGENTS IN ALL LARGE CITIES

Union Fibre Co., Incorporated Products—the Result of Twenty-five Years' Service and Experience

Materials to absorb as well as to prevent transmission of heat and sound:

LINOFELT.	MINERAL WOOL.
FIBROFELT.	ACOUSTICAL LINOFELT.
LITH.	ACOUSTIFIBROBLOCK.
PIPE COVERING.	ANTI-VIBRO-BLOC.

Note: Mineral Wool will stand 2500° F.

Safe temperature for our other materials is 280° F. and 35 lb. pressure.

Standard Specifications, Bulletins and Service

Standard drawings and specifications for the use of our products, will be mailed gratis.

We cheerfully furnish without charge bulletins and engineering advice concerning the use of our products.

Linofelt

A quilt, of highest efficiency, of selected flax fibre batt between tough Kraft or Waterproof paper. In rolls of varying widths and thicknesses.

Approximate Thickness— $\frac{5}{16}$ in.; $\frac{1}{2}$ in.; $\frac{3}{4}$ in.

Standard Widths—18, 24, 26, 32, 36, 48, and 54 in.; also any other special widths up to, and including, 108 in.

Approximate Weights per 100 Sq. Ft.— $\frac{5}{16}$ -in. Kraft, 17 lb.; $\frac{1}{2}$ -in. Kraft, 28 lb.; $\frac{3}{4}$ -in. Kraft, 39 lb.; $\frac{5}{16}$ -in. waterproof, 23 lb.; $\frac{1}{2}$ -in. waterproof, 32 lb.; $\frac{3}{4}$ -in. waterproof, 43 lb.

Fibrofelt

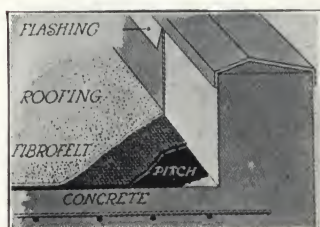
A pressed, flexible felt board of highest efficiency, of selected flax and rye straw fibres. In boards of varying widths, lengths, and thicknesses ($\frac{5}{16}$ to 1 in.), and especially adapted for roof insulation.

Approximate Thickness— $\frac{5}{16}$ in.; $\frac{1}{2}$ in.; $\frac{3}{4}$ in.; 1 in.

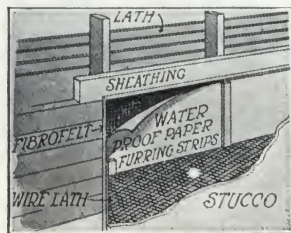
Widths— $\frac{5}{16}$ and $\frac{1}{2}$ -in. thicknesses are flanged for 16 and 24 in. on center. Also furnished flat in 32 and 36-in. widths; $\frac{3}{4}$ and 1-in. thicknesses furnished only in 32 and 36-in. widths.

Lengths—8, 8½, 9, 9½, and 10 ft.

Approximate Weights per 100 Sq. Ft.— $\frac{5}{16}$ in., 55 lb. uncrated, 65 lb. crated; $\frac{1}{2}$ in., 60 lb. uncrated, 70 lb. crated; $\frac{3}{4}$ in., 100 lb. uncrated, 110 lb. crated; 1 in., 115 lb. uncrated, 125 lb. crated.



On Concrete Roof



On Exterior Walls Finished
in Stucco

Plans for Application of Fibrofelt

Lith

A pressed board and prepared water repellent, 18x48 in., of selected flax fibre of highest efficiency. Especially adapted for cold storage and roof insulation.

Thicknesses—1, 1½, 2 and 3 in.

Approximate Weights per Square Foot—1 in., 1.25 lb. uncrated, 1.39 lb. crated; 1½ in., 1.88 lb. uncrated, 2.09 lb. crated; 2 in., 2.50 lb. uncrated, 2.79 lb. crated; 3 in., 3.75 lb. uncrated, 4.18 lb. crated.

Pipe Covering

Pressed and truly shaped from selected flax fibres. Used for cold pipes and sound deadening. Highest efficiency. Three thicknesses.

Brine Thickness—For brine and ammonia pipes with refrigerant from zero to 25° F. Also used for sound deadening. Thickness of covering from 2 to 3 in.

Special Thick Brine—For brine and ammonia pipes with refrigerant at a temperature below zero. Thickness of covering from 3 to 4 in.

Ice Water—For pipes carrying cold liquids, such as ice water, where temperatures are between 25 and 50° F. Thickness of covering from 1½ to 1¾ in.

Mineral Wool

Highest quality, no dust, and is not objectionable to handle when prepared by our patented process, which anneals and makes the fibres more pliable and tough, and prevents fibres from breaking up again into dust form. Packed in burlap bags of approximately 50 lb. each.

Grades—No. 1, unoled; No. 2, light oiled; No. 3, medium oiled; No. 4, heavy oiled.

Note: The oil anneals and waterproofs the wool fibres to a greater or lesser degree, depending upon the grade. The oiled wool is not greasy, as the oil is absorbed in the annealing process.

Acoustical Linofelt

Gives highest tests for sound absorption. Made from our best grade flax batt, burlap covered.

Made in standard rolls, 36 in. wide, 33½ ft. long, and 1 in. thick. Weighs, approximately, 60 lb. per square.

Acoustifibroblock

Highest grade and efficiency applied directly to surfaces. Its outer surface is the finished wall surface, in plain or tile effect. No surface membrane needed.

Made in slabs 18x48x1¾ in. Weights, approximately, 1.80 lb. uncrated, 2 lb. crated.

Anti-vibro-bloc

A super-insulation for elimination and deadening of severe vibrations and noises. Placed under machinery, in floors, walls, etc.

Made in slabs 18x48 in. and in thicknesses of 1, 1½, 2 and 3 in.

Approximate Weights per Square Foot—1 in., 1.33 lb. uncrated, 1.47 lb. crated; 1½ in., 2 lb. uncrated, 2.21 lb. crated; 2 in., 2¾ lb. uncrated, 2.96 lb. crated; 3 in., 4 lb. uncrated, 4.43 lb. crated.

THE SISALKRAFT COMPANY

918-20 Builders' Building
CHICAGO, ILL.

MILLS: AMERICAN REENFORCED PAPER COMPANY, ATTLEBORO, MASS.

Product

SISALKRAFT—a reenforced, waterproof paper.

SISALKRAFT

REG. U. S. PAT. OFFICE

Between or under the rafters on the roof, keeping heat in. As sheathing paper under brick veneer, stucco, shingles or clapboards.

Sisalkraft

This material has several new features peculiar to itself. Because of these features Sisalkraft can be used for many new purposes that are a big help to the contractor and builder.

Sisalkraft is made of two separate sheets of No. 1 kraft paper, two separate layers of asphaltum and two separate layers of the best grade Java rope sisal, one layer of which runs crosswise and one lengthwise with both layers firmly imbedded in the asphaltum. All these materials are rolled together under heavy pressure while hot, making an almost indestructible, thoroughly waterproof paper and giving Sisalkraft about 75% more strength than other papers.



Sisalkraft Ready for Second Layer of Asphaltum and Kraft Paper—Sisal Fibres Exposed

By almost indestructible we mean that it has strength enough to resist tearing in the wind, to withstand all kinds of rough handling, to present an almost unbelievable strength in the hands of the user. It is pliable enough to be pulled over corners or tucked into valleys and will not crack in the coldest weather.

Sisalkraft will not only shed water but will actually hold water without leaking for a period of four months by actual test.

Sizes and Weight

Sisalkraft is furnished in rolls of various widths, 36 in., 48 in. and 60 in. The 36 in. roll contains either 500 or 900 sq. ft. Other widths are 300 ft. long, giving 1200 or 1500 sq. ft. respectively. The weight of all sizes is approximately 5 lb. to a square.

Uses for Sisalkraft

For backplastering—to give double dead air space—keeping out heat, cold and dampness.

For lining the floors in public buildings, homes, etc., keeping out dust, dirt and moisture.

During the course of construction to protect stock piles, whether cement or lumber, covering in spaces left for doors and windows, for temporary partitions, contractors field houses, etc., as a wind shield or protectors on stagings, covering unfinished walls, temporary roofs.

On cement buildings to protect brick curtain wall when pouring cement under steel sash.

Coverings for cement roads and walks and other cement construction to keep off direct sun and heat so that concrete will not dry out too fast;

also to keep off heavy rain storms and as a protection to finished surfaces during the progress of other construction work.

For storm doors—in the country, in some sections, screen doors are covered with Sisalkraft in winter, converting them to storm doors.

For temporary garages, camps, enclosures for machinery, storage sheds, etc.

Covering for finished floors to protect them from painters, plasterers and other workmen.

Covering for finished interiors, walls, furniture, etc., when decorating.



Method of Use to Get Double Dead Air Space



Sisalkraft as Sheathing Paper

A typical group of houses upon which Sisalkraft has been applied as sheathing. Sisalkraft can be applied at least twice as fast as building papers due to the fact that tin caps or cleats are not necessary. An ordinary roofing nail will do. Note Sisalkraft covering stock piles in the foreground. This will be laid under the floors of other buildings after its use here.

A Few of the Advantages Found in Sisalkraft

(1) **Thoroughly Waterproof**—Having a double layer of asphaltum protected by the two layers of kraft paper on the outside Sisalkraft offers the cheapest means of applying asphaltum waterproofing.

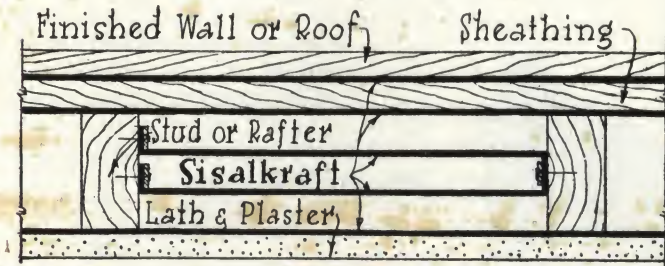
(2) **75% More Strength Than Other Papers**—Sisal reenforcing both lengthwise and crosswise gives an almost unbelievable strength.

(3) **Time Saver**—(a) Sisalkraft can be applied by one man under the most unfavorable circumstances. No time is lost for careful handling. Sisalkraft is applied much tighter than any other paper without fear of tearing. Rough handling will not injure Sisalkraft.

(b) Battens or cleats are unnecessary—all that is needed is a large head roofing nail here and there.

(c) Contractors say they can lay three times as much Sisalkraft in one hour as any other paper. One man can handle Sisalkraft with ease.

(4) **Pliable**—(a) Sisalkraft can be roughed or mugged up, straightened out and used like a new piece.



Wall and Roof Application

Detail showing application of Sisalkraft in walls or roofs for the creation of dead air spaces. The method in both cases is practically identical.

(b) Sisalkraft can be folded tight over corners. Try a sample over your own desk or some handy corner. It can be pushed into valleys—not over them.

(5) **An Every-day and Every-season Paper**—

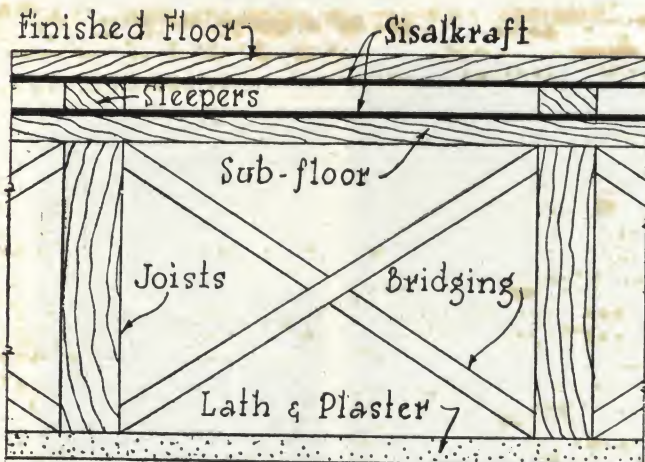
(a) Will not become brittle and crack during the winter months because the asphaltum is protected and remains pliable. Many dollars worth of labor are wasted because every time a workman touches a piece of paper it rips or breaks. There is so much waste with Sisalkraft.

(b) Sisalkraft will not stick in hot weather because the two layers of asphaltum are protected by kraft paper.

(c) Will not rip or tear in wind, and, of course, rain will not injure it.

(6) **An Excellent and Inexpensive Protection**—

Sisalkraft is the most economical material for covering stock piles, tops of foundations, brick walls, etc. If used for temporary partitions, field offices, closing-in, etc., rain and storm are kept out at a very low cost while the work continues. Sisalkraft can be taken off after such uses and used again.



FLOORS

Floor Applications

Sisalkraft should be used to secure the best results for floors, applying a layer of Sisalkraft over the sub-floor keeping lapped joints under the stripping. A second layer of Sisalkraft can be applied over the sleeper strips.

A number of field offices in New England have been used over a year—covered with Sisalkraft tacked on with ordinary roofing nails.

(7) **A Width for Every Purpose**—36 in. for sides of buildings, 60 in. for under floors and 48 in. for other purposes. Two widths can be seamed together to get greater width for covering purposes.



This Illustrates the Strength of a 4-in. Strip of Sisalkraft

(8) **Clean—Will Not Stain**—The asphaltum is protected on both sides by kraft paper.

Sisalkraft was laid over the rugs in a model home and the contractor says, "Your Sisalkraft did a wonderful job laid in the line of march through the furnished house to protect the rugs and finished floors. Nearly 10,000 persons went through this house without the slightest damage to either rugs or floors."

(9) **Economical**—(a) Every inch of Sisalkraft can be used.

(b) Can be used over again in temporary construction work. When building a number of homes the finished floors of the first building can be covered with Sisalkraft to protect them from paint, etc., and from workmen and then rolled up to be used on the floors of other buildings or as sheathing or floor linings.

(10) **Tight, Windproof Application**—(a) Sisalkraft is unexcelled as sheathing paper under stucco, brick veneer, shingles, clapboards, etc., and lasts for many years.

(b) When used as sheathing paper or between the studs and rafters to form dead air spaces Sisalkraft is unsurpassed for its insulating effect because it can be pulled up tight, applied without cracks and rips and completely prevents air seepage.

Samples and Information

File size samples will be sent on request. These samples will readily demonstrate the unbelievable strength of Sisalkraft, its complete waterproof character and its ability to withstand all kinds of abuse. Data sheets with examples of application will be sent on request.

SPRAYO-FLAKE INSULATING CO.

All Purpose Insulation Applied by Air

56 South Bay Street
MILWAUKEE, WIS.

Sprayo-Flake Insulation

Description—A new insulation consisting of flakes of pulp paper applied with a special spray gun. As the dry paper flakes leave the gun nozzle they are combined with a fine spray of silicate of soda which not only provides the necessary cohesive agent but also adds fire retarding qualities.

Efficiency—The material as applied is light and fluffy yet uniformly compact—it tenaciously holds its original position in spite of vibration. Since the insulating efficiency of any material depends primarily on its lack of density, Sprayo-Flake, obviously, rates extremely high as a heat and sound insulator.

In general characteristics, as applied, it is similar in appearance and composition to a wasp's nest.

Will Not Support Combustion—The material when in position will not support combustion.

Easily and Quickly Applied—Sprayo-Flake is easily and rapidly applied to any surface and is built to any thickness or shape required. Crevices, holes and places usually inaccessible are easily filled and sealed with the spray gun.

Furnished and Applied by Sprayo-Flake Co.—Sprayo-Flake Insulation is furnished, erected, or applied by the SPRAYO-FLAKE INSULATING Co. or their authorized agents, assuring complete, effective installations at reasonable cost.



Thickness of Sprayo-Flake Insulation as Applied



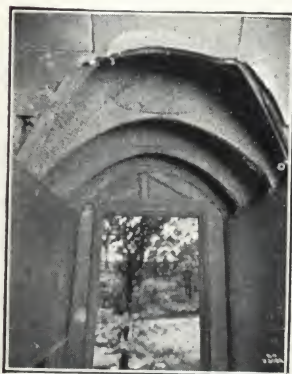
Sprayo-Flake Insulation Thoroughly Protects and Insulates Around Jambes



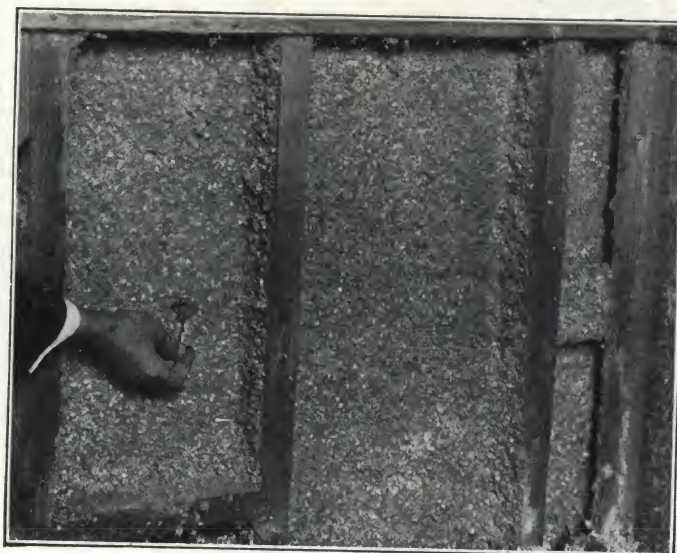
Method of Applying Sprayo-Flake Insulation by Compressed Air



Note How Sprayo-Flake Insulates Ceiling and All Crevices



Alcove Ceiling Insulated with Sprayo-Flake
Showing how easily recesses, etc., are treated



Texture of Sprayo-Flake Insulation
Note how all crevices are filled and insulated



Hard-to-get-at Corners and Tight Places Are Easily Insulated at No Extra Labor Cost

UNITED STATES MINERAL WOOL COMPANY

TELEPHONE CONNECTION

280 Madison Avenue
NEW YORK, N. Y.

FACTORY: STANHOPE, N. J. (Railroad Station, Netcong, N. J.)
WESTERN CONNECTION: INSULATING PRODUCTS Co., 1553 W. Madison Street, CHICAGO, ILL.

Product

MINERAL WOOL, a Non-combustible Insulator and Sound Deadener.

Character of Mineral Wool

A mineral substance, made by converting melted scoria into a fibrous state.

It holds from 92 to 96% of air in suspension, which is more than any other non-combustible substance.

Uses

Mineral Wool is extensively used for insulating ovens and heat treating furnaces; and by leading manufacturers of refrigerators, ice and refrigerating machinery, as well as for filtering acids and the packing of carboys.

In residences it is used for lining walls, floors, roofs and ceilings, as partly shown in the accompanying illustration. It is cheap and easily applied.

A house lined with Mineral Wool is warm in winter, cool in summer, and is thoroughly deafened. The lining is verminproof, checks the spread of fire and keeps out dampness.

How to Estimate

To find the quantity of Ordinary Mineral Wool required to fill the outside walls the full thickness of studding:

Rule—1 lb. per sq. ft. for each inch in thickness.

Take the entire distance around the building on a horizontal line and multiply by the height of the studding, which will give the square feet of outside surface. Deduct, ordinarily, one-third to one-half for space occupied by doors, windows, chimneys, studding, bracing, etc. Multiply the remainder by the thickness of the studding; the result will be the number of pounds of Mineral Wool required to fill the space.

Grades and Cost

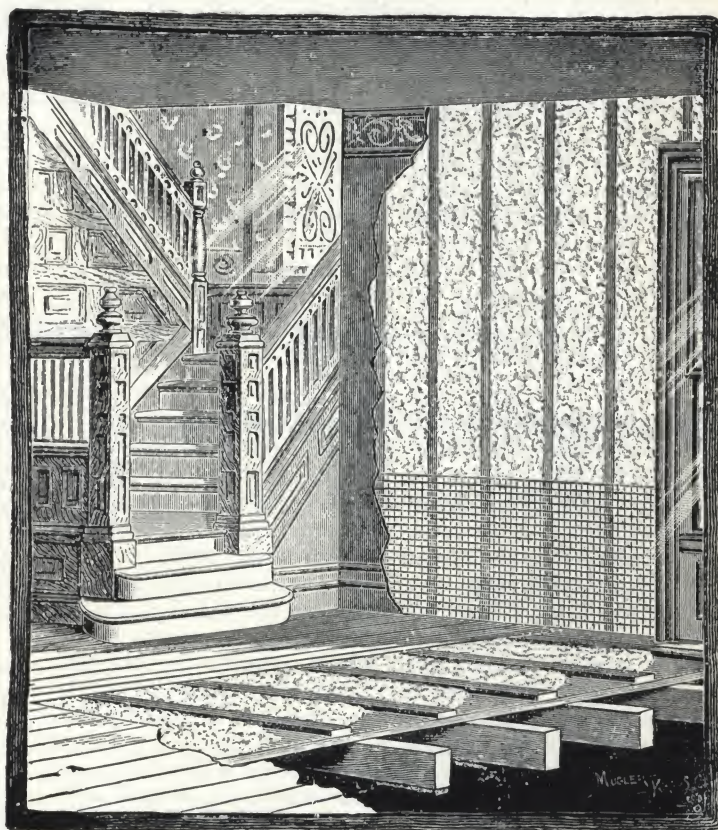
The Ordinary grade of Mineral Wool (the quality invariably used in building construction) weighs about 1 lb. per sq. ft., 1 in. thick, or 12 lbs. per cu. ft.

It costs \$30.00 (subject to change) per ton at factory. Within a radius of 200 miles from New York, N. Y., \$10.00 per ton will usually cover freight charges. A laborer can apply from $\frac{1}{2}$ to $\frac{3}{4}$ of a ton a day.

The Selected grade of Mineral Wool, which is used in chemical plants, is rarely called for in buildings.

Package

The material is packed in 3-bushel burlap bags, for which a charge of 15¢ (subject to change) each is made; if returned in good condition within 30 days, and free of all freight charges, they are credited at 10¢.



A Few Applications of Mineral Wool

How to Specify

"Insulation of Mineral Wool (UNITED STATES MINERAL WOOL COMPANY, 280 Madison Avenue, New York) shall be provided for For floors, it shall be [4 in.] thick and set upon boards placed between beams on cleats. For walls it shall fill the spaces between studs and be placed in position as the lathing is being proceeded with. For roofs, it shall fill the space between rafters from eaves to [collar beams]. The Wool shall be pressed compactly but lightly."

Samples

Samples and descriptive pamphlets will be gladly supplied, on application.

A Partial List of Installations

BUILDING AND LOCATION	ARCHITECTS
Schults Bread Co., Mount Vernon, N. Y.	C. B. Comstock
Ward Baking Company's Plants, New York and Brooklyn, N. Y.	C. B. Comstock
John D. Rockefeller, Jr., Estate, Pocantico Hills, N. Y.	Delano & Aldrich
Baker House, Glen Cove, L. I., N. Y.	Walker & Gillette
The Hebrew Sheltering Guardian Society, Hawthorne, N. Y.	H. A. Jacobs
Veryl Preston, Hohokus, N. J.	Warren & Wetmore
Estate of Henry H. Wood, Mill Neck, L. I., N. Y.	A. & F. B. Ware
E. C. Potter, Jr., Hewletts, L. I., N. Y.	H. O. Chapman
E. T. Holmes, Greenwich, Conn.	Carrère & Hastings

WOOD CONVERSION COMPANY

Balsam-Wool for Building Insulation and Sound Deadening

GENERAL OFFICE AND FACTORY

CLOQUET, MINN.

DISTRICT OFFICES

DETROIT, MICH., 503 Stephenson Building
ST. PAUL, MINN., 1955 University AvenueCHICAGO, ILL., 360 North Michigan Boulevard
NEW YORK, N. Y., Room 705, 103 Park Avenue

RETAIL DISTRIBUTION BY LUMBER DEALERS EVERYWHERE

Products

BALSAM-WOOL STANDARD INSULATION for preventing heat losses through walls, roofs, floors and ceilings; for insulating commercial and domestic refrigerators, ice houses, etc.; and for the sound deadening of floors and walls.

Balsam-Wool Refrigerator Car Insulation.

Balsam-Wool Steel Passenger Car Insulation.

Balsam-Wool Sound Absorbent for acoustical treatment in offices, banks, auditoriums, churches, hospitals, schools, broadcasting studios, etc.

Note: While this is used in acoustical correction, the material in these pages deals with sound insulation or the prevention of the transmission of sound through walls and floors. Complete information relative to Balsam-Wool Sound Absorbent, its use and application in acoustical work will be furnished on request.

Balsam-Wool Standard Building Insulation

A Wood Product—Balsam-Wool is made from pure wood fibers in fleecy wool form, permanently matted together and treated chemically to resist fire. For building purposes it is furnished $\frac{1}{2}$ and 1 in. thick, between two sheets of asphalt-coated tough kraft paper.

Highly Efficient as a Heat Insulator—In Balsam-Wool the natural heat resistance of the wood is multiplied many times by a rearrangement of the cellular wood fibers into a "wool" form which retards the circulation of air. The still air space in Balsam-Wool is approximately 95%, while its density in pounds per cubic foot is only 3.80. The fact that the paper liners of Balsam-Wool are *not stitched* or punctured in any way adds further to its heat, moisture and wind resisting qualities. Standard specifications, and test results showing the efficiency of Balsam-Wool compared with other building insulations are given in this article.

An Effective Sound Deadener—The ability of the wool to absorb sound, and the tendency of the paper covering to reflect sound waves, account for the remarkable efficiency of Balsam-Wool as a sound deadener. Standard specifications and comparative tests are given in this article.

Waterproof—The film of asphalt which lines the paper coverings protects

THERMAL CONDUCTIVITIES OF HEAT INSULATORS

Tests made by C. F. Burgess Laboratories, using standard hot plate method

Insulating material	Thickness, in.	§ Thermal Conductivity in B.t.u.		Density in lb. per cu. ft.
		1 hour	24 hours	
Balsam-Wool	.60	.249	5.976	3.80
*A	.35	.255	6.120	5.45
*B	.38	.270	6.480	14.00
*C	.50	.279	6.696	15.90
*D	.40	.309	7.416	5.07
*E	.43	.317	7.608	15.80
*F	.67	.318	7.632	15.90

*Insulating materials in competition with Balsam-Wool.

§Per square foot per 1°F. drop per 1-in. thickness.



TRADE-MARK

the wool from moisture, and at the same time keeps dampness out of the building.

Fire Resistant—The wool is chemically treated against fire.

It will char while exposed to flame, but will not smolder or burn after the flame is removed. Balsam-Wool in itself will not support combustion.

Vermineproof and Sanitary—Balsam-Wool contains no animal matter. It does not attract or harbor rats, mice or vermin. It is clean, odorless and sanitary.

Permanent—The wool can not shift or settle because each fiber is coated with an adhesive which cements it to adjoining fibers. The asphalt coating provides a permanent bond between wool and paper. Balsam-Wool is as permanent as the walls which hold it.

Uniform in Quality—During the process of manufacture, Balsam-Wool is under constant laboratory supervision for uniformity and thermal conductivity.

Low Cost of Installation—Three standard widths meet all average construction requirements. Thus, the carpenter cuts only to length. Being flexible, Balsam-Wool can be fitted easily into corners and around projections without waste of material. Being light and easily installed, it speeds up the work and keeps down installation costs.

Widths and Thicknesses—The standard widths are 17, 25 and 33 in. The standard thicknesses are $\frac{1}{2}$ in. for side walls, and 1 in. for roofs or top floor ceilings. The $\frac{1}{2}$ -in. thickness weighs 200 lb. per 1000 sq. ft., and the 1-in. thickness 330 lb. per 1000 sq. ft.

How Distributed—Balsam-Wool Standard Building Insulation is distributed through retail lumber dealers. Stocks are carried by dealers in all sections, and any retail lumber dealer can promptly obtain a supply.

A Weyerhaeuser Product

Balsam-Wool bears the name of an organization which for more than 68 years has been known for the high standard of quality maintained in all its products. On every roll of genuine Balsam-Wool will be found the Weyerhaeuser Forest Products trade-mark, the maker's pledge of personal responsibility.

EFFICIENCY OF VARIOUS SOUND INSULATORS

Tests made on actual floor sections by C. F. Burgess Laboratories

Insulation used	Thickness, in.	Sound stopped by insulation	Sound transmitted
Balsam-Wool	$\frac{1}{2}$	38 %	62 %
*G	$\frac{1}{2}$	36.5 %	63.5 %
*F	$\frac{1}{2}$	34.4 %	65.6 %
*B	$\frac{1}{2}$	26.0 %	74.0 %
*C	$\frac{1}{2}$	24.7 %	75.3 %
*A	2 ply	20.4 %	79.6 %
*D	$\frac{1}{2}$	18.1 %	81.9 %
*E	$\frac{1}{2}$	4.4 %	95.6 %

*Insulating materials in competition with Balsam-Wool.



Standard Package
Contains 250 sq. ft.
Weight, 50 lbs.



17-in. Balsam-Wool Applied Between Studs

Heat Insulation for Buildings

Practical Insulation Tests—In the effort to obtain practical insulating data for architects, a series of tests was recently conducted for WOOD CONVERSION COMPANY by the C. F. Burgess Laboratories of Madison, Wis.

Made on Actual Wall and Roof Sections—The roof and wall sections tested were of standard construction, and included types most commonly encountered in residential work.

First, each section was tested for its thermal conductivity without insulation. Commercial insulating materials, purchased from dealers' stocks, were then applied in turn, so that the series of tests would show (1) the absolute heat loss through each type of wall or roof, insulated and uninsulated, and (2) the relative efficiency of the different insulators *under actual service conditions*.

Standard heat transmission test methods were employed. Details of these will be furnished on request.

Balsam-Wool the Most Efficient—Results of these tests show a wide difference in the efficiency of the eight insulators under trial. As might be expected, their relative standing varies somewhat in the case of the different wall and roof constructions to which they were applied, but in every case the heat loss through Balsam-Wool was shown to be the lowest.

General Conclusions—Test results show that the heat loss through the roof is relatively greater than through the walls. They also show that the amount of heat loss in either case is largely dependent on the building materials employed.

The percentage of saving due to insulation is highest in the case of those walls and roofs which showed the greatest amount of heat loss when uninsulated. However, the results show that there is a large preventable waste of heat through uninsulated walls and roofs of *every* type.

The Economies of Insulation—In the light of these tests and the actual results obtained in insulated buildings, insulation must be recognized as an important measure of fuel conservation.

Thousands of insulated houses throughout the country are burning from one-fourth to one-third less coal than uninsulated houses of the same size. Moreover, heating engineers are suggesting a reduction of as much as 20% in boiler capacity and radiation when proper insulation is specified.

These economic considerations, together with summer and winter comfort and the protection against sudden temperature changes, explain the popularity and greater resale value of the insulated house.

Standard Specifications for Heat Insulation of Buildings with Balsam-Wool

Materials

Heat insulation shall be standard Balsam-Wool, manufactured by the WOOD CONVERSION COMPANY, Cloquet, Minnesota. The ½-in. thickness shall be used for sidewalls and the 1-in. thickness for top floor ceiling or roof insulation. Widths shall be as specified hereinafter. (Stock widths are 17, 25, and 33 in.)

General

Continuity of insulation shall be maintained. Where floors, ceilings or roofs are insulated, as well as outside walls, insulate walls thoroughly between joist and rafter ends.

Throughout, all joints shall be made airtight, especially at door and window openings.

Use full length strips of insulation. End joints, where necessary, shall be lapped and covered with lath, nailed through insulation to boarding or header.

Insulation strips shall in all cases run in the same direction as studding, joists and rafters.

Frame Outside Wall Insulation

(Wood siding, stucco or brick veneer finish. Studs set on 16-in. centers.)

Method No. 1 (17-in. Width)—Insulate with 17-in. width Balsam-Wool applied vertically between studding with back of insulation near face of sheathing. The flanges or turnouts shall be continuously fastened by means of laths or strips nailed securely through insulation to the studding on the sides and to soles, plates or headers at the top and bottom.

Note: Where studding is set on 24-in. centers use 25-in. width Balsam-Wool.

Method No. 2 (33-in. Width)—Insulate with 33-in. width Balsam-Wool applied vertically on inside face of studding, edges butted together on every other stud. Fur over insulation with 1x2-in. furring strips on each stud to receive lath and plaster.

Note: This method requires special width door and window frames. Where heating or plumbing pipes are installed in space between studs of outside walls, insulate between studs as in Method No. 1, in addition to insulation as above.

Masonry Outside Wall Insulation

(Stone, brick, hollow tile or concrete block)

Method No. 1 (33-in. Width)—Fur the wall with 1x2-in. furring strips on 16-in. centers, shimmed plumb and true. Insulate with 33-in. width Balsam-Wool applied vertically on inside of furring, edges butted together on every other strip. Fur over insulation with 1x2-in. furring strips on each wall-furring strip to receive lath and plaster.

Method No. 2 (17-in. Width)—Fur the wall with 2x2-in. furring strips, on 16-in. centers, shimmed plumb and true. Insulate with 17-in. width Balsam-Wool applied vertically between furring strips with back of insulation against inside face of wall. The flanges or turnouts shall be continuously fastened by means of laths or strips nailed securely to the furring on the sides and to soles, plates or headers at the top and bottom.

Roof Insulation

(Rafters set on 16-in. centers)

Method No. 1 (17-in. Width, 1-in. Thickness)—Insulate with 17-in. Balsam-Wool applied between the rafters with back of insulation against inside face of roof boarding. The flanges or turnouts shall be continuously fastened by means of laths or strips nailed securely through insulation to the sides of rafters, plates, ridges, etc.

Note: Where rafters are set on 24-in. centers use 25-in. width Balsam-Wool.

Method No. 2 (33-in. Width, 1-in. Thickness)—Insulate with 33-in. width Balsam-Wool applied on the inside face of rafters, edges butted together on every other rafter. Fur over insulation with 1x2-in. furring strips on each rafter to receive lath and plaster. (Use laths or strips if space under rafters is unplastered.)

Ceiling Insulation

(Joists set on 16-in. centers)

(Use instead of roof insulation for second floor ceilings where attic above is not to be used for living quarters; also for basement ceilings where space is unheated; and for porch ceilings where space above is used for living quarters, as in second floor extensions, etc. Insulation is also recommended for first floor ceilings under bedrooms that will be cold at night, and for ceilings of first floor bedrooms where space above is heated at night.)

Method No. 1 (17-in. Width, 1-in. Thickness)—Insulate with 17-in. width Balsam-Wool applied between joists with back of insulation against underside of rough flooring (if applied from below) or against lath and plaster (if applied from above). The flanges or turnouts shall be continuously fastened by means of laths or strips nailed securely through insulation to the sides of joists, plates, headers, etc.

Note: Where joists are set on 24-in. centers use 25-in. width Balsam-Wool.

Method No. 2 (33-in. Width, 1-in. Thickness)—Insulate with 33-in. width Balsam-Wool applied on the bottom of joists, edges butted together on every other joist. Fur over insulation with 1x2-in. furring strips on each joist to receive lath and plaster or ceiling.

Floor Insulation

(Over partially excavated or cold basement areas. Joists set on 16-in. centers.)

Method No. 1 (33-in. Width)—Insulate with 33-in. width Balsam-Wool applied over subfloor, edges butted together over every other joist. Fur over insulation with 1x2-in. furring strips secured over each joist to receive finish floor.

Note: Where entire building floor area is not insulated as above, set floor joists of insulated area sufficiently below normal joist level to compensate for thickness of insulation and stripping.

Method No. 2 (17-in. Width)—(Use where headroom below joists is sufficient for working space and is accessible.) Insulate with 17-in. width Balsam-Wool applied between joists as specified in Method No. 1 for Ceiling Insulation.

Sound Insulation for Buildings

Sound Transmission Tests—In order to furnish architects with authoritative and workable data on the problems of sound insulation, as encountered in the design of apartments, hotels, hospitals and schools, WOOD CONVERSION COMPANY several years ago began a series of exhaustive researches through the C. F. Burgess Laboratories.

The problem of sound insulation may be defined as "finding effective methods of arresting the transmission of sounds." In other words, it must be distinguished from sound absorption problems, as encountered in auditoriums and banking rooms. Information on this latter subject has long been available, but before the Burgess tests there was no practical method of measuring the sound transmission through different materials and structural units.

Made on Actual Floor and Wall Sections—The Burgess tests were made on actual floor and wall sections. The amount of sound transmitted through an uninsulated floor (or wall) was taken as 100%. Conversely, the sound stopped was 0%. Various insulated floor and wall constructions were rated by this standard. Full details of the test methods, which were developed specially, will be furnished on request.

Three Series of Tests—In the first series, the aim was to find the relative soundproofing value of various commercial insulating materials.

The results give Balsam-Wool the highest rating—38%, as against 4.4% for the least efficient material.

In the second series, the aim was to find the relative sound insulating efficiency of various floor constructions insulated with Balsam-Wool. (Figs. 1 to 5 on the following page.)

The third series was similar to the second, except that the tests were made on walls. (Figs. 6 to 10.)

General Conclusions—These sound tests developed important general conclusions, as follows:

- (1) Joist pads do not reduce the sound transmission if the floor is nailed through the joist pads into the joists.
- (2) The greater the amount of pressure on an insulator, the greater the amount of sound which it transmits.
- (3) Little of practical value is gained by offsetting the furring strips from directly over the floor joists.
- (4) Of all types of floor construction, the suspended ceiling construction showed the greatest sound resistance. (Figs. 3 to 5.)
- (5) Of the wall types studied, double studding staggered construction showed the greatest sound resistance. (Figs. 8 to 10.)
- (6) The manner of applying the insulation, and the number of layers, have a marked effect on sound resistance.

Standard Specifications for Sound Deadening Floors and Walls with Balsam-Wool

Material

Sound deadening material (insulation) shall be standard $\frac{1}{2}$ or 1 in. thick Balsam-Wool, 33 in. wide, manufactured by the WOOD CONVERSION COMPANY, Cloquet, Minn.

Floor Sound Insulation—General

Continuity of the sound deadening material shall be maintained—all joints shall be lapped at least 2 in.

Where false ceiling construction is used (ceiling joists independent of floor joists) and sound deadening material is woven between the two sets of joists, insulating strips shall run at right angles to joists, with edge laps of at least $1\frac{1}{2}$ in. Tension on all strips shall be as nearly equal as possible to guard against open joints at edge laps.

Insulation strips applied over subfloor or on bottom of joists, shall run in the same direction as joists. Strips shall be flanged at all walls to permit a 4-in. turn up under baseboard tight against wall.

Use full length strips of insulation. End joints where necessary shall be lapped $1\frac{1}{2}$ in. and covered with lath nailed through insulation to subfloor, joist or header.

Where specified, there shall be constructed a false ceiling; the joists to support the floor and those carrying the ceiling being independent. The ceiling joists shall be set midway between the floor joists with bottoms at least $1\frac{1}{2}$ in. below the bottom line of the floor joists where woven insulation is used.

Floor Sound Insulation—Methods

(Methods herein specified are arranged from low to high, in order of their effectiveness.)

Method No. 1 (One Layer, 15% of Sound Stopped)—Insulate with Balsam-Wool applied on the bottom of joists, edges butted together on every other joist. Fur over insulation with 1x2-in. furring strips on each joist to receive lath and plaster. (Fig. 1.)

Method No. 2 (One Layer, 43% of Sound Stopped)—Insulate with Balsam-Wool applied over subfloor with edge laps of at least $1\frac{1}{2}$ in. Fur over insulation with 1x2-in. furring strips over each joist to receive finish floor. (Fig. 2.)

Method No. 3 (Two Layers, 52% of Sound Stopped)—Insulate with two layers of Balsam-Wool. The first layer shall be applied on the bottom of joists, as specified in Method No. 1, and the second layer shall be applied over the subfloor as specified in Method No. 2. (Fig. 3.)

Note: Methods 4, 5, 6 and 7 are used with false ceiling construction, as specified in the last paragraph under "Floor Sound Insulation—General."

Method No. 4 (One Layer, 75% of Sound Stopped)—Insulate with Balsam-Wool woven between the two sets of joists and secured to the bottom of each floor joist with laths or strips (or tin discs) nailed through the insulation. (Fig. 4.)

Method No. 5 (One Layer, 84% of Sound Stopped)—Insulate with Balsam-Wool applied on subfloor, as specified in Method No. 2. (Fig. 5.)

Method No. 6 (Two Layers, 86% of Sound Stopped)—Insulate with two layers of Balsam-Wool. The first layer shall be applied over subfloor, as specified in Method No. 2, and the second layer shall be woven between the two sets of joists as specified in Method No. 4.

Note: Insulation applied on bottom of ceiling joists as in Method No. 1, in lieu of woven insulation, rates the same.

Method No. 7 (Three Layers, 88% of Sound Stopped)

—Insulate with three layers of Balsam-Wool. The first layer shall be woven between the two sets of joists as specified in Method No. 4; second layer shall be applied under joists as specified in Method No. 1; third layer shall be applied over subfloor as specified in Method No. 2.

Frame Wall Sound Insulation—General

Continuity of the sound deadening material shall be maintained—all joints shall be sealed.

Where floors and ceilings are insulated, as well as partition walls, insulate thoroughly between joist ends.

Where double partition (staggered stud) construction is used and sound deadening material or insulation is woven between the two sets of studding, insulating strips shall run horizontally at right angles to studs, with edge laps of at least $1\frac{1}{2}$ in. Tension on all strips shall be as nearly equal as possible to guard against open joints at edge laps.

Insulation strips applied on the face of studding shall run vertically in the same direction as the studs.

Use full length strips of insulation. End joints, where necessary, shall be butted and covered with lath nailed through insulation to stud or header.

Where specified, there shall be built double partition walls of staggered stud construction, each set of studs set on 16-in. centers, the one set of studs centering between the others. On the same side of the partition there shall be at least $1\frac{1}{2}$ in. from the face of one set of studs to the face of the other where woven insulation is used.

Frame Wall Sound Insulation—Methods

(Methods herein specified are from low to high, in the order of their effectiveness.)

Method No. 1 (One Layer, 28% of Sound Stopped)—Insulate with Balsam-Wool applied on one face of studding only, edges butted together on every other stud. Fur over insulation with 1x2-in. furring strips on each stud to receive lath and plaster. (Fig. 6.)

Method No. 2 (Two Layers, 48% of Sound Stopped)—Insulate with two layers of Balsam-Wool applied on the two faces of studding, as specified in Method No. 1. (Fig. 7.)

Note: Methods 3, 4, 5 and 6 are used with double studding staggered construction, as specified in the last paragraph under "Wall Sound Insulation—General."

Method No. 3 (One Layer, 57% of Sound Stopped)—Insulate with Balsam-Wool woven between the two sets of studding and secured on the face of every stud of one set with laths or strips (or tin discs) nailed through insulation. (Fig. 8.)

Method No. 4 (One Layer, 66% of Sound Stopped)—Insulate with Balsam-Wool applied on the face of one set of studding, as specified in Method No. 1. (Fig. 9.)

Method No. 5 (Two Layers, 73% of Sound Stopped)—Insulate with two layers of Balsam-Wool applied on the face of each of the two sets of studding, as specified in Method No. 1. (Fig. 10.)

Method No. 6 (Three Layers, 77% of Sound Stopped)—Insulate with three layers of Balsam-Wool. One layer shall be woven between the two sets of studding as specified in Method No. 3, and one layer shall be applied on the faces of each of the two sets of studding, as specified in Method No. 1.

Tile Partition Wall Sound Insulation—General

Sound deadening material between double tile or gypsum block partition walls shall be $\frac{1}{2}$ or 1-in. thickness Balsam-Wool. Special care shall be taken that the edges are lapped and that the material be fastened securely to floors, walls and ceilings.

Tile Wall Sound Insulation—Method

Insulate with $\frac{1}{2}$ or 1-in. Balsam-Wool suspended vertically from top of first wall of double partition, edges to be lapped at least 2 in., with overlap of 3 to 4 in. at top, bottom and sides, overlap to be securely fastened with strips.

TEST RESULTS SHOWING RELATIVE SOUND DEADENING EFFICIENCY OF VARIOUS TYPES OF FLOORS INSULATED WITH BALSAM-WOOL

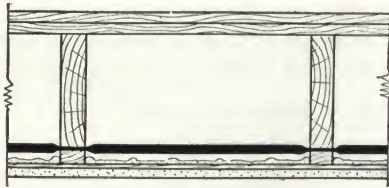


Fig. 1
Per cent of sound stopped, 15

Note: The amount of sound transmitted through a floor section constructed in the usual manner and without any insulation was taken as 100% sound transmission (or 0% sound stopped). The various types of floors insulated with Balsam-Wool were rated against this figure.
Solid black in Figs. 1 to 5 indicates Balsam-Wool.

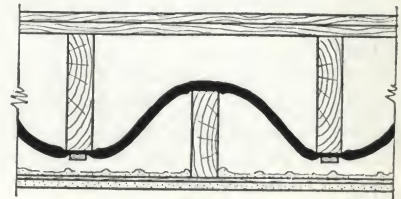


Fig. 4
Per cent of sound stopped, 75

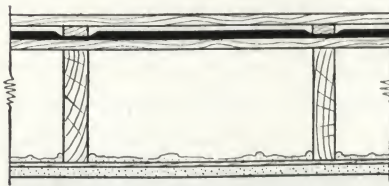


Fig. 2
Per cent of sound stopped, 43



Fig. 3
Per cent of sound stopped, 52

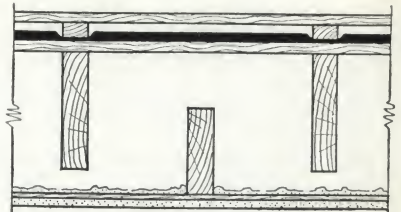


Fig. 5
Per cent of sound stopped, 84

TEST RESULTS SHOWING RELATIVE SOUND DEADENING EFFICIENCY OF VARIOUS TYPES OF WALLS INSULATED WITH BALSAM-WOOL

Note: The amount of sound transmitted through a wall section without any insulation, as illustrated, was taken as 100% sound transmission (or 0% sound stopped).

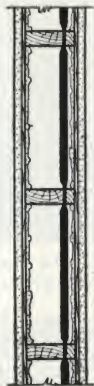


Fig. 6
Per cent of sound stopped, 28

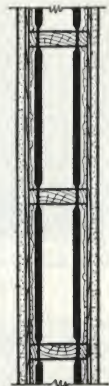


Fig. 7
Per cent of sound stopped, 48



Fig. 8
Per cent of sound stopped, 57



Fig. 9
Per cent of sound stopped, 66

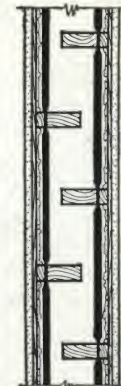


Fig. 10
Per cent of sound stopped, 73

Note: Solid black in Figs. 5 to 10 indicates Balsam-Wool insulation.

SOUND INSULATION OF FLOORS AND WALLS

TABLE OF COEFFICIENTS OF HEAT TRANSMISSION FOR VARIOUS TYPES OF CONSTRUCTION PER DEGREE TEMPERATURE DIFFERENCE

Prepared by Prof. J. C. Peebles, Testing Engineer, Armour Institute

Construction	Uninsulated	Insulated	
		$\frac{1}{2}$ -in. Balsam-Wool	1-in. Balsam-Wool
Frame Walls:			
Clapboards, paper, sheathing, lath and plaster.....	.27	.15	.11
Brick veneer, paper, sheathing, lath and plaster.....	.25	.145	.11
Stucco, paper, sheathing, lath and plaster.....	.41	.145	.11
Masonry Walls:			
Brick 8 in. no furring strips.....	.38	.16	.128
Brick 8 in. with furring strips.....	.27	.16	.128
Brick 12 in. no furring strips.....	.29	.15	.12
Brick 12 in. with furring strips.....	.23	.15	.12
Brick 4 in., hollow tile 4 in., plaster.....	.24	.145	.11
Brick 4 in. hollow tile 8 in., plaster.....	.23	.135	.102
Ceiling and Partitions:			
Lath and plaster, no flooring.....	.49	.19	.14
Lath and plaster, single flooring.....	.34	.18	.13
Roofs:			
Wood shingles, sheathing.....	.32	.17	.125
Slate 1 in., roofing felts, sheathing.....	.44	.18	.13
Tile, roofing felt, sheathing.....	.50	.18	.13
Asphalt shingles, sheathing.....	.55	.20	.14
Asbestos shingles, sheathing.....	.55	.20	.14
Composition roofing, 1-in. boards.....	.44	.20	.14

UNIVERSAL GYPSUM & LIME CO.

Manufacturers of Insulex, a Gypsum Insulation

Conway Building
CHICAGO, ILL.

For Sales Offices, see page B1362

Product

INSULEX, the Gypsum Insulation.

For Wall Board, see page B1259; for Gypsum Plasters and Finishes, Partition Tile, and Stucco, see pages B1362-1364.

Insulex

Insulex is aerated or cellular gypsum, a fire-, vermin- and decay-proof insulation and sound deadener, employed on roofs, floors, sidewalls and ceilings of residences, commercial and industrial buildings, and for industrial uses such as pipe and boiler covering, etc. Insulex is used as a light weight fill for reducing dead load in structures.

Main Uses—Insulation against heat and cold. Sound deadener. Light weight fill for floors and roofs. Fireproofing. Industrial uses such as insulating coke ovens, bake ovens, enameling ovens, dryers, roofs of clay plants, lumber kilns, boilers, hot water tanks, high pressure steam pipes, pipe chases, outside water towers, underground heating mains, bakeries, constant temperature rooms, etc., fireproofing built in vaults, light structural steel and other uses suggested by those enumerated above.

Description—Insulex is aerated or cellular gypsum and is used for sound deadening and insulation against heat and cold. It is light in weight and its structure consists of millions of tiny dead air cells, each incased in a mineral wall of gypsum, itself of low conductivity. It comes in powdered form, put up in 80-lb. sacks. No. 12 Insulex is also put up in 40-lb. paper sacks. Each sack is marked with the trade-name "Insulex Gypsum Insulation" and full directions are given on each sack for mixing and application. Insulex, when mixed with water, expands $2\frac{1}{2}$ to 7 times, depending on kind and for purpose used. It sets in 20 to 30 minutes. Tiny confined dead air cells are formed by millions, creating a remarkable resistance to heat, cold and sound. Any desired thickness or shape can be installed.

Insulex is supplied to make different finished weights per cubic foot—12, 18, 24 and 30 lb. per cu. ft. being the usual standards. The numbers on the sack indicate the weight per cubic foot of the set material in place.

Advantages—Insulex is fire-, vermin- and decay-proof and does not disintegrate in any way with time or moisture. Composed entirely of mineral matter, it can not decay; being of a refractory nature, it cannot burn. Insulex is not of vegetable or animal origin, consequently will not harbor or attract vermin or rodents. These advantages, together with its ease and low cost of application, make Insulex attractive. Insulex does not require any skilled labor or expensive equipment to apply. It bonds perfectly with concrete and other structural materials. It can be installed in old as well as new buildings.

When poured in place, Insulex expands and flows easily into the smallest crevices and cracks and it clings tightly to all joists and studding, thus effectively sealing the structure from heat losses through uninsulated cracks.



The advantage of using Insulex as a floor fill, to enable the architect and engineer to reduce dead load in any structure, is given by the analysis of a typical panel below:

Fs structural steel = 16,000 lb.
Fs reinforcing steel = 18,000 lb.
Fc concrete = 700 lb.

Panel 21 ft. 10 in. by 23 ft.

Concrete rib construction, 12-in. joists with 2-in. top and 3-in. concrete fill floated to finish vs. concrete rib construction with 10-in. joists (allowable because of reduced load) 2-in. top $2\frac{1}{4}$ -in. Insulex Special Floor Fill and $\frac{3}{4}$ -in. cement finish.

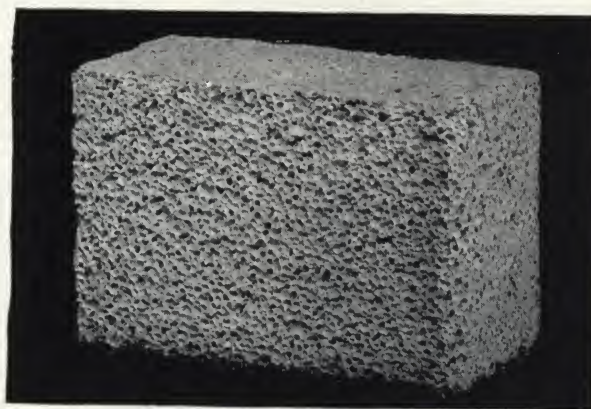
Concrete Fill 12-in. joists $12 \times 12 \times 5 \times 22 = 110$ cu. ft.

slab $\frac{5 \times 23 \times 22}{12} = 210$ cu. ft.
320 cu. ft. = 11.85 cu. yd.

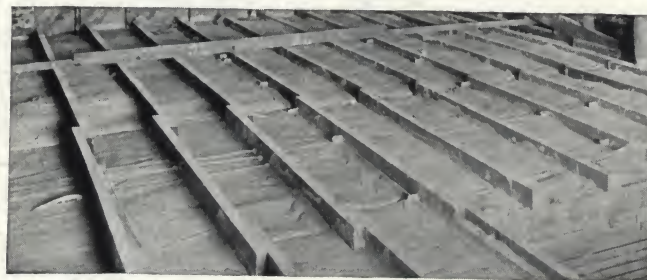
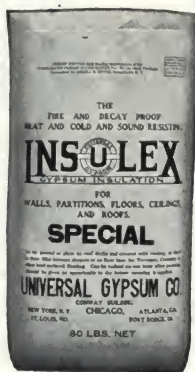
Insulex Fill 10-in. joists $\frac{12 \times 10 \times 5 \times 22}{12} = 91.6$ cu. ft.

slab $\frac{2.5 \times 23 \times 22}{12} = 105$ cu. ft. = 7.3 cu. yd.
196.6 cu. ft.

Total concrete saved 4.55 cu. yd.



Millions of Tiny Air Cells, Visible to the Eye, Make the Ideal Insulation Condition



Insulex No. 12 Application for Ceiling Insulation



Insulex Application Over Concrete or Wood Deck for Insulation or to Build Up Slopes and Saddles

Reinforcing Rods

Rods = $5/4 \times 22 \text{ ft.} = 28 \text{ ft.}$
Concrete fill = $2 \times 28 \times 2.04 \times 12 = 1370 \text{ lb.}$
Insulex fill = $28 \times (2.04 + 1.50) \times 12 = 1190 \text{ lb.}$
Total rods saved = 180 lb.

Structural Steel

$2 \times 70 \times 23$
Concrete fill = $\frac{2000}{2 \times 65 \times 23} = 1.61 \text{ tons}$
Insulex fill = $\frac{2000}{2000} = 1.49 \text{ tons}$

Total structural steel saved = .12 tons

Total saving per panel in using Insulex fill vs. concrete fill =

Cu. yd. of concrete = 4.55 cu. yd.
Pounds reinforcing rods = 180 lb.
Structural steel = .12 ton

Plus savings, made possible through a lower total design load, in columns, footings and pilings.

Tests—Insulex has been tested by the U. S. Bureau of Standards, Armour Institute and other recognized institutions. Below are given certain tests.

Standard concrete roof construction uninsulated and insulated with No. 24 Insulex with a 5-ply built-up-roofing included.

C = Conductivity air to air in B.t.u. per sq. ft. per hour per degree.

R = Thermal resistance to passage of heat per sq. ft. per hour per degree.

	No Insulation		Insulex 2 in.		Insulex 3 in.		Insulex 4 in.	
	C	R	C	R	C	R	C	R
CONCRETE								
2 in.	.553	1.81	.221	4.53	.170	5.89	.138	7.25
3 in.	.518	1.93	.215	4.65	.166	6.01	.136	7.37
4 in.	.488	2.05	.209	4.77	.163	6.13	.134	7.44
5 in.	.457	2.19	.203	4.91	.160	6.27	.131	7.63
6 in.	.437	2.29	.199	5.01	.157	6.37	.129	7.73
SOLID CEMENT TILE								
1 1/8 in.	.85	1.17	.280	3.88	.190	5.24	.151	6.59
1 3/8 in.	.568	1.76	.223	4.48	.171	5.84	.139	7.20
HOLLOW CEMENT TILE								
3 in.	.310	3.23	.167	5.95	.137	7.31	.115	8.69

We submit herewith results of tests conducted on slabs of different dimensions, made from No. 24 Insulex base and mortar (1 to 3) top covering. Slab was supported on steel plate and load applied as noted to top of mortar.

No.	Slab, in.	Thickness Insulex base, in.	Thickness mortar covering, in.	Load applied	Load, lb.	Failed
1	10x10	1 1/4	3/4	2x2 roller	2180	Slab broke
2	12x12	1 1/8	3/8	2 1/2 x 2 1/4 long	1400	Slab broke
3	8x 4 1/2	1 1/4	3/4	1x1	1100	Slab broke
4	14x14	2 3/8	3/8	1x1	2300	Punched hole in mortar

The results of these tests would indicate that No. 24 Insulex has ample strength to be used as a base for floors for office buildings or hospitals when a 3/4-in. cement mortar is used for a wearing surface.

The following results were obtained from test of Insulex designated No. 24. Mixed and cast 4x4x6 in. Tested two weeks later for compression. Compression measured by travel of head.

Load, lb.		Compression		Load, lb.		Compression	
Actual	Per sq. in.	Inches	Per inch	Actual	Per sq. in.	Inches	Per inch
80	5	0.003	0.0005	1600	100	0.0125	0.0021
112	7	0.004	0.0007	1760	110	0.013	0.0022
240	15	0.005	0.0008	2240	140	0.014	0.0023
320	20	0.006	0.0010	2560	160	0.015	0.0025
400	25	0.007	0.0012	3200	200	0.017	0.0028
640	40	0.008	0.0013	3600	228	0.018	0.0030
960	60	0.009	0.0015	4200	263	0.019	0.0032
1200	75	0.010	0.0016	4800	300	0.021	0.0035
1280	80	0.011	0.0018	5600	350	0.026	0.0043
1440	90	0.012	0.0020				

Specification Data

Roof Insulation—For roof insulation on top of wood or concrete flat roofs, Insulex No. 24 is recommended. Insulex should never be applied less than 2-in. thickness; thickness to be from 2 in. to thickness as conditions require.

Preparation of the Roof—Remove all loose material and rubbish from the roof surface. All drain connections should be set to proper grade and protected so that Insulex will not flow into and clog them. No priming or mopping of the roof deck is required. Stop all openings in roof deck before pouring Insulex, to prevent loss of material.

About 3 ft. from the parapet wall on one side of the roof, lay the first screed strip of the thickness the insulation is desired—the strip to extend across the roof. Mix and pour the Insulex according to the manufacturer's instructions printed on every bag, and screed to level with a short straightedge.

After the roof is covered in this manner, allow the Insulex to dry thoroughly and apply roofing.

Floors—For insulation, sound deadening, or for floor fill between concrete slabs and finished wood floors, or between rough wood floors and finished wood floors.

Preparation of the Floor—Remove all loose material and



Pouring Insulex for Floor Fill Over Rough Wood Floor or Over Tile or Concrete Arches

No grouting necessary around pipes or conduits



Screeding Insulex Floor Fill to Receive Hard Surfaced Flooring



Screeding Insulex Floor Fill Between Sleepers to Receive Finished Wood Flooring

Note Insulex fills all voids around sleepers

rubbish from floor. Stop all openings in floor before pouring Insulex, to prevent loss of material. Set proper leveled wood sleepers to receive finished wood floors. The sleepers will act as screeding strips for the Insulex. Mix in accordance with instructions printed on every bag and pour the Insulex in place between sleepers. Immediately after pouring, strike off with a straightedge, so notched that the surface of the Insulex will be about 1/4 in. below the top of the sleepers. Continue this process until the floor is covered. Allow Insulex to dry thoroughly, then cover with one layer of waterproof paper, lapped 3 in. before laying finished floor. **Important:** The rough floor must not be waterproofed or primed.

For hard surface flooring such as cement, terrazzo, art marble, tile, etc., the foregoing specifications will apply except that no sleepers are required. The cement, terrazzo, art marble, etc., top may be laid as soon as the Insulex has properly set.

Co-operative Service

We have standard drawings and specifications for the use of Insulex printed in looseleaf pamphlet form, suitable for filing or reference. We will gladly furnish these upon application. We also have a well equipped Engineering Staff who will be glad to go into the solution of your problem if it involves insulation, radiation, sound deadening or reduction in dead load.

UNITED STATES GYPSUM COMPANY

Thermofill, The Dry Fill Insulation

300 West Adams Street

CHICAGO, ILL.

For Sales Offices, see page B1359

Products

THERMOFILL, the Dry Fill Insulation.

For Acoustical Plaster, see page A19; for Structo-lite Cement, see pages A44-45; for Floor Voids, see page A114; for Reinforced Roof Tile and Monolithic Floors and Roofs, see pages A166-170; for Partition and Furring Tile, Beam and Column Covering, see pages A382-383; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Thermofill— The Dry Fill Insulation

Thermofill is a "fluffy" gypsum material which gives a high degree of heat, cold and sound insulation when employed in the walls, ceilings, floors and roofs of residences, apartments and commercial buildings.

The material is light in weight; clean and easy to handle; and is packed in 50-lb. paper sacks.

Method of Installation

Ease of installation is one of the many desirable features of Thermofill, The Dry Fill Insulation, and a feature that makes the use of the material practicable in buildings already built, as well as in new construction.

Thermofill is installed simply by pouring (dry) into the space that is to be insulated. The economy of this application is at once apparent.

In residences already built, or in new residences, a large reduction of heat loss in winter and a more comfortable interior in summer can be secured by pouring Thermofill (dry) between the floor joists in the attic, directly upon the ceilings of the top floor rooms.



Pouring Thermofill (Dry) Between Floor Joists in Attic Directly Upon Ceilings of Upstairs Rooms

Reduces heat loss in winter and insures cooler room temperature in summer



Leveling Thermofill with a Board Notched at the Ends to Allow Proper Clearance at the Bottom

2 in. is the minimum thickness recommended



If the Attic Is to Be Used, Nail Sheetrock to the Rafters as Shown and Fill the Space Behind with Thermofill

Complete details for Thermofill installation in other locations sent upon request.

Advantages

Thermofill provides an extremely high degree of heat, cold and sound insulation because of the form and composition of the material. Gypsum is an excellent natural insulator and this quality is increased many fold due to the myriads of confined air cells assured by the fluffy nature of the material and the method of installation. When installed between walls and between floors and ceilings, Thermofill prevents air circulation and the resulting passage of heat and sound.

Because it is made of gypsum.

Thermofill does not burn and it thus provides valuable protection to inflammable wood framework.

Thermofill, because of its mineral nature, can not decompose and it will not harbor vermin.

Because of its low initial cost and the saving in labor due to simplicity of application, Thermofill offers the builder a most economical as well as a most effective insulator.

Covering Capacity

The covering capacity is indicated in the following table:

Position of use	Per 50-lb. bag		Per ton	
	Sq. ft. 1-in. thick	Number cu. ft.	Sq. ft. 1-in. thick	Number cu. ft.
Walls.....	25	2	1000	83
Ceilings and floors.....	30	2½	1200	110

Thermofill is made in one weight only and is packed in 50-lb. paper bags with complete directions printed on back.

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Insulation of Residential,
Commercial and Industrial Buildings
135 Twenty-fourth Street, PITTSBURGH, PA.

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TACOMA, WASH.
TORONTO, ONT.
TULSA, OKLA.

Products

ARMSTRONG'S CORKBOARD for the Insulation of Walls and Roofs of residences, apartments, commercial and industrial buildings of all types.

For Cold Storage Insulating Materials and Machinery Isolation, see pages A208-209; for Linotile and Armstrong's Cork Tile, see pages B1508-1509; for Cork Bulletin Boards, see page C3329.

Armstrong's Corkboard

The increasing costs of domestic fuel as well as the growing appreciation of the comfort of a heatproof house have given a marked impetus to the use of insulating materials in residence and apartment construction. For this purpose no better material can be obtained than Armstrong's Corkboard. It combines all the good points of other insulating materials and eliminates the faults common to most of them. It is the most efficient practical insulation known and has been the accepted standard insulating material in cold storage construction for the past twenty years or more. There is nothing new or experimental about its use.

Description—Armstrong's Corkboard is composed entirely of cork. The cork is ground up, thoroughly sifted to remove all dust, dirt and fine particles and is then compressed in metal moulds and baked. The baking process liquefies the natural gum or resin of the cork. While in a liquid state this gum permeates the whole mass, coats each of the granules with a natural moisture-proof coating and cements them tightly together into a light, strong sheet of Armstrong's Corkboard.

Advantages—To be truly satisfactory, a house insulating material must be more than just a good non-conductor of heat. It should also be:

- (1) Nonabsorbent of, and unaffected by, moisture.



Nailing Armstrong's Corkboard to Inside Face of Studs.
Plaster Is Applied Directly to the Corkboard
without the Use of Lath

- (2) A fire retardant.
- (3) Structurally strong.
- (4) Easy to handle and erect.
- (5) Adequate thickness in a single layer.

Armstrong's Corkboard meets these requirements completely. It is nonabsorbent and has no capillarity like fibrous insulating materials. It is slow burning and does not smolder or carry fire. It has structural strength and stability. It is light and clean to handle and is easily cut, sawed and nailed. Its use eliminates wood or metal lath as plaster is applied directly to its surface.

Size and Thickness—Armstrong's Corkboard is made in boards 12x32 or 36 in., and in thicknesses from 1 to 3 in. The correct thickness to use depends entirely upon the structural and climatic conditions.

Methods of Construction—The ease with which Armstrong's Corkboard can be erected is one of the chief points in its favor. It can be put up just as readily as lumber in buildings of frame construction, or erected in portland cement mortar against brick, concrete, stone or hollow tile. It provides continuous insulation that is fire-safe, verminproof and moistureproof.

The details on the following page show how Armstrong's Corkboard is applied to the various types of residence construction. Against brick and hollow tile walls the corkboard is shown erected in portland cement mortar and in frame construction it is shown nailed to the studs, 16 in. on centers. Plaster is applied directly to the corkboard in either case without the use of lath. Other types of construction not shown here can also be used.

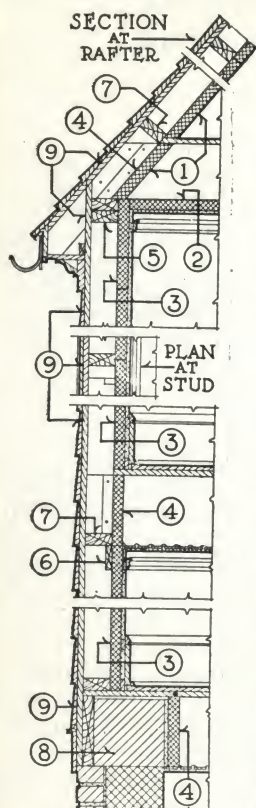
Specifications for the Insulation of Residences with Armstrong's Corkboard

Material—All insulation shall be Armstrong's Corkboard, 12 in. wide, 32 (or 36) in. long and 1½ or 2 in. thick, manufactured by ARMSTRONG CORK & INSULATION COMPANY, Pittsburgh, Pa.

Application—Masonry Walls—The inside surfaces of all walls to be insulated shall be properly cleaned and freed of loose bits of mortar, etc. Directly against these walls, Armstrong's Corkboard, 1½ in. thick, shall be erected in a ½-in. backing of portland cement mortar, mixed in the proportion of 1 part of portland cement to 2 parts of clean, sharp sand. All joints shall be made tight and vertical joints shall be broken.

Frame or Brick Veneer Walls—Armstrong's Corkboard, 1½ in. thick, shall be securely nailed to the studs with galvanized nails 2½ in. long. Nine nails shall be used for each sheet of corkboard. All joints shall be made tight and vertical joints shall be broken.

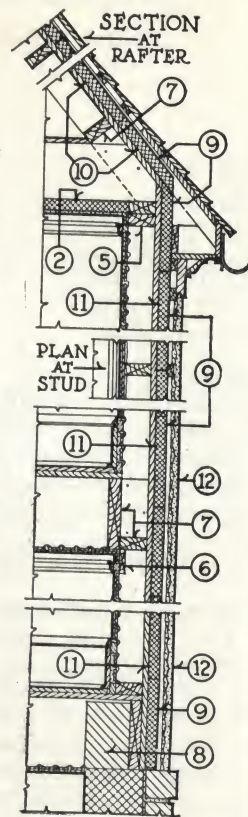
Stucco Finished Frame Walls—Armstrong's Corkboard, 1½ in. thick, shall be securely nailed to the sheathing with galvanized nails 2½ in. long. Nine nails shall be used for each sheet of corkboard. All joints shall be made tight and vertical joints shall be broken.



Corkboard Applied on Inside Face of Studs and Rafters

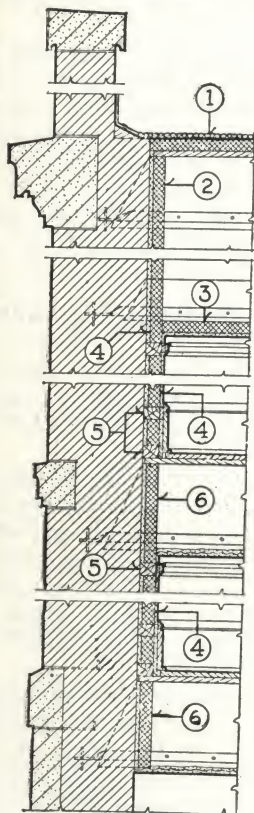
Frame Construction Details and Methods

- (1) Roof Insulation—*Armstrong's Corkboard* nailed to underside of rafters—plaster may be omitted in unfinished attic spaces. This insulation may be omitted if attic is unfinished and top story is insulated as at 2.
 - (2) Top Story Ceiling Insulation—*Armstrong's Corkboard* nailed to ceiling joists forming plaster base. This insulation may be omitted if roof and attic ceiling are insulated as at 1 and 10.
 - (3) Wall Insulation—*Armstrong's Corkboard* nailed to inside face of studs forming plaster base. Plaster grounds for interior wood trim are nailed through the corkboard with nails sufficiently long to penetrate 1 in. into studs.
 - (4) Corkboard cut in and fitted tight between joist and rafters to maintain continuity of insulation—vital points often neglected.
 - (5) Rafter plate.
 - (6) Ribbon.
 - (7) Fire stops.
 - (8) Masonry beam fill above basement wall—assists materially in reducing heat loss.
 - (9) Continuous sheet of waterproof building paper over sheathing, roof boarding and corkboard—prevents wind-driven air leakage. Flash thoroughly with paper around window and door openings.
 - (10) Roof Insulation—Corkboard nailed over roof boards. Tack a lath over each rafter (approximately 16 in. on centers) to the corkboard (over waterproof paper). Over the lath, nail 1x2 in. furring strips spaced to take the nails of wood shingles, slate or tile—the nails securing furring strips must be of sufficient length to pass through the lath and cork and penetrate into the roof boards 1 in. The lath prevents decay of furring strips. *This method is adapted to alteration work.* Omit roof insulation if attic is unfinished and top-story ceiling is insulated as at 2.
 - (11) Wall Insulation—*Armstrong's Corkboard* nailed over sheathing. *This method is adapted to alteration work.*
 - (12) Portland cement stucco on metal lath applied over furring. Furring strips, 1x2 in., are applied over corkboard and paper with nails sufficiently long to pass through the corkboard and penetrate the sheathing 1 in. Furring may be omitted and self-centering metal lath substituted, secured as specified for the furring strips. *Magnesite stucco may be applied directly to the corkboard surface.*
- Note: Window and door frames must be designed to fit the wall thicknesses imposed by the added thickness of the corkboard.*



Corkboard Applied on Outside Over Sheathing and Roof Boards

Masonry Construction Details and Methods

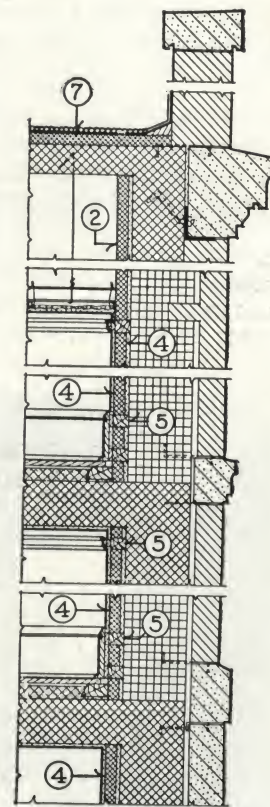


Wood Joist Construction

- (1) Roof Insulation—*Armstrong's Corkboard* nailed over roof boards. Any standard built-up roofing may be applied directly to the corkboard under the same specification as required over a concrete slab. This insulation may be omitted if top-story ceiling is insulated as at 3.
- (2) Attic or Roof Space Wall Insulation—*Armstrong's Corkboard* applied to masonry in a ½-in. backing of portland cement mortar. Required if roof is insulated—may be omitted if roof is not insulated and top-story ceiling is insulated as at 3. No plaster is required over the corkboard in unfinished portions of the building.
- (3) Top Story Ceiling Insulation—*Armstrong's Corkboard* nailed to ceiling joists forming plaster base. This insulation may be omitted if roof is insulated.
- (4) Wall Insulation—*Armstrong's Corkboard* applied to masonry in a ½-in. backing of portland cement mortar. The corkboard forms a plaster base.
- (5) Rough grounds secured to masonry with face flush with interior corkboard surface. These form nailing for plaster grounds to receive wood trim. Wood soldiers or blocks should not be built into exterior masonry walls to form nailing members. Rough grounds should be substantially and permanently secured to the masonry in any of the standard methods of attachment best adapted to the construction (expansion or toggle bolts, metal wall plugs, etc.).
- (6) Corkboard cut in and fitted tight between joists—vital points often neglected.
- (7) Roof Insulation—*Armstrong's Corkboard* applied over concrete slab in hot pitch or asphalt mopping. Finished roofing over corkboard applied as described in 1. (Corkboard may be applied in similar manner over any type of fireproof construction.)

Note: Use special care to maintain continuity of insulation at exterior window reveals and at doors.

Note: For fireproof pitched roofs covered with slate or tile, apply corkboard and roofing as at 10, assuming the same provisions for nailing of finished roofing as would exist were corkboard not installed.



Fireproof Construction

Typical Details and Methods of Installing Armstrong's Corkboard

Magnesite stucco shall be applied directly against the surface of the corkboard or portland cement stucco shall be applied over self-furring metal lath nailed through the corkboard to the sheathing.

Ceilings and Roofs—Armstrong's Corkboard, 2 in. thick, shall be securely nailed to the joists (or rafters) with galvanized nails 3 in. long. Nine nails shall be used for each sheet of corkboard. All joints shall be made tight and short joints shall be broken.

Interior Finish—The exposed surface of the corkboard shall be plastered in accordance with the plastering specification.

Samples and Literature

Samples of Armstrong's Corkboard Insulation and a filing folder, containing detailed information and complete specifications for the use of the material in residence construction, will be mailed on request.

Insulation of Roofs

Insulation of roofs of office, commercial and industrial buildings serves several important purposes. It conserves fuel in winter heating; keeps the upper floors cooler in summer and makes them more comfortable for employees and safer for the storage of goods that might be affected by excessive heat. It prevents condensation of moisture on underside of ceilings when there is excessive humidity. In textile and paper mills and other industrial plants where goods or machines might be harmed by drip from wet ceilings, roof insulation is absolutely essential.

Advantages—On most buildings, roof insulation should be placed on top of the slab with the roofing laid directly over it. It must be firm enough to afford a substantial base so that there is no danger of the roofing being broken when walked upon. However, since there is always a chance that from some other cause a break may occur in the roofing and permit the entrance of water, a roof insulating material must be non-absorbent of moisture.

In structural strength, moisture resistance, and in heat retarding value, Armstrong's Corkboard is a most efficient insulation for building roofs, as it is for cold storage work. When laid in hot asphalt and with the surface mopped with the same material, it is so completely moistureproof that it will not be permanently



Laying 1-in. Armstrong's Corkboard on the Roof of Weave Shed, Naumkeag Steam Cotton Co., Salem, Mass.

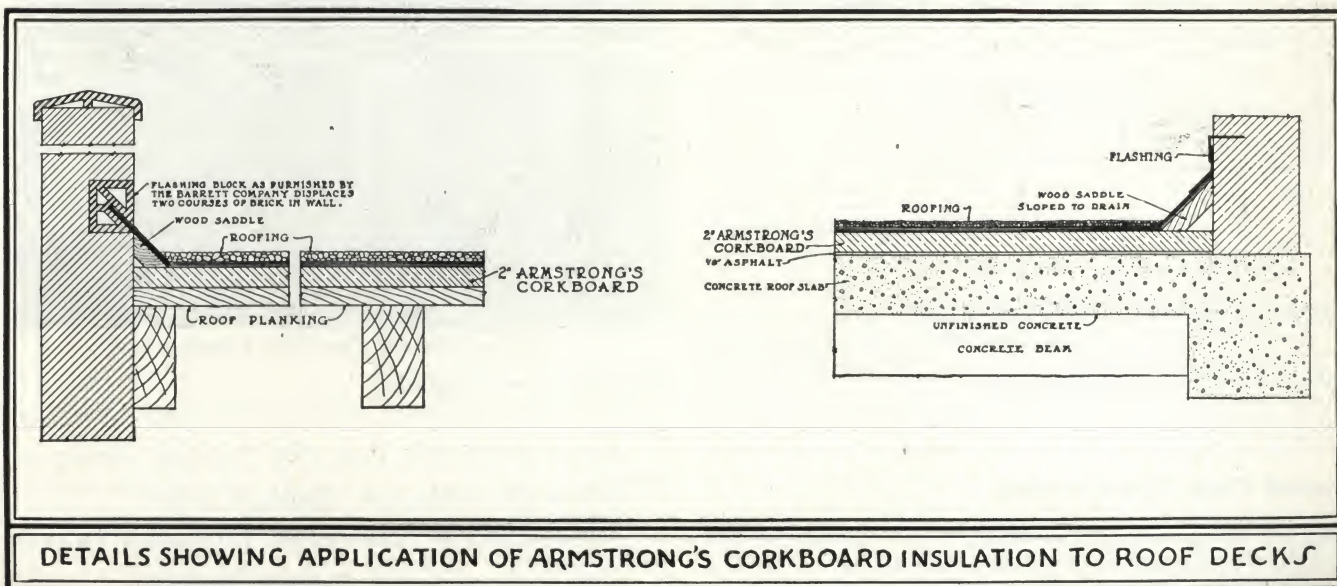
affected by any chance leaks in the roofing. Armstrong's Corkboard is nonabsorbent and it has no capillarity. Unlike some insulating materials which are often ruined by moisture in a few months, Armstrong's Corkboard is a permanent insulation and by far the most economical.

Sizes and Thicknesses—Armstrong's Corkboard comes in sheets, 12x36 in., 1 to 6 in. thick, and is easily and quickly laid. The proper thickness for insulating against heat or cold, or to prevent condensation can be determined only by an analysis of conditions in each case, such as outside and inside temperatures, humidity, etc.

Short Specification—The roof shall be insulated with Armstrong's Corkboard of the proper thickness applied in accordance with the standard specification of ARMSTRONG CORK & INSULATION COMPANY.

Further Information—The Engineering Department of this Company has collected considerable data on the subject of roof insulation and is prepared to furnish architects and engineers with specific and reliable information. Inquiries will receive prompt attention.

Publications—"Insulation of Roofs with Armstrong's Corkboard"; "Insulation of Roofs to Prevent Condensation."



CORK IMPORT CORPORATION

Pure Baked Corkboard, Cork Pipe Covering and Cork Tile
345-349 West 40th Street, NEW YORK, N. Y.

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Products and Service

NOVOID CORKBOARD INSULATION for all cold rooms, refrigerators and roof insulation; NOVOID CORK COVERING for refrigerated lines, tanks and drinking water systems; RUBBERCORK, a plastic insulation for all cold fittings; NOVOID CORK TILE for floors.

In our organization are experts whose many years of experience are at your disposal in connection with any insulation problems. Complete warehouse stocks of our products are carried at convenient points throughout the country. In addition, a minimum stock of 1,000,000 board feet of Novoid Corkboard is always ready for shipment from the port of Palamos, Spain.

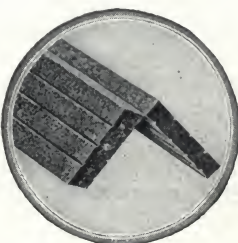
Novoid Corkboard

Made in Spain, home of cork, in the largest cork manufacturing plants in that country, Novoid Corkboard is a high grade product with maximum insulating value and structural qualities.

In the making of cork discs for crown caps, champagne and fine taper corks, cork lined summer helmets, cork specialties, cork paper for cigarette tips, etc., only the best grade of cork bark is used. The waste left over from their manufacture is necessarily of the finest quality, dry and clean. This cork waste is properly granulated in graduated sizes, compressed in moulds so that the granules are forced closely together, and then baked by a slow and careful process in special ovens. In the baking process their natural resin binds the cork granules into strong solid sheets having *no voids or air spaces between granules*. No foreign binder is used.

In a sheet of Novoid Corkboard the dead air spaces are confined entirely to the hermetically sealed microscopic air cells in the cork itself.

Novoid Corkboard is entirely free from hard-back and "green centers." Green or improperly baked centers are disastrous to any insulating job *after* the corkboard has been installed for some time. They cannot be detected by a surface inspection so, to guard against them, Novoid Corkboard is baked in special moulds 25x37 inches in size. After removing it from the mould, each sheet is split and then finished full standard 12x36 inches. As a result the center of each sheet is open to inspection by the purchaser and its high quality verified *before* it is installed. Corners and edges are cut true and square, insuring tight joints and reducing to a minimum the labor of erection.



NOVOID CORKBOARD

Thickness, in.	*Number of sheets	Bd. ft.	Bd. ft.	Cu. ft.	Gross wgt., lb.
Per carton					
1	24	72	72	6.37	65
1½	16	48	72	6.37	65
2	12	36	72	6.37	65
3	8	24	72	6.37	65
4	6	18	72	6.37	65

*Sheets are full standard 12x36 in.

Novoid Corkboard Roof Insulation

Used on roofs, Novoid Corkboard prevents the transmission of heat, making a building warmer in winter and cooler in summer, saving fuel and adding to the comfort of the occupants of the building. Standard roofings can be applied directly over Novoid Corkboard. It is proof against moisture and will retard fire. It can be laid on any kind of roof, old or new.

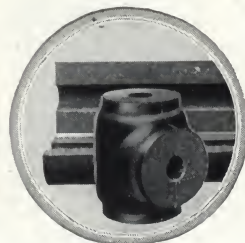
Novoid Cork Pipe Covering

A companion product to Novoid Corkboard. Made in three standard thicknesses: Heavy Brine, for temperatures below 0° F.; Brine, for temperatures from 0° F. to 25° F.; Ice Water, for temperatures above 25° F.

Novoid Cork Pipe Covering has many uses—for covering all brine and ammonia lines wherever used and for insulating the ice water lines of refrigerated drinking water systems in hotels, office buildings and factories. For covering tanks we recommend the use of Novoid Cork Lagging.

For covering all lines and fittings Novoid Cork Fitting Jackets are used.

These cork jackets are *moulded to fit* closely so that no air spaces will be left between the pipe and the insulation.



Rubbercork

A plastic insulation for covering all cold fittings. Can be used with Novoid Cork Covering in place of cork fitting jackets. Its use saves time and money on insulating jobs because no time is lost when changes in the plans make new fittings necessary. Can be used to replace damaged or broken fitting covers on existing lines.

Novoid Cork Tile

Novoid Cork Tile has many properties which recommend it as a flooring material. It is a non-conductor of heat, which means it is a warm floor. It wears well, giving years of service under unusually severe conditions, as in libraries or restaurants.

Novoid Cork Tile comes in three shades of brown and in several standard and special sizes. They can be harmoniously blended into an unlimited number of beautiful patterns, each attractive and pleasing.

A Novoid Cork Tile floor is an easy floor to walk on because of the natural resiliency of the cork. Quickly and easily laid. Easy to clean and keep looking new.

NOVOID CORK TILE

Standard sizes, in.		Special sizes, in.	
Squares	Strips	Squares	Strips
4x 4	18x3, 4, 6 and 12	3x3	18x9
6x 6	24x3, 4, 6 and 12	9x9	24x9
12x12	36x3, 4, 6 and 12		36x9



Typical Novoid Cork Tile Installation

Literature and Samples

Bulletin 271—Novoid Corkboard Insulation. Sample on request.

Bulletin 272—Novoid Cork Pipe Covering. Sample on request.

Bulletin 270—Rubbercork. Sample on request.

Bulletin 273—Novoid Cork Tile. Samples on request.

Bulletin 275—The Insulation of Refrigerated Drinking Water Lines.

Bulletin 276—Corkanstele Industrial Buildings.

ESTABLISHED 1865

L. MUNDET & SON, INC.

Manufacturers of Jointite Cork Products

461 Eighth Avenue
NEW YORK, N. Y.FACTORY
HILLSIDE, N. J.

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PIPE COVERING and MOULDED CORK FITTING
COVERS.Also Jointite Mastic Coated Cork Board, Jointite
Machinery Isolation Cork, Regranulated Cork Fine,
Regranulated Cork Coarse, Jointite Cork Tile Flooring,
Jointite Cork Bulletin Board, Granulated Cork Screened,
Granulated Cork Unscreened.

"Everything Made of Cork."

Pure Baked Cork Board**For Cold Storage Construction**—For packing
plants, ice plants, breweries, creameries, dairies, ice cream
factories, refrigeration, fur storage vaults and all other
requirements where maintenance of uniform tempera-
tures and conservation of refrigeration are important.**For House Insulation**—The successful use of pure
cork board for refrigeration insulation is ample proof of
perfection in insulating material. Refrigeration experi-
ence points the way to this proven insulator for the mod-
ern home.**Jointite Pure Baked Cork Board****Jointite Cork Board Meets United States Gov-
ernment Specifications**—The insulation requirements
of the United States Government are without a doubt the
most severe, as witness the following test specifications:"The weight of the cork board shall not be less than 8
pounds nor more than 12 pounds per cubic foot."Representative samples of the cork board shall be sub-
merged in boiling water at atmospheric pressure for three hours
without disintegrating. Immediately upon removal from the
boiling water the samples shall be measured for linear expansion
which shall not exceed two per cent in any direction."To this rigorous test requirement, Jointite Cork
Board conforms in every particular.**Pure Cork Sectional Pipe Covering and
Moulded Cork Fitting Covers**For ammonia, cold water, ice water, brine
and special cold lines.Pure cork covering is the only thoroughly satisfac-
tory covering for cold pipes of all kinds. Jointite cork
covering and Jointite moulded fitting covers are made
from pure granulated cork, compressed and moulded
to fit various sizes of pipe and fittings in ordi-
nary use.**Pure Cork Sectional Pipe Covering****Moulded Cork Fitting Covers**They are coated with Jointite mineral rubber compound,
ironed on at the factory. And, being applied to the
lines with waterproof cement on the joints, they
produce a positive Jointite insulation not affected by
moisture.Jointite pipe coverings and moulded covers for fit-
tings possess maximum insulating efficiency, durability,
neat appearance and ease of application.**Suggested Thickness for Sectional Pipe Cover-
ing and Moulded Fitting Covers—**

- (1) Approximately 1½-inch thickness for ice-water and
cold lines where temperature of 30° Fahrenheit and higher are
carried.
- (2) Standard brine covering, from 2 to 3-inch thickness, is
designed for ammonia and brine lines where temperature ranges
from 0° to 30° Fahrenheit.
- (3) Special thick covering from 3 to 4-inch thickness for
temperature below 0° Fahrenheit.

Mundet ServiceSatisfaction is a big word with a big meaning. To
our customers, both prospective and actual, we give an all
inclusive service which combines quality products, engi-
neering knowledge and construction skill.The construction department maintained by us is in
keeping with our high quality product. All insulation
work is therefore performed in the most approved and
workmanlike manner. To contractors or owners who
prefer to install the insulation themselves, we extend the
privilege of drawing on our knowledge and experience,
all in the interests of profitable insulation.Write for samples, prices, information or construc-
tion estimate to the Home Office.

UNITED CORK COMPANIES

Insulation Against Heat and Cold—Isolation Against Noise and Vibration

Grant Avenue, LYNDHURST, N. J.

SALES OFFICES

NEW YORK, N. Y., '0 Church Street
CHICAGO, ILL., 1151 Eddy Street
PHILADELPHIA, PA., 600 So. Delaware Avenue
BOSTON, MASS., 45 Commercial Wharf

CLEVELAND, OHIO, 1200 W. Ninth Street
PITTSBURGH, PA., 624 Bessemer Building
CINCINNATI, OHIO, Cincinnati Terminal
Warehouse Building

ATLANTA, GA., 402 Walton Building
BUFFALO, N. Y., 681 Ellicott Square
BALTIMORE, MD., 801 Whitaker Building
HARTFORD, CONN., 528 Capitol Building

MILWAUKEE, WIS., FEDERAL ASBESTOS & CORK INSULATION Co., Agent

Products and Service

CRESCENT 100% PURE CORKBOARD, GRANULATED and RE-GRANULATED CORK: for the insulation of cold storage and freezing rooms, tanks, roofs, residences, etc., also for soundproofing.

CRESCENT MACHINERY ISOLATION CORKBOARD, for eliminating vibrations and reducing noise of machinery.

CRESCENT CORK COVERING, for brine or ammonia pipe lines, ice or cold water lines, and special cold lines.

CRESCENT CORK LAGGING for cylindrical tanks. Designing, furnishing and installing cork insulation and isolation is our specialty. We have a staff of expert engineers and field erectors at every one of our sales offices.

For Cork Brick and Tile, and Cork Bulletin Boards, see page B1530.

Catalogues, Samples and Service

Catalogues and samples of any of our materials will gladly be sent on request to any one interested.

Branch offices in principal cities assure satisfactory service in the installation of any of our products.

Crescent 100% Pure Corkboard Insulation

Crescent Corkboard is 100% pure, screened, granulated cork compressed into moulds to the thickness desired and then baked for several hours at a moderate temperature. This process liquefies the natural waterproof gum of the cork, which acts as a binder and protects the cork from moisture. No other binder is used.

The heat conductivity of Crescent 100% Pure Corkboard averages 7 B.t.u. per sq. ft. per degree difference in temperature per 24 hours per inch thickness.

Crescent 100% Pure Corkboard is adaptable to all kinds of construction. It has great structural strength and makes a permanent insulator. It is impervious to moisture, will not warp, rot, mold or deteriorate in any way. Tested and officially approved by the National Board of Fire Underwriters.

Size of boards 12x36 in. from 1 to 4 in. thick. Weight .75 lb. per ft. board measure.

Send for our General Catalogue "Facts and Figures on Insulation."

Roof Insulation

The elimination of heat loss through roofs as well as the prevention of condensation on the underside of roof slabs is of utmost importance in practically every building erected. The roof of every office, commercial or industrial building should be insulated. The use of Crescent 100% Pure Corkboard for this purpose conserves fuel by eliminating heat loss; keeps the upper floors cooler in summer by preventing the penetration of the sun's intense heat; eliminates condensation of moisture on the underside of ceilings in plants when there is excessive humidity.

The proper thickness of corkboard to be used for the prevention of heat loss or the elimination of condensation can be determined only by an analysis of conditions in each case, such as inside and outside temperature, humidity, etc. The Engineering Department of the Company will gladly co-operate with architects and engineers in designing roof insulation to meet specific requirements. Inquiries will receive prompt attention.

Natural Granulated Cork

Natural granulated cork is furnished in two sizes, known as 8/20 C. S. and 12/20 C. S., meaning that they are sifted through screens of 8 or 12 meshes and over screens of 20 meshes to the inch.

Natural granulated cork is a superior filling because the cork is odorless, non absorbent, does not support combustion, is not subject to decay and has a very low heat conductivity.

Re-granulated Cork

This is a by-product obtained in the manufacture of corkboard. It is more waterproof and its insulation value is higher than that of granulated natural cork.



The grades generally used are known as "Fine," from dust up to $\frac{3}{8}$ -in. granules; "Coarse," from $\frac{1}{8}$ to $\frac{5}{8}$ -in. granules; and "Mixed," a combination of both. For general use the Fine or Mixed is recommended, but where dust would prove objectionable the Coarse is preferable.

It is mostly used for filling around tanks or where cork in board form would be unsuitable.

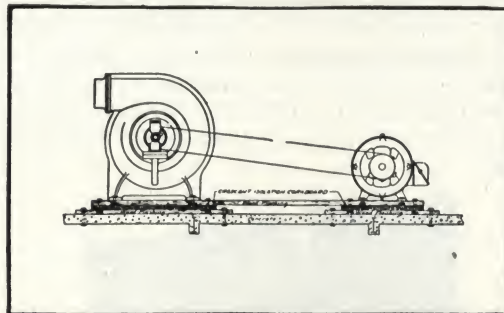
APPROXIMATE WEIGHT PER CUBIC FOOT OF GRANULATED AND RE-GRANULATED CORK

GRANULATED CORK		RE-GRANULATED CORK	
8/20 C.S. 13 lb.	12/20 C.S. 15 lb.	Fine and Mixed 7 lb.	Coarse 6½ lb.

Crescent Machinery Isolation Corkboard

Every moving piece of machinery sets up vibrations. In the average manufacturing plant it is also the principal source of noise. Vibrations and noise have proved to be a direct cause of fatigue, accidents, and carelessness. They diminish the efficiency and output of employees. Vibrations and noise should be eliminated whenever possible.

Pumps, fans, compressors, generators, motors, steam hammers, lathes, presses, etc., produce vibration noises that are transmitted to and frequently amplified by the foundations or floors upon which machines stand. They should be isolated from foundation or floor with a material capable of absorbing their vibrations.



Typical Machinery Isolation Installation

Crescent Machinery Isolation Corkboard, because of its natural elasticity and vibration absorption qualities, is the logical material for this purpose. Similar to Crescent 100% Pure Corkboard but more densely compressed, it consists of thousands of granules of cork. Each granule is a mass of small, sealed cells containing trapped air. Hence these sheets of Isolation Corkboard form a large air cushion that absorbs and breaks up the vibrations of the machines placed upon it. The structure of this material is very strong, and will support exceptionally heavy loads with negligible compression. It is moistureproof, easily installed and reasonable in price.

Crescent Cork Covering

Crescent Cork Covering is a most efficient and economical insulation for brine lines, ammonia lines, ice or cold water lines, and special cold lines of every kind. It is manufactured of pure, clean, granulated cork, compressed and moulded in sectional forms to fit the various sizes of pipe. The fitting covers are moulded to conform to the shape and size of the various fittings in ordinary use. It is finished with a coating of mineral rubber that provides a waterproof covering for all lines and fittings. The insulation is applied with waterproof cement on all joints, which further assures covering that is impervious to moisture.

Crescent Cork Covering Provides—(1) Maximum insulating efficiency. (2) Permanent and durable insulation. (3) Neat, clean and sanitary covering. (4) A saving of at least 80% of the refrigeration lost from bare pipes. (5) An easily applied covering at a moderate cost.

Thicknesses—Standard Brine thicknesses: 2 to 3 in. thick. Designed for brine and ammonia gas lines, and for lines where the refrigerant temperature ranges from 0° F. to 25° F.

Ice Water thickness: approximately 1½ in. thick. For drinking water lines, cold water lines, etc., where temperature of 25° F. and higher is carried.

Special Heavy Brine thickness: 3 to 4 in. thick. For lines where the temperature runs below 0° F.

Note: Covering of the proper thickness must be used to secure satisfactory results.

Crescent Cork Lagging for Cylindrical Tanks

Crescent Cork Lagging and Discs beveled to any desired radius without finish, coated one side, or coated both sides with mineral rubber finish, are furnished for covering cylindrical brine tanks, ammonia accumulators, ice water tanks, filters, etc.

Send for our literature giving detailed weights, list prices, etc., and for samples if desired.

WICANDER & CO., INC.

Manufacturers and Importers of Pure Corkboard and Corkwood

271 Madison Avenue, NEW YORK, N. Y.

BRANCH OFFICES

DETROIT, MICH., General Motors Building

LOS ANGELES, CAL., 214 East 3rd Street
CHICAGO, ILL.

ST. LOUIS, MO., Syndicate Trust Building

Wicander's "Thrubake" Corkboard

It is especially adapted for heat and cold insulation for all temperatures below 400° F. It is a solid insulator of constant high quality; can be readily sawed and handled like wood; odorless, not hygroscopic.

Uses—Chiefly used in the construction of refrigerated rooms, ice boxes, ice cream cabinets, freezing tanks; for insulating the roofs and walls of dwellings, commercial and industrial buildings. Also suitable for soundproofing, isolating noise and vibration from motors, engines and other machinery.

Wicander Organization

Established in 1868, this company operates its own corkboard factories in Spain, Sweden and Latvia, as well as cork product factories at Stockholm, Gotenburg and Helsingborg, Sweden; Helsingfors and Abo, Finland; Seixal, Sines and Vendas Novas, Portugal; Algeciras, Spain; Djidjelli, Algier; Odessa, Russia; Warsaw, Poland; Libua, Latvia; and at Hamburg, Germany.

Large stocks for immediate delivery are carried at New York, Boston, Buffalo, Chicago, Indianapolis, St. Louis, New Orleans, Denver, Los Angeles, San Francisco and other points.

Method of Manufacture

The by-product—cork waste—obtained in the production of bottle stoppers and other cork articles is carefully ground up in small particles of about 1/4 to 1/2 in. in size. The cork granules are so cut and mixed that a minimum of void spaces is created between the granules when confined in moulds. By grinding up cork into small



The Four Thicknesses of Corkboard

sharp granules, eliminating all hard pieces, a higher insulating quality is obtained.

The cork granules are placed into steel moulds, covered by a steel plate, the mould placed under a hydraulic press, pressure applied until the layer of material is 4 in. thick when the form is locked and passed slowly through baking oven at about 550° F. This causes the evaporation of water which cork as a vegetable product contains and causes the natural sap to exude. This sap acts as a binder cementing the cork particles securely together.

After the heat has penetrated the cork slab uniformly and all excess moisture has escaped, the color all through the 4-in. slab is chocolate brown, and when the thick slab after cooling is sawed up into thinner slabs, one cannot tell which side was exposed to the heat.

Insulating Quality

The high insulating effect of baked corkboard is due to the millions of small air cells within the cork, and to the absence of moisture. Tests made at the Bureau of Standards, Washington, D. C., and partly reproduced herewith show remarkably favorable values for Wicander corkboard.

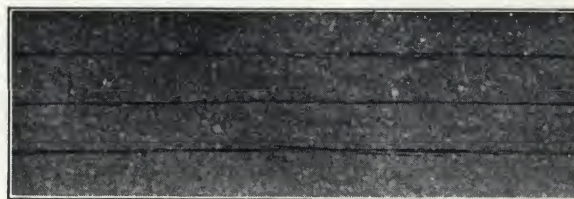
TABLE 1. INSULATING VALUE OF PURE CORKBOARD

Expressed in B.t.u. per 24 hr., per sq. ft. 1 in. thick, per deg. F., difference in temperature of faces of specimen. Tested by Hot Plate Method.

Weight, lb. per cu. ft.	Mean temperature of sample under test, deg. F.					
	104°	86°	68°	50°	32°	14°
9	7.20	7.03	6.88	6.72	6.58	6.41
7.6	6.77	6.60	6.46	6.29	6.14	5.98

Sizes and Packing Details

Wicander Corkboard is offered in dimensions of 12x36 in., either 1, 1 1/2, 2, 3 or 4 in. thick, which sizes have been used in the United States for many



Wicander Corkboard

years. To help preserve the square sawed edges, these slabs are neatly packed in cardboard containers.

In building and many other applications a larger slab is found particularly advantageous in eliminating much labor and reducing the number of joints. These slabs come in metric sizes, namely 1/2x1 metre, equivalent to 19 1/8x39 3/8 in., the thickness being 1, 1 1/2, 2, 3 and 4 in. These large metric slabs are packed in wooden crates. The complete details are given in the table below.

Engineering Service

Wicander Engineers will be glad to co-operate with architects and engineers in the solution of any problem in heat (or cold) insulation and isolation. Distributors maintaining construction crews are ready to deliver and to install corkboard at any point at lowest prices consistent with Wicander performance. Inquiries promptly attended to.

WICANDER CORKBOARD

Standard sizes—Packed in cardboard containers											Metric sizes—Packed in wooden crates										
Size of sheets			Number sheets in crate	Feet B.M.	Sq. ft.	Cardboard containers					Size of sheets			Number sheets in crate	Feet B.M.	Sq. ft.	Wooden crates				
Thick- ness, in.	Length, in.	Width, in.				Length, in.	Width, in.	Depth, in.	Cu. ft.	Gross wt. lb.	Thick- ness, in.	Length, in.	Width, in.				Length, in.	Width, in.	Depth, in.	Cu. ft.	Gross wt. lb.
1	36	12	24	72	72	36 1/4	24 1/4	12 1/4	6	60	1	39.37	19.68	40	215	215	42	42	22	17.91	194
1 1/2	36	12	16	72	48	36 1/4	24 1/4	12 1/4	6	60	1 1/2	39.37	19.68	28	225 3/4	150 1/2	42	42	23	18.81	204
2	36	12	12	72	36	36 1/4	24 1/4	12 1/4	6	60	2	39.37	19.68	20	215	107 1/2	42	42	22	17.91	194
3	36	12	8	72	24	36 1/4	24 1/4	12 1/4	6	60	3	39.37	19.68	14	225 3/4	75 3/4	42	42	23	18.81	204
4	36	12	6	72	18	36 1/4	24 1/4	12 1/4	6	60	4	39.37	19.68	10	215	53 3/4	42	42	22	17.91	194

ARMSTRONG CORK & INSULATION COMPANY

Manufacturers of and Contractors for Cold Storage and Cold Pipe Insulation

135 Twenty-fourth Street, PITTSBURGH, PA.

BRANCHES AND AGENTS

ALBANY, N. Y.
ATLANTA, GA.
BALTIMORE, MD.
BIRMINGHAM, ALA.
BOSTON, MASS.
BUFFALO, N. Y.
CHARLOTTE, N. C.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO

COLUMBUS, OHIO
DALLAS, TEX.
DENVER, COLO.
DETROIT, MICH.
GRAND RAPIDS, MICH.
HARTFORD, CONN.
HOUSTON, TEX.
INDIANAPOLIS, IND.
JACKSONVILLE, FLA.
KANSAS CITY, MO.

LOS ANGELES, CAL.
LOUISVILLE, KY.
MONTREAL, QUE.
MEMPHIS, TENN.
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MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.

PITTSBURGH, PA.
PORTLAND, ORE.
ROCHESTER, N. Y.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SPOKANE, WASH.
TACOMA, WASH.
TORONTO, ONT.
TULSA, OKLA.

Products

ARMSTRONG'S CORKBOARD for the insulation of cold storage, freezing and constant temperature rooms and tanks.

ARMSTRONG'S NONPAREIL CORK COVERING for brine, ammonia, refrigerated drinking water and all other low temperature pipe lines.

ARMSTRONG'S CORK MACHINERY ISOLATION for reducing the noise and vibration from fans, pumps, compressors, etc.

For House and Roof Insulation, see pages A201-203; for Linotile and Armstrong's Cork Tile, see pages B1508-1509; for Cork Bulletin Boards, see page C3329.

Armstrong's Corkboard

Armstrong's Corkboard is generally recognized as the standard insulation for cold storage and constant temperature rooms of all kinds. It is made of clean granulated cork, slightly compressed in sheets and baked in metal moulds at a moderate temperature. This process liquefies the natural waterproof gum or resin of the cork, which binds the mass firmly together and protects it against moisture.

Advantages—Containing no foreign substances and consisting only of pure cork, the heat conductivity of Armstrong's Corkboard is as low as any of the commercial insulating materials. Being cellular in structure, not fibrous, it is free from capillary attraction and will not absorb moisture. It is easy to install, and when erected properly, Armstrong's Corkboard is proof against mold, rot and vermin, and will not absorb or give off offensive odors or deteriorate in any way. Furthermore,



Erecting Armstrong's Corkboard Against Concrete Walls in Portland Cement Mortar

Armstrong's Corkboard is slow burning and does not smolder or carry fire. It has been tested and approved by the National Board of Fire Underwriters.

Armstrong's Corkboard is giving excellent satisfaction in thousands of plants employing refrigeration, situated throughout the civilized world.



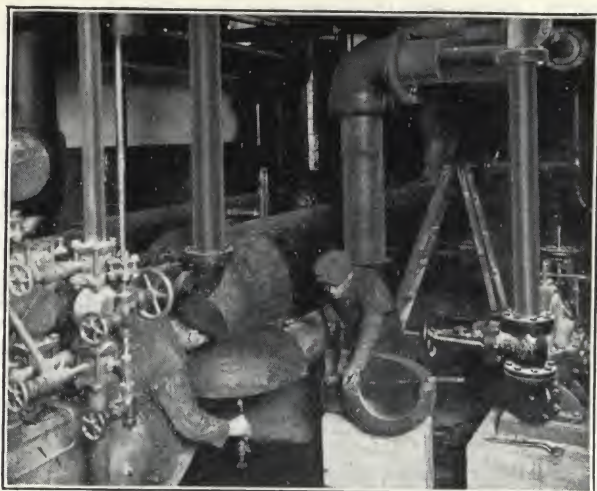
Cold Storage Room Insulated with 6 in. of Armstrong's Corkboard, Fisherman's Cooperative Sales & Cold Storage Co., Detroit, Mich.

Finish—Ordinarily Armstrong's Corkboard on walls and ceilings is finished with portland cement plaster applied directly to the exposed surface, but where moisture conditions are severe, Armstrong's Mastic Finish Corkboard should be used. This is standard Armstrong's Corkboard with a 1/8-in. coating of asphalt mastic ironed on at the factory.

Catalogues and Samples—The Company publishes a number of booklets on the various applications of Armstrong's Corkboard containing complete information, specifications, etc. Any of these publications will be cheerfully supplied on request together with samples.

Armstrong's Nonpareil Cork Covering

Armstrong's Cork Covering is a most efficient, durable and economical insulation for brine, ammonia and ice water lines and for cold pipes and tanks generally. Its efficiency is due in a large measure to the peculiar characteristics of its sole ingredient, cork. Like Armstrong's Corkboard, Armstrong's Cork Covering consists of granules of pure cork compressed and baked in moulds at a moderate temperature. The natural gum of the cork, liquefied by the heat, cements the particles firmly together and coating each granule with a shellac-like film, renders it practically impervious to moisture. The covering is



Applying Armstrong's Cork Covering and Lagging at the Plant of J. Butler & Co., Long Island City, N. Y.

then coated, inside and out, with a mineral rubber finish ironed on. As a result Armstrong's Cork Covering is protected internally and externally against deterioration due to moisture absorption and the penetration of frost. When properly applied and the joints sealed with waterproof cement, Armstrong's Cork Covering will last for years—longer than the pipes in many recorded instances.

Insulating Efficiency—The insulating efficiency of Armstrong's Cork Covering is due to the thousands of tiny sealed dead air cells which make up the structure of natural cork. This cellular construction so retards the transmission of heat that Armstrong's Cork Covering effects a saving of approximately 85% of the refrigeration which would be lost from bare pipes.

Forms and Sizes—Armstrong's Cork Covering is supplied in moulded covers for practically all standard, screwed and flanged fittings and in 36-in. split sections for straight pipe runs of the sizes ordinarily used. Armstrong's Cork Covering is made in three thicknesses:

- (1) Special Thick Brine—From 3 to 4 in. in thickness for lines carrying refrigerant below 0° F.
- (2) Brine Thickness—From 2 to 3 in. in thickness for lines carrying refrigerant between 0° F. and 25° F.
- (3) Ice Water Thickness—Approximately 1½ in. in thickness for refrigerated drinking water lines and others where temperatures are above 25° F.

Armstrong's Cork Covering is also furnished in the form of lagging for the larger sizes of pipes and fittings, beveled to the proper radius; and in any thickness up to 6 in. for the insulation of tanks and other cylindrical cold surfaces.

Samples and Literature—A 48-page book, "Non-pareil Cork Covering," contains complete information and specifications of inestimable value to all users of refrigeration. A copy of this book and a sample of the covering will be sent on request without charge or obligation.

Contracting Service

With a thoroughly trained construction force, the ARMSTRONG CORK & INSULATION COMPANY is prepared to handle complete contracts of any size for the erection of its products. Branch offices will co-operate with architects and engineers in solving insulation problems, entirely without charge or obligation.

Drinking Water Systems

The refrigerated drinking water system has, in recent years, become firmly established not only as a

modern convenience, but as a requisite of economy and efficiency in mills and factories, hotels, office buildings, and other public and semipublic buildings. Such a system delivers properly cooled water in exactly the quantity required, when and where wanted. It occupies little space, saves time and money, and is clean and sanitary, eliminating the waste and mussiness of the ordinary ice water tank or the bucket-and-dipper method. In manufacturing plants, particularly, the excellent results of the refrigerated drinking water system contribute in a very positive way to improve morale and efficiency, and to reduce labor turnover and time lost by sickness.

Armstrong's Cork Covering in ice water thickness is especially adapted for the insulation of the distributing lines and apparatus. It is neat in appearance, moisture-proof and fire retardant. Its high insulating efficiency insures a minimum use of refrigeration, and its durability is a guarantee of long life in service.

Booklet—A new publication, "Refrigerated Drinking Water for Mills, Public Buildings, Hotels and Office Buildings" contains valuable data on water, power and refrigeration requirements, approximate costs, etc. A copy will gladly be mailed on request.



Drinking Water Lines Insulated with Armstrong's Cork Covering, Canvas Finish, United Drug Co., St. Louis, Mo.

Armstrong's Cork Machinery Isolation

In hotels, apartment houses, hospitals and other buildings where quiet is imperative, measures must be taken to silence the operation of fans, blowers, pumps, compressors and similar machines. Such machines are generators of noise-producing vibrations which are transmitted and frequently amplified by the foundations and floors upon which they rest. To render their operation more quiet, therefore, they should be isolated from the foundation or floor by a material capable of absorbing the vibrations produced.

Armstrong's Cork Machinery Isolation, a material made of cork granules moulded in board form under pressure and then baked, is ideally suited for this purpose. The innumerable cells of the cork composing it form a large air cushion which effectively breaks up and absorbs the greater part of the vibrations from the machine under which it is placed. Armstrong's Cork Machinery Isolation is structurally strong and does not settle or harden but retains its elasticity indefinitely. It is impervious to moisture, easy to install and reasonable in price.

Bulletin—A bulletin giving detailed information about this material, including compression tests, methods of application, etc., will be mailed on request.

THE PHILIP CAREY COMPANY

Manufacturers of Heat Insulation

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

PIPE COVERINGS and INSULATION.

Also Insulating and Refractory Cements, and Miscellaneous Asbestos Products of all kinds.

For Waterproofing and Dampproofing Materials, see pages A56-57; for Built-up Roofing, see pages A400-403; for Asbestos Shingles, see page A415; for Asphalt Shingles, see page A421; for Flooring, see page B1537.



Carey Carocel Covering (Heating Systems)

Consists of alternate layers of fine corrugated and flat sheets of asbestos paper. Furnished in standard 36-in. long sections, canvas jacketed with bands for applying for all pipe sizes. Specifically designed to give maximum insulating value on low and medium temperature steam pipes. Better adapted than any other type of covering for temperatures ranging from hot water up to 35 lb. steam pressure.

This covering is very firm with smooth cylindrical surface, making it very desirable for exposed heating system pipes. It has 8 layers of corrugations per inch of thickness.

Technical Bulletin No. 102, furnished on request, shows comparative heat insulation values of Carocel and other insulations.

Carey 85% Magnesite Covering (High Pressure Steam)

Consists of, approximately, 85% basis hydrated carbonate of magnesite and, approximately, 15% asbestos fiber. Furnished in sections 3 ft. long, canvas covered, with metal bands, for sizes up to and including 10 in.; for larger sizes, segmental blocks are furnished. It is particularly adapted for use on high pressure steam pipes.

Standard size of blocks, 6x36 in.; thickness 7/8 to 4 in., inclusive.

Technical Bulletin No. 104, furnished on request, contains full data on heat transmission and efficiencies of Carey 85% Magnesite Pipe Covering in various thicknesses and for various pipe sizes.

Carey Impervo Covering (To Prevent Sweating)

Composed of layers of high grade insulating felt and constructed in 2 layers, each layer having a lining of waterproof felt and a jacket of waterproof felt.

Furnished in standard sections 36 in. long, finished with canvas jacket and bands for applying for all pipe sizes. Specifically designed for use on cold water and ice water lines to prevent sweating and to maintain the low temperature of the liquid. It should always be applied in double layers to break all seams and joints to prevent air reaching the pipe.

Carey Protecto Covering (To Prevent Freezing)

Consists of an inner layer of hair felt and an outer layer of wool felt.

Furnished in sections 36 in. long, finished with canvas jacket with bands for applying for all pipe sizes.

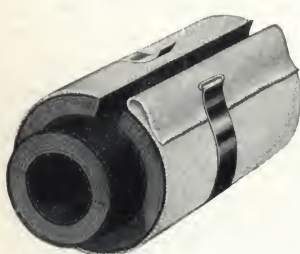
The insulating properties of these materials are well known and Protecto furnishes a combination resulting in high insulating value and neat appearance which is so often lacking when hair felt only is used.

Specifically designed to protect cold water and compressed air pipes from freezing.

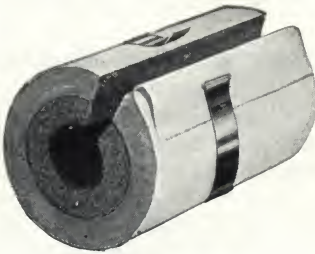
Specifications for Insulating Power Plants

Boilers—Cover all exposed boiler tops, combustion chambers and drums with Carey 85% Magnesite Blocks 2 in. thick, firmly wired on and finished with a 1/2-in. coat of Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

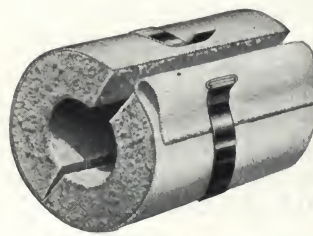
On connections from boiler to smokestack, apply V-rib



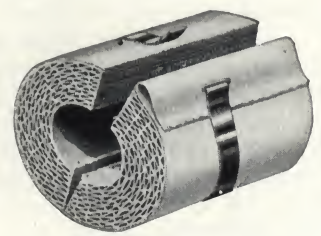
Carey Impervo



Carey Protecto



Carey 85% Magnesite



Carey Carocel

MONETARY LOSSES RESULTING FROM HORIZONTAL BARE STEAM PIPE

Gage Press.	Hot Water			10 Lbs.			80 Lbs.			120 Lbs.			160 Lbs.			200 Lbs.		
Temp.	180° F			239.4° F			324.0° F			350.0° F			370.7° F			387.9° F		
Pipe size	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.	Dollars loss	Pounds coal	B.T.U. per lineal ft. per ° F. diff. per hr.
1"	1.91	763	.878	3.26	1305	.973	5.72	2290	1.138	6.25	2601	1.178	7.27	2910	1.242	8.07	3230	1.280
2"	3.24	1297	1.491	5.36	2142	1.600	9.78	3910	1.943	11.37	4549	2.052	12.75	5100	2.145	14.00	5600	2.220
3"	4.56	1824	2.100	8.24	3292	2.460	13.88	5550	2.760	16.14	6450	2.910	18.04	7210	3.030	19.84	7945	3.150
4"	5.78	2305	2.650	9.87	3950	2.950	17.70	7075	3.520	25.50	8200	3.700	22.85	9145	3.842	25.15	10060	3.981
6"	8.20	3280	3.775	14.21	5680	4.240	25.30	10110	5.024	29.30	11720	5.295	32.80	13120	5.522	36.00	14420	5.715
8"	11.00	4398	5.050	18.25	7300	5.450	32.60	13030	6.455	37.65	15050	6.840	42.40	16940	7.125	46.05	18420	7.300
10"	12.68	4965	5.925	22.05	8820	6.584	40.20	16100	8.010	46.70	18690	8.440	52.30	20910	8.805	57.75	23100	9.150
12"	15.00	6000	6.995	26.44	10580	7.890	47.40	18950	9.425	55.40	22120	10.00	61.76	24700	10.40	70.00	28010	11.14
14"	16.60	6635	7.625	28.90	11560	8.620	52.00	20800	10.34	60.50	24200	10.92	67.50	27000	11.36	74.10	29670	11.76
16"	18.82	7525	8.650	32.80	13120	9.790	58.76	23500	11.70	68.40	27320	12.34	76.10	30410	12.80	84.25	33700	13.35

Note: In these tables, coal has been figured at \$4.00 per ton of 2000 lb.; 13,000 B.t.u. per lb. of coal; labor, boiler room expense, etc., taken at \$1.00 per ton, making total value of coal fired at \$5.00 per ton. Boiler efficiency taken at 70%. Air temperature 70° F. Experimental data obtained at the Mellon Institute.

expanded metal lath to provide an air space of, approximately, $\frac{3}{4}$ in. Then apply Carey 85% Magnesia Blocks, 2 in. thick firmly laced in place and covered with hexagonal wire mesh, stretched tight and finished with a $\frac{1}{2}$ -in. coat of Carey No. 100 Hard Finish Asbestos Cement.

Apply a thin coating of Carey B. T. U. Cement over entire exposed brick boiler wall surface. Use from 45 to 50 lb. of cement per 100 sq. ft. of surface. Then apply a 2-in. coat of Carey 85% Magnesia Cement reinforced with wire mesh fastened to brickwork and finish with a coat of Carey No. 100 Hard Finish Asbestos Cement.

High Pressure Steam Piping—Cover all high pressure saturated steam pipes, 4-in. diam. and larger, with double standard thick 85% Magnesia Pipe Covering. Cover all high pressure steam pipes under 4-in. diam. and all high pressure drip pipes with 2-in. Carey 85% Magnesia Pipe Covering.

For superheated steam pipes use combination of the first layer Carey Hi-Temp Covering and outer layer Carey 85% Magnesia Covering as recommended in detail in Bulletin 101—High Temperature Heat Insulation.

Exhaust Steam Piping—Cover all exhaust pipes and mains within buildings with 1 layer of $1\frac{1}{2}$ -in. Carocel Asbestos Sectional Pipe Covering.

Feed Water Piping—Cover all feed water pipes with 1 layer of 1-in. Carocel Asbestos Sectional Pipe Covering.

Fittings—Cover all high pressure and exhaust steam fittings, valves and flanges with Carey 85% Magnesia Blocks and 85% Magnesia Cement, or all 85% Magnesia Cement, to a thickness corresponding to covering on adjacent pipe. Trowel smooth and finish with canvas jacket pasted on.

Finish—Over all pipe covering, apply a 16-lb. asbestos paper and an extra 8-oz. canvas jacket, tightly stretched and sewed on, approximately, 3 stitches to the inch. All canvas surfaces are to be sized and finished with 2 coats of lead and oil paint of color to be selected by architect.

Heaters, Receivers, Tanks, Traps, etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of $1\frac{1}{2}$ in., or with 1-in. Carocel Blocks and $\frac{1}{2}$ -in. Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2-in. hexagonal

wire mesh, stretched tight, and apply Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

Finish with canvas jacket smoothly pasted on. Canvas jacket shall be of same weight as used on 85% Magnesia Pipe Coverings.

Specifications for Insulating Heating Systems

Boilers, Heaters, etc.—Cover all such appurtenances with Carey 85% Magnesia Blocks and Carey No. 100 Hard Finish Asbestos Cement to a minimum thickness of $1\frac{1}{2}$ in., or with 1-in. thick Carocel Blocks and $\frac{1}{2}$ in. thickness of Carey No. 100 Hard Finish Asbestos Cement. Wire blocks securely in place, cover with 2-in. hexagonal wire mesh, stretched tight, and finish with Carey No. 100 Hard Finish Asbestos Cement, troweled smooth.

Heating Pipes—Cover all mains, risers and returns (except horizontal radiator connections) with 1-in. thick Carocel Asbestos Sectional Pipe Covering.

Fittings—Cover all fittings and valves (except radiator valves) with asbestos cement approximately 1 in. thick, troweled smooth, and finish with canvas jacket smoothly pasted on. The canvas shall be the same weight as that used on the pipe covering.

Finish—All exposed canvas jackets shall be sized and painted with 2 coats of lead and oil paint of color selected by the architect. Pipe covering bands shall be applied on 18-in. centers.

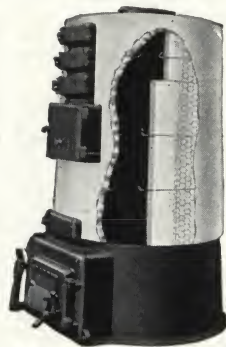
Specifications for Insulating Plumbing Systems

Hot Water Piping—Cover all hot water mains and piping with Carocel Asbestos Sectional Pipe Covering 1 in. thick.

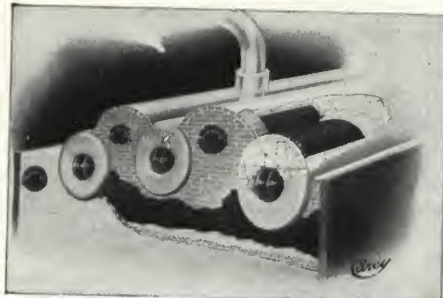
Cold Water Piping—Cover all cold water pipes within buildings, whether exposed or concealed, with Impervo Pipe Covering, in 2 layers, applied by the broken joint method, each layer being $\frac{1}{2}$ in. thick. Cover all cold water pipes in entrances, areaways, unheated rooms or otherwise exposed to freezing, with Protecto Pipe Covering 1 in. thick.

Ice Water Piping—Cover all ice water pipes, whether exposed or concealed, with Impervo Pipe Covering, in 2 layers, applied by the broken joint method, each layer being $\frac{3}{4}$ in. thick.

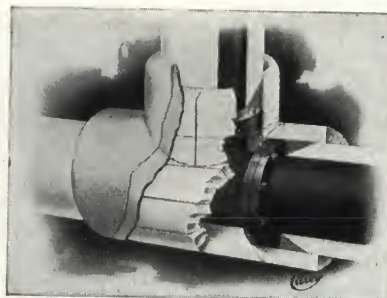
Finish—Same as for heating system.



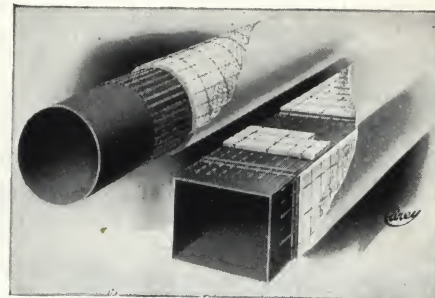
Method of Insulating Boilers, Heaters, Tanks, etc.



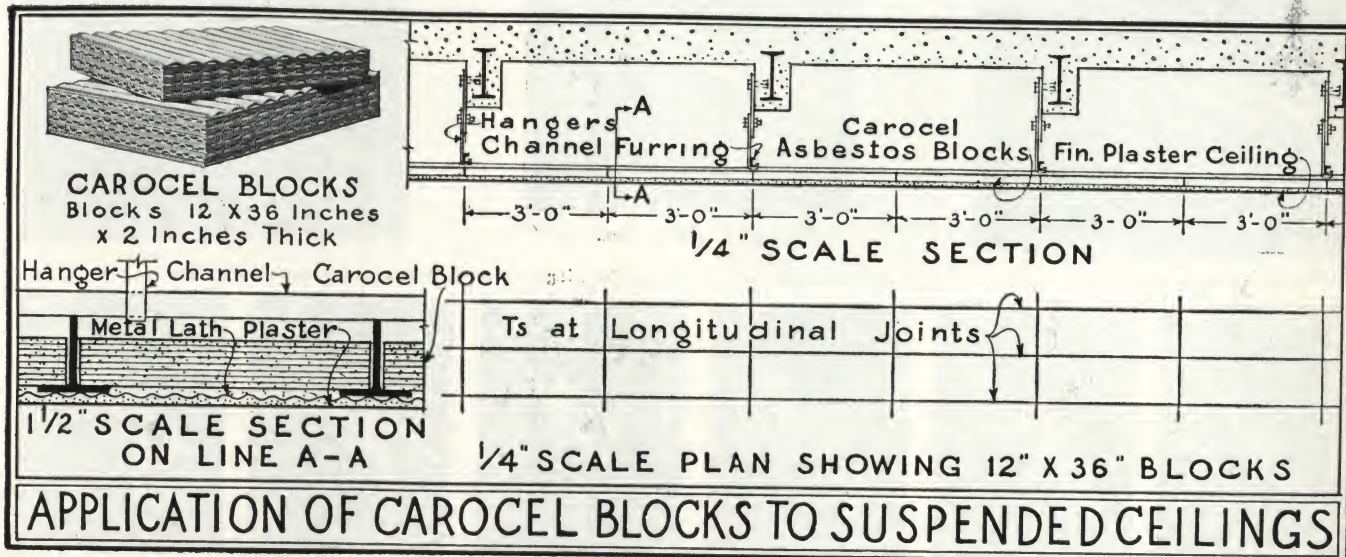
Method of Insulating Boiler Tops, Ends and Walls



Method of Insulating Fittings, Flanges, etc.



Methods of Insulating Boiler Breechings



ESTABLISHED 1910

THE RIC-WIL COMPANY

Underground Conduit Systems for Heating Pipes

Union Trust Building, CLEVELAND, OHIO

AGENTS IN PRINCIPAL CITIES

Products

RIC-WIL INTERLOCKING CONDUIT, INTERLOCKING BASE DRAIN, PIPE SUPPORTS and RIC-WIL UNDERGROUND PIPE COVERING used in the "RIC-WIL METHOD" of Insulating Underground Steam, Hot Water and Fuel Oil Pipes.

Ric-wiL Interlocking Conduit

Ric-wiL Conduit is first quality, standard weight, vitrified salt glazed tile of the bell and spigot type.

It is shipped on the job in full round sections and split into top and bottom halves as used. When installed, bell and special Loc-liP side joints are sealed with portland cement. Loc-liP joint (see illustrations below) is shaped so that cement locks top and bottom halves permanently together in all directions, giving conduit extraordinary rigidity and strength. Leakage is practically impossible. Top and bottom halves are interchangeable (foolproof) and numbered in pairs so that companion pieces may be kept together.

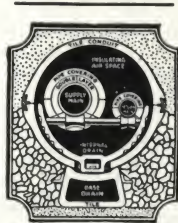
Sections are all in 2-ft. lengths, sizes from 4 to 24-in. inside diameter. Every sixth section of conduit has an opening in the bottom half through which a pipe support of the roller type projects to carry the steam, hot water or oil pipes, thus making the pipe supports independent of the conduit itself, a desirable feature for this class of work.

Ric-wiL Interlocking Base Drain

Ric-wiL Base Drain is first quality vitrified salt glazed tile of such design that it is both a base for supporting and lining up the conduit and drain for carrying away any water which might otherwise accumulate around the conduit. The base drain also provides two points of support for conduit, adding 35% to the ground load which the conduit will carry safely, as compared to the same conduit placed on flat ground or broken stone.

The top of the base drain has a slot in it into which the bell of conduit fits, making sections of conduit and base drain stagger with each other so that a strong interlocking construction results.

No concrete foundation is necessary in solid ground. Free drainage area of the base drain is large and ample for every practical condition. Three sizes are made: No. 1 for 4 and 6-in. conduit, No. 2 for 8 to 15-in. conduit, inclusive, and No. 3 for larger sizes. We will furnish ordinary drain tile instead of base drain, if desired, but the base drain will save more than its extra cost in labor, and makes a far better job.



Ric-wiL Pipe Supports

The pipe supports are planned to carry from one to five or more pipes and are ordinarily spaced 12 ft. apart. They are strong, made of cast iron, rustproofed, and interlock with the base drain, imposing no load on the conduit itself. Once in place, no movement of the pipes can disturb them.

Ric-wiL Conduit Systems for All Uses

Ric-wiL Conduit for underground pipe is of four types to meet varying service requirements.

Type SPC System—For steam heating and power pipes and for superheated steam. The tile itself is not lined with insulation as in Types DA and DF but the insulation is applied to pipes direct and consists of any standard make of sectional pipe covering, the kind and thickness depending upon the service to be rendered. Double drainage is provided in this type.

Type F System—For steam heating and power pipes. A lower priced type than the others, consisting of unlined Ric-wiL conduit with filler packed around the pipes. Filler is the same as described in Type DF System. Special water-proof filler can be furnished when specified.

Type DA System—For hot water, oil transmission and condensation returns. Tile and insulation in one, the latter moulded inside the tile and keyed in. Consists of a diatomaceous earth (Sil-O-Cel) mixture, light in weight and of high insulating quality; will not deteriorate. This type insulates the pipes from surrounding ground but not from each other, making it specially adapted to carry oil and steam pipes together for oil transmission. Exceptionally easy to install.

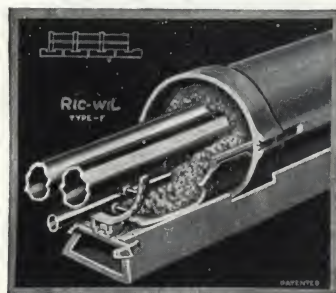
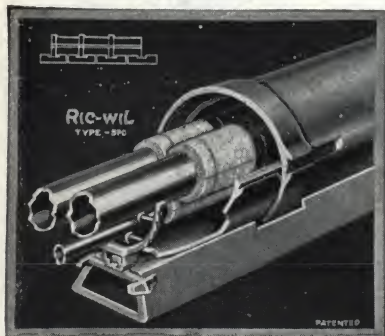
Type DF System—For steam heating and power pipes. This is Type DA with the addition of Ric-wiL Conduit Filler to be packed around the pipes at a density specified by the manufacturer. The filler is a good non-conductor which will not corrode the pipes nor shrink. Special water-proof filler can be furnished when specified.

Cast Iron Ric-wiL Conduit

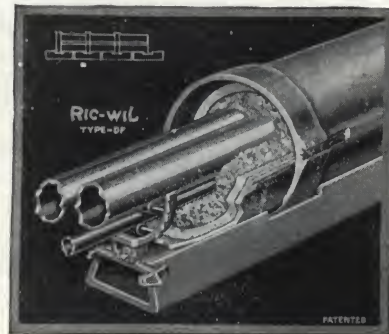
For extra heavy duty under railroads or other places where conduit is subject to very heavy load, Ric-wiL is made of cast iron similar in design to regular tile Ric-wiL. It has the Loc-liP Joint and "interlox" with regular conduit. Special heavy duty base drain is furnished.

Engineering Service

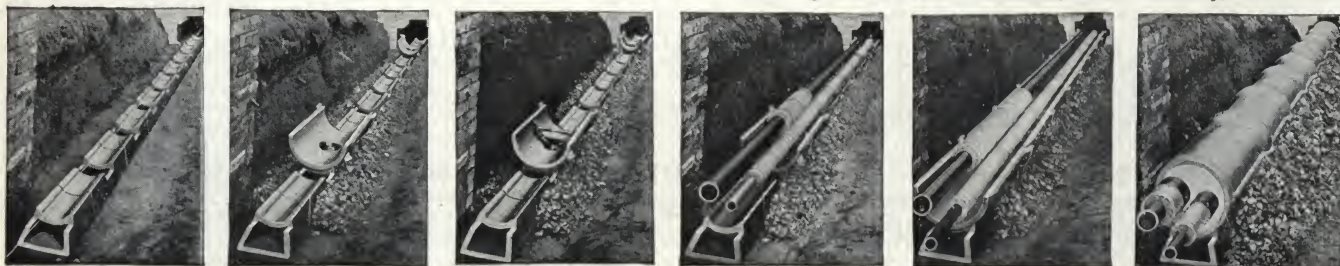
Maintained for the convenience of customers. Inquiries answered promptly. Catalogs and special information furnished on request.



Ric-wiL Conduit Systems



Below: Step by step as Ric-wiL is installed. Note how sound engineering has made for unusual speed and economy.



KEASBEY & MATTISON COMPANY

AMBLER, PA.

Miners of Chrysotile Asbestos and Manufacturers of Asbestos
and Magnesia Products

BRANCHES AND ENGINEERING DEPARTMENTS

BALTIMORE, MD.
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CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO

MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.

PHILADELPHIA, PA.
PITTSBURGH, PA.
WASHINGTON, D. C.

Products

"FEATHERWEIGHT" 85% MAGNESIA PIPE
and BOILER INSULATION.

AMBLER HIGH TEMPERATURE INSULA-
TION.

AMBLER SOUND ABSORBING PLASTER.
AMBLER ASBESTOS THEATER CURTAINS.
ASBESTOS AIR CELL COVERINGS and
BLOCKS.

Also manufacturers of Asbestos Textiles in variety.



"Featherweight" 85% Magnesia Coverings

"Featherweight" 85% Magnesia is the registered name of the product. It saves the most coal, because, being the lightest covering, it contains the largest percentage of air cells, making it the best non-conductor of heat and most economical 85% Magnesia covering manufactured in the United States or elsewhere.

As the original producers of 85% Magnesia pipe and boiler coverings, our long experience and our selective methods of manufacture assure both architect and engineer that when their specifications call for "Featherweight" 85% Magnesia Coverings the owner of the building for which they are specified will receive thoroughly durable coverings; most efficient as coal savers, because by their use the best results in heat conservation are obtained.

85% Magnesia coverings of our manufacture have been in service for a quarter of a century upon very high temperature superheated steam pipes and, upon removal, they show no change in the structure or character of the coverings.

We also manufacture the highest grade of air cell coverings, which are built of corrugated laminated sheets of chrysotile asbestos.

Consult our engineering departments on any insulation problem. Specifications furnished on request.

Ambler High Temperature Insulation

Ambler High Temperature Insulation has been found, through tests made at Massachusetts Institute of Technology, to have all the qualities required of an insulation for controlling the high temperature found in modern engineering practice.

Ambler Sound Absorbing Plaster

Description—This commodity combines wonderful properties of sound absorption with most meritorious structural qualities. It is sanitary, a fire-retardant, and has heat insulating qualities greater than asbestos board of equal thickness. It is furnished complete, ready for mixing with water, and is applied without special skill by the regular plastering contractor. *We claim it is the most practical plaster, for all wall and ceiling surfaces, that has been devised.*

Advantages—Ambler Sound Absorbing Plaster reduces excessive reverberation and the resulting confusion of sound in modern buildings. By its application to sufficient wall and ceiling surface, it produces those acceptable periods of reverberation productive of correct acoustical effects. A conservative value of the sound absorption of this plaster is 13 to 19%, depending upon the pitch; while the possibilities from careful mixing and application may be appreciated by recent tests made by the Massachusetts Institute of Technology, which found carefully prepared panels to have a sound absorbing value of 35%.

In addition, the finished surface in its natural color has an attractive texture, very desirable from an architectural standpoint.

Uses—Ambler Sound Absorbing Plaster is used in obtaining acceptable periods of reverberation in theaters, auditoriums, halls, churches, temples, schoolrooms, banking rooms, etc.

It is especially restful in hotels, apartments and hospitals.

It also decreases the sound intensity from a constant source in any room, particularly prevalent in offices, and reduces the fatigue caused by such noises.

Quantity Required—Ambler Sound Absorbing Plaster is applied in uniform $\frac{1}{4}$ -in. thickness. Making ample allowance for dropping, one ton will cover 80 sq. yd. The $\frac{1}{4}$ -in. coat weighs approximately 2 lb. per sq. ft. after drying.

Approved Specifications—Ambler Sound Absorbing Plaster shall be applied as a finishing coat $\frac{1}{4}$ -in. thick, on all surfaces specified and per

detailed specifications furnished by the manufacturer on request.

The sound absorbing plaster shall be applied upon a base of brown coat plaster, darbied to an even surface, so that the Ambler Sound Absorbing Plaster shall not vary materially from $\frac{1}{4}$ -in. thickness. After the plaster has been troweled to a fairly uniform surface, it shall be allowed to set until sufficiently dry and then floated, all final strokes to be in the same general direction.

All windows, skylights and other openings shall be covered during the application and drying of the Ambler Sound Absorbing Plaster, so as to insure uniform drying of the plastered surface.

Follow the directions for mixing and applying Ambler Sound Absorbing Plaster as issued by the manufacturers, KEASBEY & MATTISON COMPANY, Ambler, Pa.

Service—Write our nearest branch office or send plans, including data on interior surfaces and furnishings, and prompt analyses and recommendations for your requirements will be given. In this way correct acoustics can be pre-determined before final working drawings are completed.



Auction Room, Perishable Products Terminal,
Philadelphia, Pa.

Plastered with Ambler Sound Absorbing Plaster

Theater Curtains

Ambler Asbestos Theater Curtains are made of the highest grade asbestos cloth, specially woven for the particular requirements of strength, close texture, fire resistance, non-bagging, non-wrinkling and non-stretching. The Bureau of Standards has carried out extensive tests on fire resisting curtains and a copy of the report on that work will be furnished on request.

THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA

2121 Guarantee Title Building
CLEVELAND, OHIO

DISTRICT ORGANIZATIONS

BOSTON, MASS., 11 Beacon Street
CHICAGO, ILL., 228 North LaSalle Street
CLEVELAND, OHIO, 2124 Guarantee Title Building
DENVER, COLO., 1735 Stout Street
DETROIT, MICH., 400 U. S. Mortgage Trust Building
HARTFORD, CONN., 226 Pearl Street
NEW YORK, N. Y., 1716 Grand Central Terminal

NORFOLK, VA., 112 West Plume Street
PHILADELPHIA, PA., 121 North Broad Street
PITTSBURGH, PA., 702 First National Bank Building
PORTLAND, ORE., 908 Lewis Building
RALEIGH, N. C., 508 Commercial National Bank Building
SALT LAKE CITY, UTAH, 301 Atlas Block
SEATTLE, WASH., 913 Arctic Building

General Information

Herewith is presented the essential data and information about common brick which the architect or engineer should have at his command.

Common brick includes all types of burned clay or shale brick which have a natural surface, i.e., not spe-

BRICK
Forever

Building Brick Definition

Committee C-3 on brick of the American Society for Testing Materials have recently—June 1927—offered the following definition for the term "brick."

"Brick"—A structural unit formed while plastic into a rectangular prism, usually solid and $8 \times 3\frac{3}{4} \times 2\frac{1}{4}$ in. in size.



Common Brick Used in a Half Timbered House

EDSON GAGE, Architect

cially treated to produce certain surface effects. As is well known, common brick can be had in a wide variety of colors and surface textures, even in brick made in the same locality. The overburned "clinker" brick and the "culls," with both of which architects have accomplished such beautiful effects, are common brick.

Note—"The term 'brick' is understood to mean a unit of burned clay or shale. When other substances are used, such as lime and sand, cement and sand, fire clay, adobe, etc., the term 'brick' should be suitably qualified."

This definition, published as information to elicit suggestions and criticisms, agrees with that which the architectural profession has always understood and used.

Building Brick Classification

A new classification for building brick offered as tentative by Committee C-3 of the American Society for Testing Materials classifies building brick into three grades, A, B and C, depending mainly on their compressive strength.

Grade A includes those bricks having an average compressive strength (tested flatwise) of 4500 lb. per sq. in. or over; Grade B those having an average strength of 2500-4500 lb. per sq. in. and Grade C those having a compressive strength of 1250-2500 lb. Under the new specification absorption requirements are eliminated, since they do not accurately measure any desirable quality of building brick.

Strength of Solid Brick Work

A complete analysis of 454 laboratory tests of brick piers and walls made in this country from 1882 to 1926 shows that the average compressive strength of commercial brick masonry laid in cement or cement-lime mortar to be 1923 lb. per sq. in. and the average wall strength of brick masonry laid in lime mortar to be 1068 lb. per sq. in. The strength of individual brick ranged from a minimum of 1659 lb. per sq. in. to 18,337 lb. per sq. in. About 75% of all brick tested showed an average compressive strength of 3500 lb. per sq. in. or over.

The meaning of these abstract figures may be clearer if we consider them in a comparative sense. For example, most building codes require a minimum compressive strength for concrete block units of only 700 to 800 lb. per sq. in. The strength requirements for hollow tile and some other building units are slightly higher.

But the average strength of brick masonry, as developed in the tests mentioned above, is considerably higher than the strength of individual units required by most building codes. It is fair to say that there is no building material which builds into greater masonry strength than does common brick.

Strength of Brick Hollow Walls

The most comprehensive investigation on the strength of both solid and hollow walls has recently been concluded at the U. S. Bureau of Standards. Crushing tests on over 160 full-sized wall panels demonstrated quite conclusively that wall strength depends upon three principal factors—strength of individual brick, strength of the mortar and the character of workmanship.

The strength of solid walls was found to agree substantially with the average results stated above. The strength of hollow walls was found to average between 50% and 60% of the strength of solid walls of the same thickness, using the same materials and the same character of workmanship. The average of the hollow wall strengths ran from about 700 lb. per sq. in. to 1500 lb. per sq. in. for both 8 and 12-in. walls.

It would appear, therefore, that the strengths of hollow walls, as developed in this authoritative laboratory, are more than ample for any purpose for which hollow walls are recommended.

Fire Resistance of Brick Masonry

The recommendations of the National Board of Fire Underwriters, through the Underwriters' Laboratory, Inc., are as follows:

Walls (exterior and interior) and partitions built of common, hard-burned clay brick with cement or lime

and cement mortar, conforming in height, loading, and other limitations to requirements of the building code, recommended by the National Board of Fire Underwriters; of good average workmanship and quality of materials, and built according to good current practice are shown by tests conducted at the United States Bureau of Standards and at Underwriters' Laboratories, Inc., in accordance with the Standard Fire Test Specification to furnish protection against passage of flame and dangerous transmission of heat for the periods stated in the following classifications. The thickness here given as 12 in. is in some parts of the country designated as 13 in. These terms are to be considered as equivalent.

CLASSIFICATIONS

	Ratings
4-in. interior partitions. Non-bearing.....	1 hour
8-in. interior or exterior walls. Non-bearing, or bearing with incombustible structural members framed in.....	5 hours
Bearing, with combustible structural members framed in.....	2 hours
12-in. interior or exterior walls. Non-bearing or bearing. Not less than.....	9 hours
The foregoing classifications will usually be increased at least $\frac{1}{2}$ hour by the application of portland cement stucco or portland cement or gypsum plaster $\frac{3}{4}$ in. thick, to either side.	

The report of the Bureau of Standards' tests, too voluminous for inclusion here, is found in the Bureau of Standards Circular Letter No. 228. It contains much more data than given in the rating table above.

Thermal Resistance

Various authorities do not agree exactly on what is the actual resistance to heat transmission through any kind of masonry walls. The result of many investigations has shown, however, that both solid and hollow brick walls have very high thermal resistance. There is no form of construction having any higher, unless special insulation is incorporated. The heat loss from buildings through windows, doors and through the roof is at a very much higher rate than could possibly take place through brick walls. Attention to these points brings much greater returns than efforts to increase the thermal resistance of brick masonry.

Permanence

The very process of making brick produces an inherent quality of permanence. The clays and shales, which are the raw materials from which brick are made, have been purified and reduced by nature to a chemically stable compound or mixture, and the process of burning for many hours at high temperatures (about 2000° F.) produces a product which is as near indestructible as any building material can be. No building material surpasses brick in this respect.

There are no laboratory tests which can accurately measure the permanence of a building material, time alone can supply the test. Brick structures of all kinds standing in almost perfect condition after centuries of exposure are the best proof of the permanence of common brick.

The Artistry of Common Brick

The architectural profession is responsible for what might be termed the renaissance of common brick. The numerous combinations which are possible in bricks, bonds, mortar colors and patterns have been used with

advantage by architects to produce homes and other structures of singular beauty and charm.

Since common brick does come in such a variety of color tones and surface textures, these modern effects are possible. The modern trend is entirely away from the conventional geometrical aspect of the past to the more pleasing and almost animate beauties of the present.

Such modern beauty has been incorporated in some of the country's most costly and magnificent structures as well as in hundreds of modest homes.

Economical Construction

While good sound construction in solid brick walls is by no means expensive, methods of cost saving in residential construction are accomplished by the use of several practical systems of building brick hollow walls. The principal saving is in the quantity of brick required. The same exterior effects obtained with common brick by the variation of bonds, mortar joints, patterns and textures are obtained as easily with hollow as with solid wall for first class construction but hollow walls as the country's most prominent architects and is evidenced by thousands of attractive residences built within the past few years. Three methods of economical construction are briefly described herewith:

Ideal Walls—

The Ideal Wall is the general name used to describe all types of hollow walls built with standard common brick by placing some of the brick on edge. There are two general types of Ideal Walls, and only in the All-Rolok type does the exterior appearance of the Ideal Wall differ from the standard and traditional brickwork with which all architects are familiar.

Ideal Rolok-Bak Walls—This type of hollow wall is a general utility wall and may be employed not only for exposed walls but for unexposed walls and for basement construction. The exterior 4-in. thickness is of brick placed flat and the backing is laid of brick on edge. On the exterior, therefore, the brickwork has the usual appearance and may be faced in any bond desired. The wall may be 8 in. thick or in multiples of additional 4-in. thicknesses.

Ideal All-Rolok Walls—This type of hollow wall is interesting because of its low labor cost and minimum amount of material required. Its flat header courses and continuous stretcher courses are laid very rapidly. The wall may be built 8 in. thick and in multiples of 4-in. additional thicknesses.

Economy Walls—

This practical wall represents the lowest cost masonry construction. It is designed primarily for one and two-story houses. It is a 4-in. brick wall reinforced by pilasters and blanketed by back mortaring. At the right will be noted a comparison of the savings in material in each of the four types of brick wall construction now available to architects.

Common Brick Economy

Solid Brick Walls—

Nothing will ever take the place of the solid brick wall for first class construction but hollow walls as here described may be used where the solid wall has a great excess of strength. Economy in material is shown by the following comparison, taking the number of brick required for walls of a typical small house in each of the four types of construction as follows.

Solid walls of typical house require 25,130 brick.

Ideal Rolok-Bak Wall—

The use of this type of hollow wall construction represents a saving of approximately 20% in brick required as compared to solid brick walls.

Ideal Rolok-Bak walls for the same house require 20,696 brick.



Ideal Rolok-Bak Wall

Ideal All-Rolok Walls—

This type of hollow brick wall construction represents a saving of approximately 24% over solid walls.

Ideal All-Rolok walls for the same house require 17,739 brick.

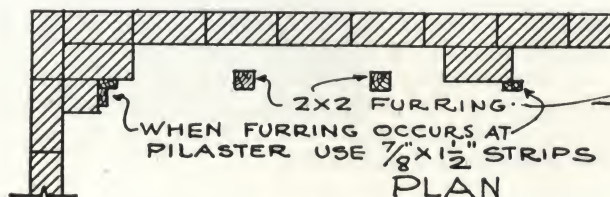


Ideal All-Rolok Wall

Economy Walls—

This newly developed type of 4-in. brick wall represents a saving of approximately 41% in the amount of brick as compared to 8-in. solid walls.

Economy walls for the same house require 14,783 brick.



Economy Wall

Complete Treatise—A complete treatise containing full directions for the construction of both Ideal and Economy Walls may be obtained from the COMMON BRICK MANUFACTURERS' ASSOCIATION.



Common Brick—Whitewashed
Photo by GILLIES

Skintled Brickwork

These forms of wall surfaces are produced by setting the brick roughly at different angles, projecting and recessing them beyond the wall line, and even permitting the squeezed mortar to remain in place as it happens to overlap the surface. Although this method does not necessarily increase costs, it produces a novel and pleasing charm of surface.

Some architects elect to cover brick walls with whitewash to produce the aged or flat white surface sometimes associated with certain styles of architecture.

A book containing illustrations and architectural details of various skintled brickwork effects, with exact instructions for building may be obtained by addressing the Association.

Common Brick for Garden Walls and Walls

Common brick used in garden walls and garden walks is making for itself a most enviable reputation. Common brick has a peculiar aptitude for blending harmoniously with its surroundings, with a mellowness and a variety of colors distinctively its own.

Common brick in the garden wall or walk will successfully resist the action of the elements indefinitely. Its permanent appearance may be counted upon. Weathering does not detract from its colorings, as the colors are burned-in and fadeless.

Publications

Books of the Association, which the architect should find useful, are listed below:

The Heart of the Home—Beautifully illustrated brick fireplace designs with complete directions for proper construction. 25 cents.

Skintled Brickwork—Photos and details showing how to obtain these interesting and attractive wall surfaces. 15 cents.

Brick—How to Build and Estimate—A complete manual of brick construction including important and useful data and tables of required material quantities. 25 cents.

Mortar—All the essential information about mixing and using all kinds of mortar. Free.

Reinforced Brick Storage Structures and Silos—Full information and data on these economical brick structures including complete construction directions. 15 cents.



Common Brick—Skintled
Photo by GILLIES

THE CARLYLE-LABOLD CO.

Manufacturers of Clatone Face Brick

PORTSMOUTH, OHIO

PLANTS: SCIOTOVILLE AND COAL GROVE, OHIO
(Both on Norfolk and Western Railway)

Clatone Face Brick

Clatone Face Brick in Buffs, Greys, Ironspots, Browns and Gun-metals.

Brickettes, size $8 \times 2\frac{1}{4} \times 1$ in Reds, Buffs, Greys and Ironspots.

Our Buffs are produced in our special Rough Texture and also in the Smooth. Greys and Ironspots are produced in Rough, Smooth and Matt Texture. Browns and Gun-metals are produced only in our regular texture brick.

We have a multitude of beautiful combinations of these shades which will satisfy the tastes of your most particular client.

See also our pages on Quarry Tiles.



Above: No. 500

A very uniform shade of Ivory Buff. This brick can be furnished in a very beautiful blend of Buffs, Pinks and Greys which makes a very attractive piece of brickwork. Smooth brick, the same shade as No. 500 can be furnished and is an excellent brick for both interior and exterior work.



Left: No. 90.

Smooth Manganese Grey is a very desirable brick for the larger type of construction, especially where it is desired to match or harmonize with limestone work on the building. Also produced in matt texture.

We also furnish a lighter shade of Natural Smooth Grey which can be furnished in straight or blended shades.

Below: No. 561

A beautiful blend of Light and Dark Rough Texture Ironspots. The different shades in this blend can be furnished separately. The same shades or blend of shades can also be furnished in matt and smooth texture. This brick is very desirable for most any type of exterior work.

Production Facilities

Our annual capacity of twenty-five million bricks assures you of satisfactory shipments and avoids delays in building construction. Our plants are centrally located for quick shipments to most any part of the United States and Canada east of the Rockies.

We distributed these bricks during 1926 into thirty-two states, Canada and Cuba. Authorized dealers in all principal cities. Inquiries sent direct to Portsmouth will be given immediate attention.



AMERICAN ENAMELED BRICK & TILE COMPANY

INCORPORATED 1893

Manufacturers of Enameled Brick

Dealers in Face Brick

TELEPHONES
LEXINGTON 1183, 1184, 1185

Graybar Building, 420 Lexington Avenue
NEW YORK, N. Y.

CABLE ADDRESS
"AMEREBRICK"

AGENTS IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Products

ENAMELED and PORCELAIN BRICK:
White, Mottled and Standard Colors in
Standard Sizes and Ornamental Shapes.
(See plates.) We are the largest manu-
facturers of this commodity in North and South America.

Territory

The business operations of this firm cover North and
South America, Europe, Asia and Australia.

Personal Representatives

For the convenience of our customers in the United States
and Canada, we have, in order to keep in closer touch with
them, located representatives in all the principal cities to attend
personally to inquiries, orders and deliveries.

Dispatch of Shipments

Factory and office are in constant telephone connection
with each other, and we have a local telephone exchange con-
necting every department of the factory for quick and sys-
tematic dispatch of business.

Shipping Facilities

Our works, located but an hour's travel from the New
York Office, are situated so as to enable shipping over two of
the largest railroads—the Pennsylvania and the Central of
New Jersey, and their connecting lines. We are also situated
on tide water, so that shipments can be made by vessel for the
coastwise and export trade.

Precaution Against Delay

Every part of our factory, including machinery, has its
duplicate, which prevents any possibility of delay caused by
breakdowns; should they occur.

Capacity

Our present capacity is 12,000,000 brick per annum, which
will be increased as occasioned by the demand.

Stock

The average stock on hand at our factory is more than
2,000,000 brick, giving a large assortment for immediate
shipment.

Illustrations of Stock Designs

Much delay is saved by use of stock design of moulded
brick. In the two following pages are shown designs that we
recommend as being most satisfactory in manufacturing re-
sults. We try to keep a stock of these on hand, in standard
colors. These designs are chosen to reduce manufacturing
difficulties and delays to a minimum; to enable composite
mouldings to be made up; and to enable prompt filling of orders.

*Send for plates and actual paper reproduction depicting
decorative possibilities of enameled brick.*

Details Required for Special Arch Brickwork

When ordering special arches, please consult the accom-
panying cuts and give all necessary information as to details.
Furnish details as far as possible in advance of the time the
arches will be required. We should be allowed from 4 to 6

TRADE **AM-EN** MARK

The Last Word in Enameled Brick

weeks' time to make up arch brick to
conform with detail. We keep no arches
in stock.

We can not always guarantee uni-
formity of shade in arches as in regular
deliveries of first quality plain stock brick, therefore strongly
recommend the use of stock specials for lintels of doors and
windows. (See study of window opening on second page
following.)

Colors—In Bright Enameled or Dull Porcelain Finish

In addition to our regular white and standard colors, such
as our sage green, red brown, black, etc., we have made a
specialty of mottles in the following colors:

Gray, brown, black, mixed gray and black, which give an
excellent appearance for both interior and exterior work, hav-
ing a finish more on the type of marble than enameled brick.

If you have in mind, at any time, a particular color, shade
or finish of enameled brick for interior or exterior purposes,
advise us of your ideas and requirements and we will be
pleased to submit samples.

Uniformity of Shade of Our Product

We guarantee uniformity of shade in all first quality
deliveries to the limit of practicability. Colors and effects
giving most uniform results are, in order of uniformity, white,
mottled gray, mottled brown, mottled black, sage green and
red brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders
if ample time be given, to match in shade the moulded and
stretcher stock, but can not always guarantee to uniformly
shade shipments of specials, particularly on rush shipments.

Special Features and Advantages

In making our product we follow the English and Scotch
systems, working by the soft mud process. This is without
question the only process which insures durability and the
closest relation of bond obtainable between body and glaze.

Our brick are burnt in but one fire, thus making the chem-
ical change in the body and the glaze simultaneous.

Where manufacturers use the dry pressed process, the
brick have to be burnt first as front brick before the enamel can
be applied, and fired again for the fluxing of the glaze.

We use hard and durable glazes, not soft lead glazes fre-
quently seen on inferior grades of enameled brick and tile.

There has not been a single case during our 35 years of busi-
ness where any peeling or discoloring has been seen or reported.

This is better than any guarantee which we might be asked
to give, as it covers a distributed output of over 140,000,000
brick, located all over the United States and elsewhere and
subject to all varieties of climatic conditions.

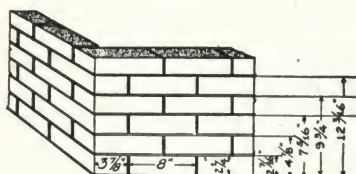
Cleaning

Enameled brick are best cleaned with some alkaline solu-
tion, such as caustic soda or sodium carbonate. This cleans
the enamel and does not affect the cement or lime mortar.

Acids

Sulphuric, nitric, or hydrochloric acids, even in concen-
trated form, will not affect our glazes; but if used as a wash,
even when diluted, they will attack the cement or lime mortar.

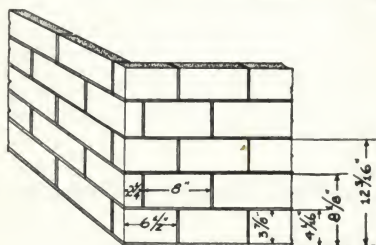
The only commercial acids which will attack and destroy
our enamel are hydrofluoric and hydrofluorsilicic.



STANDARD SIZE

APPROXIMATELY $7\frac{1}{2}$ STANDARD BRICK WITH $\frac{3}{16}$ " JOINT = 1 SQ. FOOT
5 BRICK AND 5 JOINTS LAY UP APPROXIMATELY $12\frac{3}{16}$ " IN HEIGHT

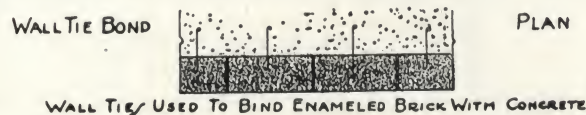
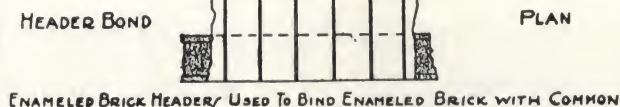
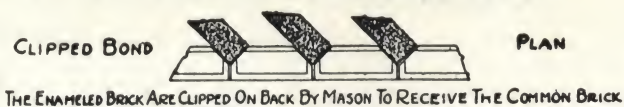
APPROXIMATELY $4\frac{1}{3}$ FLATTER BRICK WITH $\frac{3}{16}$ " JOINT = 1 SQ. FOOT
3 FLATTERS AND 3 JOINTS LAY UP APPROXIMATELY $12\frac{3}{16}$ " IN HEIGHT



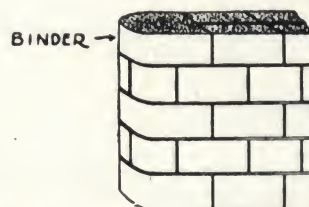
FLATTER SIZE

Comparison of Sizes Showing Number of Bricks Per Square Foot

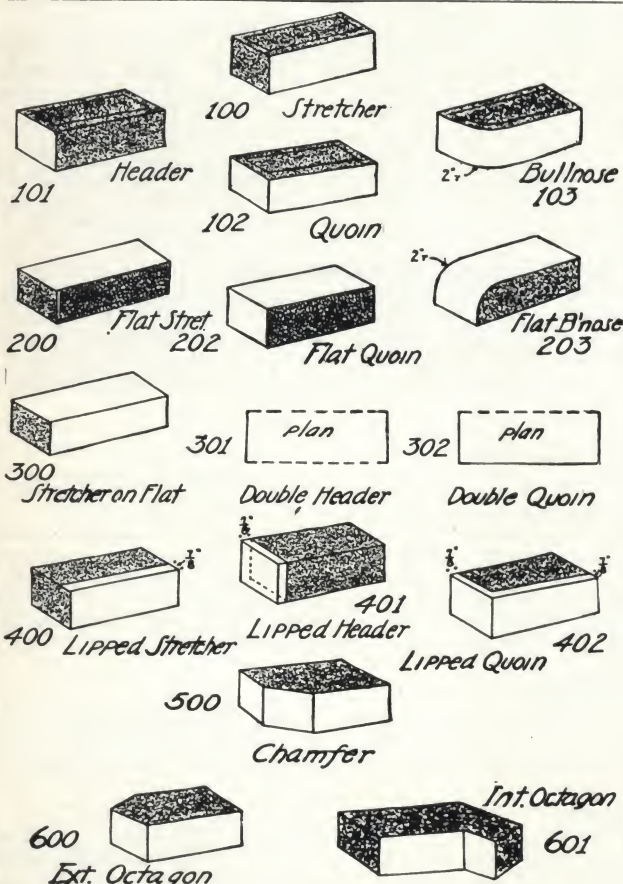
All dimensions are approximate



DOUBLE FACE FLATTER WALL

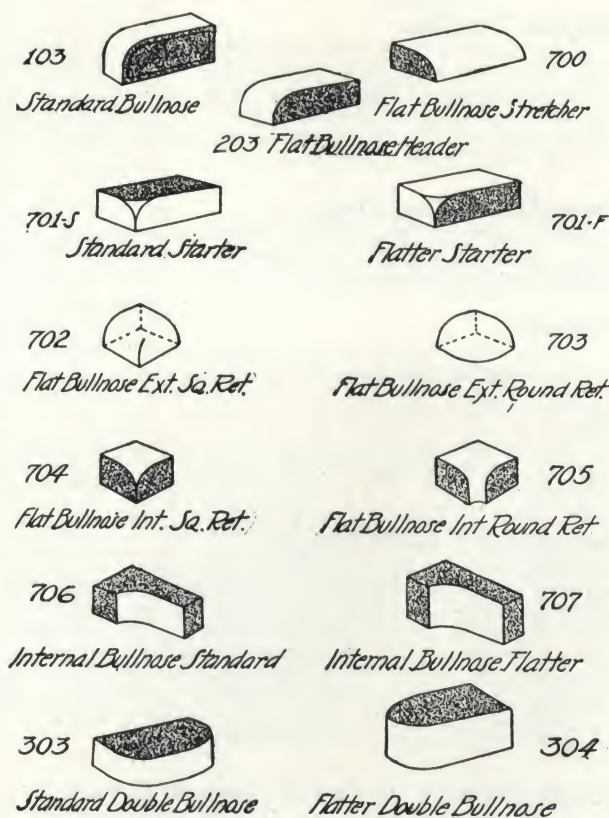


System of Bonding or Tying Enameled Brick to Common Brick or Concrete Backing, Also Method of Bonding Flatter Brick for Partitions



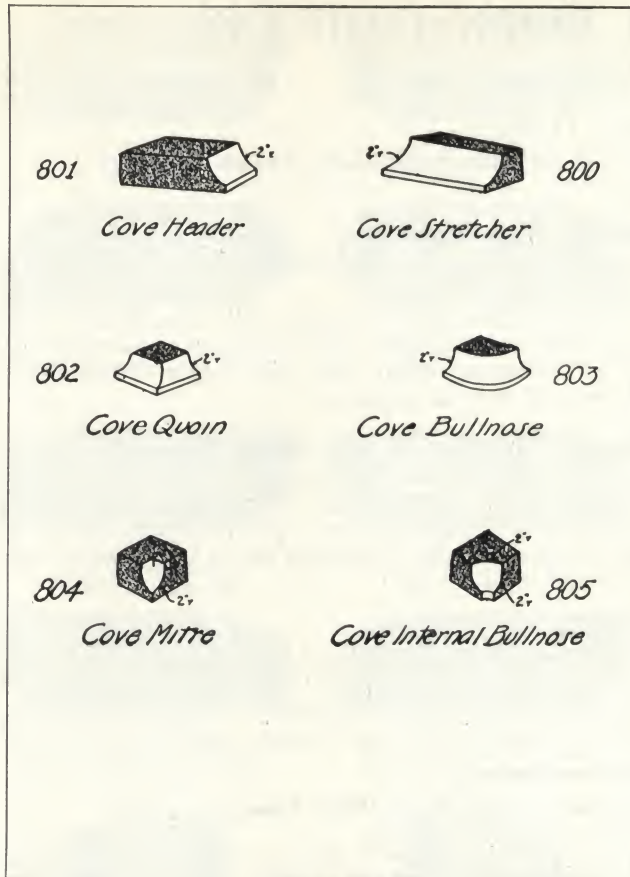
Illustrations of Types

For projection and dimensions see next page



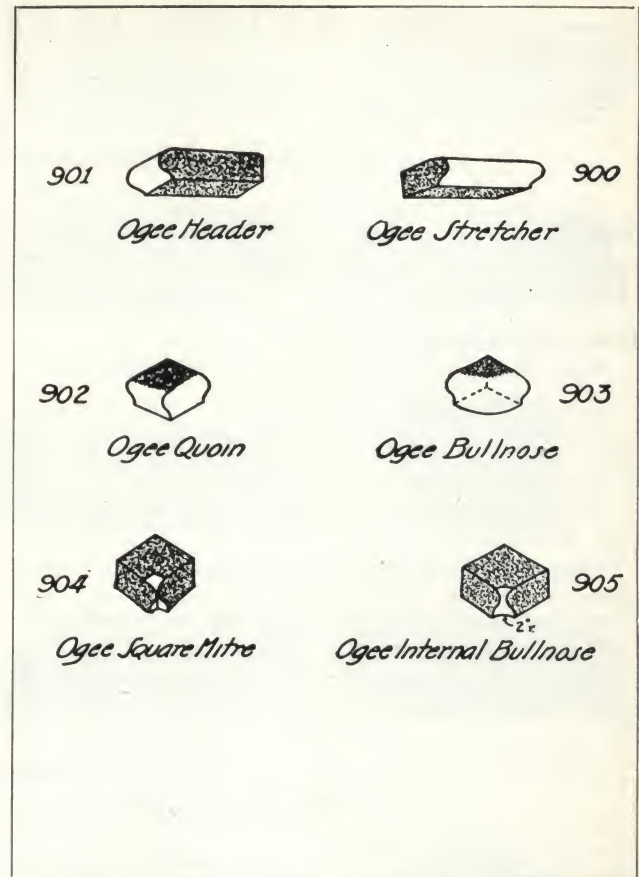
Bullnose Specials

For projection and dimensions see next page. All brick shown have 2-in. radius



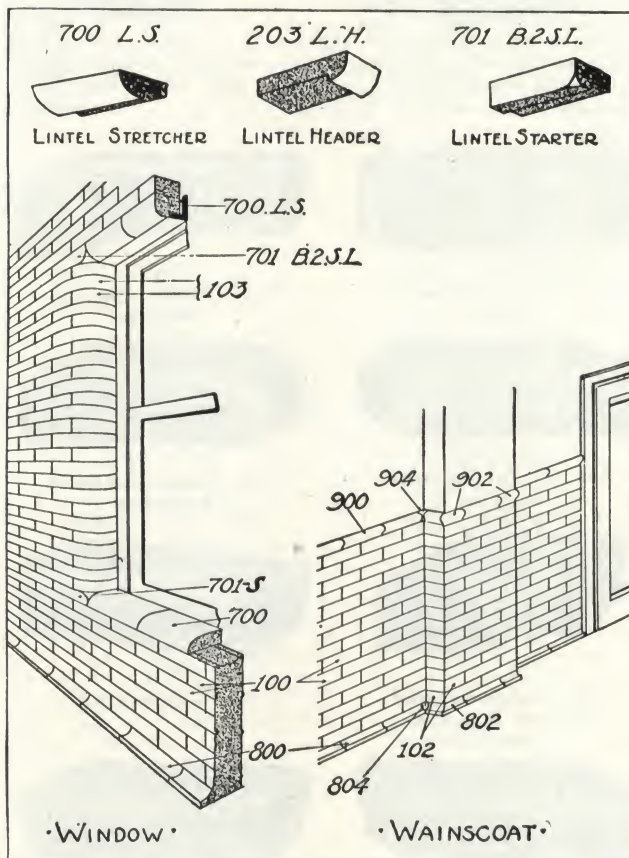
Cove Mould

For projection and dimensions see cut below



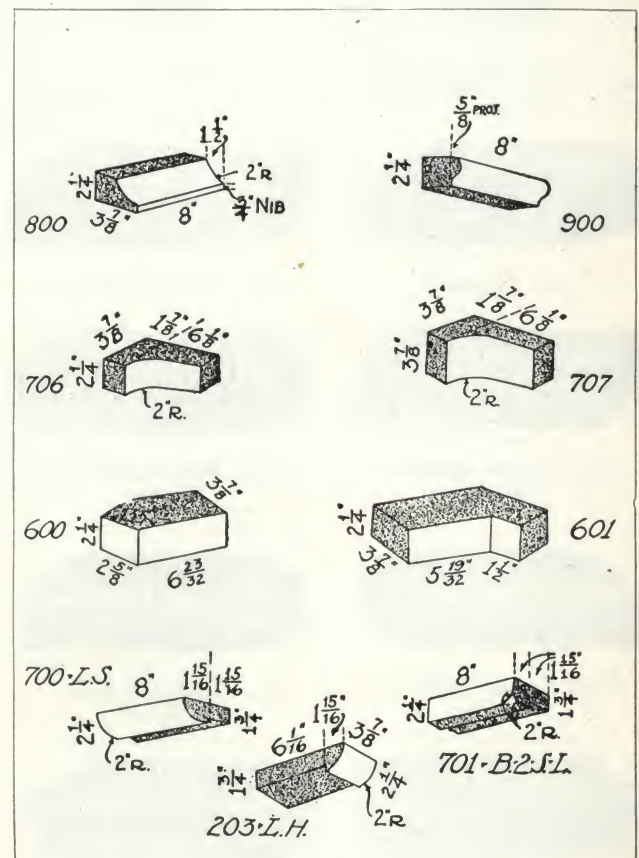
Ogee Mould

For projection and dimensions see cut below



Study of a Window Opening and of a Base and Cap Course

For projection and dimensions see next cut



Projection and Dimensions of Special Shapes

THE ATHENA GLAZED BRICK COMPANY

Manufacturers of Salt Glazed Brick

NELSONVILLE, OHIO

SALES AGENCIES IN ALL THE PRINCIPAL CITIES OF UNITED STATES AND CANADA

Products

ATHENA SALT GLAZED BRICK.
SANITARY FLOOR BRICK.

Athena Salt Glazed Brick

Size— $8 \times 2\frac{1}{4} \times 3\frac{7}{8}$ in.

Shade Numbers, etc.—Made in beautiful shades of mahogany (102), golden (104), buff (103), thoroughly vitrified and salt glazed on both faces and ends, and rich in both color and glaze.

All standard shapes carried in stock and special shapes made on order.

Uses—This product is used for facing both interior and exterior walls where a beautiful, sanitary and permanent wall is desired.

Principal Places—Schools, hospitals, gymnasiums, swimming pools, garages, office and factory buildings, prisons, power plants, acid vats, packing plants, subways, etc.

Sanitary Floor Brick

Size— $8 \times 3\frac{7}{8} \times 1\frac{1}{8}$ in. (shade 102). $8 \times 4 \times 1\frac{1}{8}$ in. (shade 103).

Uses—This product is especially desirable for use in packing house floors, and is being extensively used for this purpose. Only one side is glazed and either side may be used as desired.

General Properties of Salt Glazed Materials

All shades of standard and floor brick are burned to about 2200° F., thoroughly vitrified and salt glazed; moistureproof and acidproof; will not craze, crack or peel; withstand heavy crushing strain and always look fresh and clean.

Facilities

We have a modern, electrically equipped plant, with an annual capacity of 18,000,000, and a large and well selected stock for quick shipment. Samples and prices will be furnished by our nearest agent upon request.

Some Prominent Buildings in which Athena Glazed Brick Were Used

LOCATION AND BUILDING	QUANTITY
Allentown, Pa.—School Building	405,000
Alton, Ill.—State Institutions	540,000
Athens, Ohio—Garage	320,000
Boston, Mass.—East Boston High School	300,000
Bridgeport, Conn.—High School	350,000
Brooklyn, N. Y.—Public Schools	317,000
Chicago, Ill.—State Institution	410,000
Detroit, Mich.—Ford Motor Co.	1,500,000
Dixon, Ill.—State Institution	608,000
Fairfield, Ala.—Tennessee Coal, Iron & Railway Co.	614,000
Fordson, Minn.—Ford Power Plant	350,000

LOCATION AND BUILDING	QUANTITY
Lansing, Mich.—Industrial School for Boys	302,000
Louisville, Ky.—Louisville Gas & Elec. Co.	350,000
Milwaukee, Wis.—School Building	410,000
New York, N. Y.—United Electric Light & Power Co.	650,000
Light and Power Stations	930,000
Omaha, Neb.—Packing House	400,000
Ossining, N. Y.—State Prison	400,000
Pittsfield, Mass.—Pontoosuc School	402,000
Pittsburgh, Pa.—Market House	600,000
Washington, D. C.—Public Schools	1,000,000
Waterbury, Conn.—Crosby High School	400,000



No. 1
45° Octagon



No. 2
2-in. Radius Bullnose



No. 3
2-in. Radius Bullnose
Binder



No. 4
2-in. Radius Internal
Bullnose



No. 5
2-in. Radius Bullnose
Stretcher



No. 6
2-in. Radius Bullnose
Header



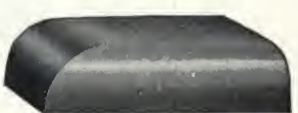
No. 7 Left
2-in. Radius Bullnose
Stretcher
Round external corner



No. 8 Right
2-in. Radius Bullnose
Stretcher
Round external corner



No. 9 Left
2-in. Radius Bullnose
Stretcher
Square external corner



No. 10 Right
2-in. Radius Bullnose
Stretcher
Square external corner



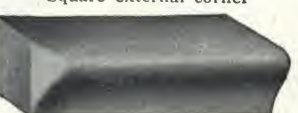
No. 11
2-in. Radius Internal
Corner Bullnose
Stretcher



No. 12
O. G. Stretcher



No. 13 Left
O. G. Runout



No. 14 Right
O. G. Runout



No. 15 Left
O. G. Round External
Corner



No. 16 Right
O. G. Round External
Corner



No. 17 Left

O. G. Square External Corner



No. 18 Right

O. G. Square External Corner



No. 19 Left

O. G. Internal Corner



No. 20 Right

O. G. Internal Corner



No. 21 Left

1-in. Cove Square External Corner



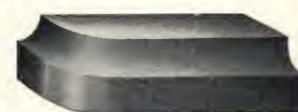
No. 22 Right

1-in. Cove Square External Corner



No. 23 Left

1-in. Cove Round External Corner



No. 24 Right

1-in. Cove Round External Corner



No. 25 Left

1-in. Cove Square Internal Corner



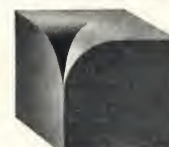
No. 26 Right

1-in. Cove Square Internal Corner



No. 27

1-in. Cove Stretcher



No. 28

2-in. Radius Bullnose Internal Corner



No. 29 Left

2-in. Radius Bullnose Header Sill and Jamb Miter



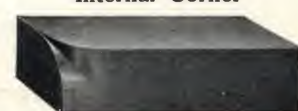
No. 30 Right

2-in. Radius Bullnose Header Sill and Jamb Miter



No. 31 Left

2-in. Radius Bullnose Stretcher, Sill and Jamb Miter



No. 32 Right

2-in. Radius Bullnose Stretcher, Sill and Jamb Miter



No. 33 Left

2-in. Radius Bullnose Sill and Jamb Miter



No. 34 Right

2-in. Radius Bullnose Sill and Jamb Miter



No. 35

2-in. Radius Round Bullnose Corner



No. 36

2-in. Radius Square Bullnose Corner

Sales Agencies

AGENT

Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Acme Brick Company
Adams Payne & Gleaves, Inc.
Adams Brothers-Payne Co.
Albany Builders Supply Co.
Archer, J. S.
Baker & Holmes Co.
Baltes, Edward M., & Co.
Black Company, John H.
Bonner & Marshall Brick Company
Building Material Co.
Chillicothe Coal Co.
Clay-Ingels Co.
Consolidated Brick Co.
Copp Builders Supply Co., Ltd.
Cummins Brick & Tile Co.
Denison "H" Tile & Brick Co.
Denver Pressed Brick Company
Dolben & Company
Drummond & Reeves, Ltd.
Duluth Builders Supply Co.
Gaddis-Harison Brick Co.
Gaddis-Harison Brick Co.
Hardison Co., W. T.
Hood Brick Co., B. Mifflin
Hood Brick Co., Charlotte
Hood Brick Co., B. Mifflin
Hood Brick Co., B. Mifflin

CITY

Dallas, Tex.
Fort Worth, Tex.
San Antonio, Tex.
Houston, Tex.
Little Rock, Ark.
Fort Smith, Ark.
Shreveport, La.
New Orleans, La.
Oklahoma City, Okla.
Tulsa, Okla.
Roanoke, Va.
Lynchburg, Va.
Albany, N. Y.
Richmond, Va.
Jacksonville, Fla.
Fort Wayne, Ind.
Buffalo, N. Y.
Chicago, Ill.
Steubenville, Ohio
Chillicothe, Ohio
Lexington, Ky.
Charleston, W. Va.
London, Ontario
Syracuse, N. Y.
Pittsburgh, Pa.
Denver, Colo.
Boston, Mass.
Toronto, Ontario
Duluth, Minn.
Columbus, Ohio
Dayton, Ohio
Nashville, Tenn.
Atlanta, Ga.
Charlotte, N. C.
Raleigh, N. C.
Greenville, S. C.

AGENT

Hood Brick Co., B. Mifflin
Hood Brick Co., B. Mifflin
Ketcham, O. W.
Ketcham, O. W.
Ketcham, O. W.
Ketcham, O. W.
Kilvert & Co., R. Y.
Kuhlman Builders Supply & Brick Co.
Lincoln Brick Company
McDonald Coal & Brick Co.
McEwing & Thomas Clay Products Co.
Moore-Coney Co.
Mossman Brothers Co.
Ochs Brick & Tile Company, A. C.
O'Neil & Co., Ltd., Wm.
Ottawa Fireproof Supply Co.
Pickett, Dr. J. E.
Pomeroy Cement Block Co.
Queisser Co., The R. L.
Sioux City Brick & Tile Co.
Southern Building Material Co.
Speakes Co.
Stephenson Brick Co.
Stinson-Reeb Builders Supply Co.
Sunderland Brothers Co.
Swan, Theodore H.
Thayer, O. C., & Son
Thornton Fire Brick Co.
United Clay Products Corp.
United Clay Products Corp.
United Clay Products Corp.
Watts Morehouse Co.
Whaley Brick Co.
Wisconsin Face & Fire Brick Co.

CITY

Memphis, Tenn.
Daisy, Tenn.
Philadelphia, Pa.
New York, N. Y.
Washington, D. C.
Baltimore, Md.
Winnipeg, Man.
Toledo, Ohio
Grand Rapids, Mich.
Detroit, Mich.
St. Louis, Mo.
Cincinnati, Ohio.
Huntington, W. Va.
Minneapolis, Minn.
Vancouver, B. C.
Ottawa, Ontario
Minersville, Pa.
Pomeroy, Ohio
Cleveland, Ohio
Sioux City, Iowa
Norfolk, Va.
Superior, Wis.
Birmingham, Ala.
Montreal, Canada
Omaha, Neb.
Rochester, N. Y.
Erie, Pa.
Clarksburg, W. Va.
Wichita, Kan.
Des Moines, Iowa
Kansas City, Mo.
Jackson, Mich.
Louisville, Ky.
Milwaukee, Wis.

THE FINZER BROS. CLAY CO.

Manufacturers of Clinton Face Brick for Interior and Exterior Use

SUGARCREEK, OHIO

THE CLAY CITY

Finzer Bros. Face Brick Colors

The regular Clinton line of face brick can be supplied in the following colors:

Clinton Colors—

Clinton Reds—Nos. 130, 140, 145 and 150.

Red Matt—Nos. 420, 430, 440 and 445.

Clinton Ivories—Nos. 220, 230 and 250.

Smooth Buff—Nos. 320 and 330.

Forestblend—No. 455.



Samples

Samples of unique textures and colors of Clinton Face Brick will be sent free of charge upon request.

Textures

Clinton Face Brick can be secured in Smooth, Matt or Rug Textures.

Specifications

To insure the use of Finzer Bros. brick insert the word "Clinton" or "Forestblend" at any place in the specifications where face brick is called for.

Special Advantages

The plant is located in Sugarcreek, Ohio, "the Clay City." The clays from this region are internationally famous for their purity and beauty. Ours is one of the few plants equipped to mix shale and fire clay thereby producing shades which can be manufactured in very few plants.

Finzer Bros.' representatives are located throughout Eastern United States and prompt shipments of any amount of brick can be made on short notice.



Shade 230 Ivories, Uniform



Shade 330 Light Ivory



Shade 390 Dark Buffs



Shade 455 B & E Mixture



Shade 455 A & D Mixture (Flemish Bond)



Shade 440 Dark Red



Shade 145 Extra Dark Red



Shade 455 Full Range

Forestblend Face Brick



Texture

Forestblend is made by special patented process and can be obtained only from the Finzer Brothers Clay Company or their representatives. This texture is something entirely new and particularly appealing to the architect. Samples will be forwarded upon request.

Colors

Forestblend may be obtained in colors listed below. There are some three to five shades of each of these major colors. Forestblend known as Shade 455 of the Clinton Face Brick line will permit the architect to effect practically any color scheme desired. That is accomplished by eliminating certain shades and substituting others. This additional service is given without extra charge by our Finzer representatives.

455A—*Browns*

Blues

455B—*Dark Tangerines*

455C—*Greens in range*

455D—*Reds and red hearts*

455E—*Light Tangerines*

Special Note

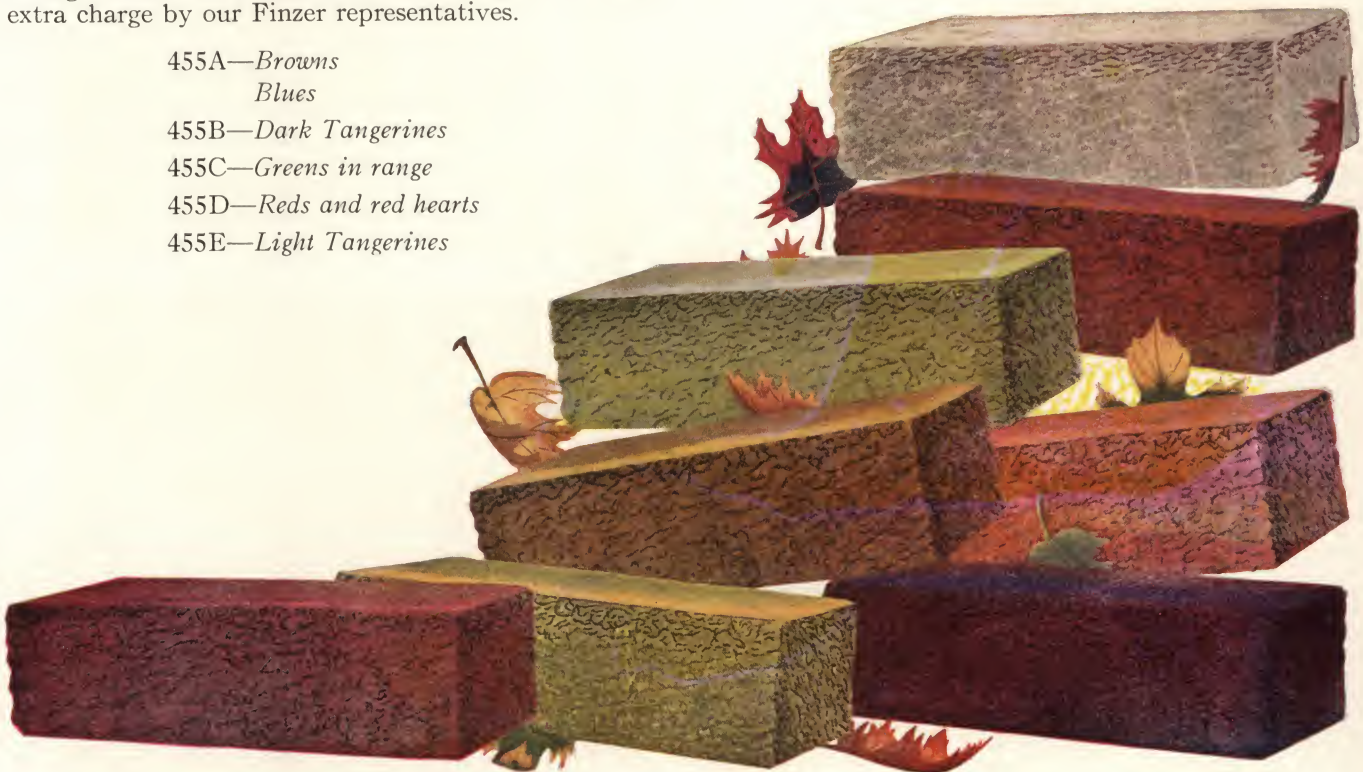
Regular carload mix consists of 35% 455A's, 20% 455B's and E's, 20% 455C's and 25% 455D's. These percentages, as stated, can be varied to suit the purchaser's requirements. We can also arrange to include a percentage of straight Red Matts known as Shade 440 or 445 in the above if a large percent of reds is desired.

Representative Installations

We would like the architect in all cases to see the beautiful effects which can be produced with Forestblend Face Brick or any of the Clinton Line. Due to the large number of buildings in Eastern and Mid-western United States which have been faced with Clinton Face Brick, it is impossible to publish a complete list in this limited space. Upon request however, we would be very glad to send to any architect a list of buildings near his office. Simply write to Finzer Brothers Clay Company, Sugarcreek, Ohio, stating the information you desire. It will be furnished promptly and no salesman will call unless you request it.

Plant Locations and Shipping Facilities

The Finzer Bros. plant is located on the Wheeling & Lake Erie Railroad, which road is able to furnish ample cars for all requirements. We have connections with New York Central, Pennsylvania, B. & O., Erie and Nickle Plate roads and all leading trunk lines of Eastern United States. The yearly capacity of our plant is 45 million bricks. Orders of any size can be taken care of promptly.



FISKE & COMPANY, INC.

Manufacturers of Face Brick and "Fisklock" Brick
Sole Manufacturers of "Tapestry" Brick
115 Federal Street, BOSTON, MASS.

BRANCH OFFICE: 17 West 46th Street, NEW YORK, N. Y.

Products

FACE BRICK: FISKE MILTON REDS, DARLINGTON GRAYS, "FISKLOCK," "TAPESTRY," "TAPESTRY" ANTIQUES, "CALEDONIAN," and other high grade Face Brick. Also Fire Brick and Brick Specialties.

Trade-Names and Patents

"Tapestry" Reg. U. S. Pat. Off.

"Fiske" Reg. U. S. Pat. Off.

"Fisklock" Reg. U. S. Pat. Off.

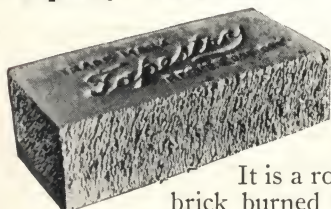
"Caledonian" Reg. U. S. Pat. Off.

To protect our customers against substitution of inferior products, these trade-marks are branded on our bricks.

Fiske Service

Fiske service starts with your order or even before and continues until the last brick is in the building. It is our aim to provide the architect and the owner through our great variety of textures and ranges of color with every opportunity for self-expression and to aid the builder through "Fiske Service" to carry out their ideas.

"Tapestry" Brick



It is a rough texture, end-cut face brick burned to flashed shades. The colors of "Tapestry" brick are soft and rich with almost an infinite number of shades. There is only one "Tapestry" brick; Fiske makes it.

"Tapestry" Antiques

"Tapestry" Antiques are just what the name implies—old looking, irregular bricks that might have come from an old English wall. All the colors of "Tapestry" burned to deeper shades are available in "Tapestry" Antiques.

The New Fiske Brick

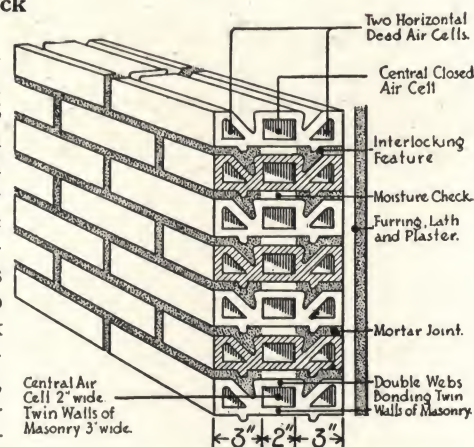
Architects who have seen this brick tell us that we have found a new color combination and prophesy a popularity equal to that of our famous "Tapestry" Brick. This new member of the Fiske line may be had in "Fisklock" as well as solid brick. It is burned to soft blending shades of browns, purples and grays. Just to see this brick brings up delightfully new possibilities in building effects.

"Fiske" Brick

A face brick with smooth face in grays and buffs, or end-cut rough texture in full range of colors and clear reds.

"Fisklock" Brick

"Fisklock" is an interlocking channel brick, 8x2 1/4 x 8 in., with rough texture and beautiful coloring. It has the face of a standard brick and is equivalent to one face brick and one common brick, forming an 8-in. wall by itself, saving labor cost of brick backing.



The multitude of horizontal dead air cells in a "Fisklock" wall make it an ideal insulator against heat or cold, while the lack of continuous mortar joints prevents moisture from striking through.

Economy—Each "Fisklock" brick is equivalent to two standard bricks, but is laid without additional effort because of the balanced handhold.

"Fisklock" saves freight and truckage costs—it weighs only seven-tenths as much as the face brick and common brick it replaces, and less mortar is required than in an equivalent wall of solid brick.

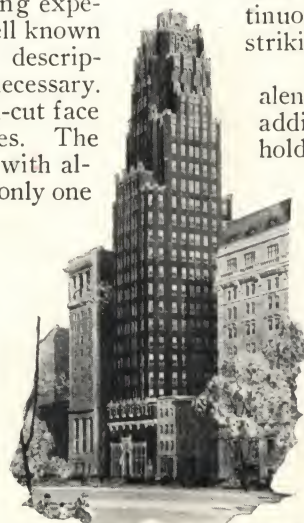
"Fisklock" in the wall is cheaper than any other form of face brick construction.

"Caledonian" Brick

A horizontal rough texture side-cut face brick burned to either clear colors or a range of shades.

"The Black Brick Building"

FISKE & COMPANY, INC., is always ready to co-operate with the architect and assist the builder. For the American Radiator Building, Fiske produced a black brick specially manufactured to meet the requirements of the architect. This structure is frequently spoken of as "The Black Brick Building."



"The Black Brick Building,"
American Radiator Company, New York, N. Y.



View of One of the New Fiske Tunnel Kilns

HANLEY COMPANY, INC.

FORMERLY BRADFORD BRICK & TILE CO.

Tunnel Kiln Face Brick

BRADFORD, PA.

NEW YORK OFFICE: 565 Fifth Avenue

PLANTS: BRADFORD, PA., SUMMERVILLE, PA.
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

BOSTON OFFICE: 260 Tremont Street

Products

"BRADFORD FULL RANGE;" "BRADFORD REDS;" "SUMMER GREYS;" "SUMMER BUFFS;" COURT BRICK; IMPORTED FACE BRICK; RED FLOOR TILE.

Hanley Face Brick—Available in All Colors and Textures

"Bradford Reds"—(a) Even shades in a deep cherry red to a light red; available in dry press or wire cut. (b) Rich range of colors including greens, browns, tans, blues and reds.

"Summer Buffs and Greys" and Hanley Whites, Browns, Goldens, Tangerines—(a) Even shades in buff, grey, white, cream, brown, tangerine and golden. (b) Blends of practically any percentage of these colors which are desired to fit the architect's scheme for color. Available in either dry press or wire cut process.

Made in what is believed to be the largest and most modern tunnel kiln face brick plant in the world, these brick approach perfection in face brick, due to the unique process by which they are made. In the tunnel kiln process which was initiated in a practical way by the HANLEY COMPANY, INC., in 1921 and refined in 1925, brick are no longer burned in the beehive type of kiln with its large amount of manual handling and its resultant poor mechanical quality and heavy breakage.

Characteristics—Hanley Face Brick are made by a new process, introduced and developed by the HANLEY COMPANY, INC., by virtue of which colors are predetermined and mixed to suit the architect, in contrast to the old type of brick plant which obtains a standard range of colors and does not have control over the percentage of shades and colors to be included in the blend. This ability to exactly mingle colors to order is a big step forward in the color possibilities of face brick, as any color combination can be chosen to blend with the roof, trim, shutters, entrance and landscape.

Two features of Bradford Smooth Wirecut Reds which have given them a unique position in face brick construction are: (1) mechanical perfection and (2) rich cherry red color that has never been attained in any other face brick. These features have led to their usage for trim for stucco and frame houses where vivid coloring is necessary to give life to a dull wall; porch piers and steps which demand mechanical perfection, exact size and hardness as well as rich colors, in all of which Bradford Smooth Wirecut Reds are leaders.

In the Hanley tunnel kiln process brick are handled just half as many times as required by the old beehive process. A further advantage of the HANLEY COMPANY, INC., process is that brick require but five days to go through the complete manufacturing process, as against three to four weeks required by the old process.

Architects, by virtue of this process, are able to obtain service on special types of brick in one-fifth the time, and are assured of a better brick mechanically, thereby reducing laying cost in the wall. The ease of laying is further increased by the three holes in the brick, which combined with the absorption makes them an ideal brick for winter laying.



TRADE-MARK

The even shades of "Summer Buffs and Greys" are characteristic for their clear colors, due to the process of manufacture and to the fact that natural gas, a clean fuel is used. A full variety of textures is available in all types. In addition to the clean buff and grey colors, a beautiful range of brown and tan colors mingled with a grey background are available for large structures in which a range of color is desired to add life to the large wall expanse.

Court Brick

The practice of using "Court Brick" for light reflecting purposes in the tall structures being erected today, is growing with the increase in tall buildings. An additional usage for Hanley Courts is for basement interiors where, in 4-in. walls both sides of the brick are exposed.

The Hanley Court Brick deserves special mention. It is not a discolored by-product, but is guaranteed to be free from dark headers or "flashings," mechanically an excellent product, and easy to lay. Hanley "Courts" will give a light wall effect far superior to that ever before offered.

Imported Face Brick

These handmade brick have received a widespread welcome from the leading residential and apartment architects in the country. They combine the non-mechanical features of imported brick with the soft, gently blending hues of yellow, orange, tan and red. Their use has been largely in suburban work where the color blend with shrubbery is very effective.

Red Floor Tile

Flawless surface, deep rich red color and impenetrable hardness are features which make Bradford Floor Tile distinctive. Made regularly in the following sizes and weights:

3x3 in., .65 lb. each
3x6 in., 1.3 lb. each
6x6 in., 2.6 lb. each.

Territory Served

Due to the exceptionally high quality of Hanley Face Brick they are shipped to a wide territory, the Bradford Reds being sold regularly in 32 states east of the Rockies, whereas the white, grey and brown brick are distributed to an even wider territory.

Facilities

The name "Hanley" is a guarantee of the best products that 35 years' experience can produce.

Two of the most modern face brick plants in the world built on the *tunnel kiln principle*, enable us to promptly deliver red, grey and buff face brick in any quantity and in a number of distinctive types of smooth and rough texture.

Architects in 32 States have placed their confidence in Hanley products and have learned to depend on the character, reputation and stability of this progressive manufacturing concern.

HOCKING VALLEY PRODUCTS COMPANY

Manufacturers of "Greendale" Face Brick

General Offices: LOGAN, OHIO

DISTRIBUTORS

ATLANTA, GA., B. Mifflin Hood Brick Co.
 BUFFALO, N. Y., John H. Black Co.
 CHICAGO, ILL., Wisconsin Lime & Cement Co.
 CINCINNATI, O., Cincinnati Builders Supply Co.
 CLEVELAND, O., Cleveland Builders Supply & Brick Co.
 DETROIT, MICH., Frederic B. Stevens, Inc.

KANSAS CITY, MO., Nicholson Clay Products Co.
 MILWAUKEE, WIS., Wisconsin Face & Fire Brick Co.
 NEW YORK, N. Y., O. W. Ketcham
 PHILADELPHIA, PA., O. W. Ketcham
 PITTSBURGH, PA., Martin Brick Co.
 ST. LOUIS, MO., McEwing & Thomas Clay Products Co.

WASHINGTON, D. C., O. W. Ketcham
and in all leading cities

Product

A complete line of Face Brick sold under the trade name "Greendale." Suitable for every type of construction from the simplest bungalow to the most elaborate office building or public structure.

"Greendale"

TRADE MARK

FACE BRICK

"Greendale" Blends

Pontiac Pot-Pourri—A combination of gray, brown, gun metal and red Rugs; especially appropriate for certain types of churches, apartments and residences. Illustration on opposite page.

Characteristics

"Greendales" are made from clays of unusually high and uniform quality, mined on our own properties. "Greendales" are thoroughly burned, vitrified, and retain their original beauty. Age and weathering only serve to enhance their beauty. They can be obtained in an unlimited variety of color tones ranging through various shades of red, buff, brown and gray. "Greendale" brick are assorted in uniform shades and can be blended in any percentage. The popularity of "Greendale" Brick is widely recognized because of their distinctive texture and wonderful color harmony.

"Greendale" Rug Brick

The texture of the "Greendale" Rug when laid in a wall gives the appearance of the soft and alluring color tones of a Turkish or Persian rug.

Shades—No. 72 Light Ivory; No. 74 Cream; No. 76 Light Buff; No. 78 Medium Buff; No. 80 Dark Buff with pinkish cast; No. 86 Flashed Grayish Brown; No. 88 Light Brown, tan cast; No. 90 Medium Brown; No. 92 Dark Brown; No. 94 Gun Metal.

"Greendale" Semi-Smooth

This is a new and unusual texture and is the result of much study and experiment to meet the insistent demand for a brick in the large cities which will resist the effects of smoke and dust and still produce a light wall effect. The texture is sufficiently rough so as not to give a wall the glaring effect of a smooth brick, but still removes the objection which many architects and owners feel toward the use of rough texture brick.

"Greendale" Red Rug Brick

Manufactured from selected shale and burned to a rich Burgundy Red. Manufactured for blending purposes only and not offered for sale as a straight line.

Seville—A blend of "Flashed" grayish brown shades which can be readily adapted to Spanish types of architecture. This blend produces a light wall effect yet the colors are neutral to dust and dirt. Illustration on opposite page.

561 Full Range—A blending of all clear burned Rug shades running from Light Ivory to Dark Buff. Natural Cement or Buff mortar color is very appropriate with this blend. Illustration on opposite page.

563 Full Range—A blending of all "Flashed" Rug shades running from gray to gun metal. Effective when laid in natural cement or double strength chocolate mortar with raked joints. Color card on request.

261 Full Range (Semi-Smooth)—Is furnished in the same range of color as the 561 Full Range. (See color illustration opposite page.) However, this color range can be modified by leaving out the lighter or darker shades so as to give a more uniform effect.

262 (Semi-Smooth)—Is a blend of gray and grayish brown similar to the Seville blend. See illustration opposite page.

Plant and Facilities

"Greendale" Face Brick is manufactured at Greendale, Ohio, in one of the largest individual plants in the country. The tract consists of about 2200 acres containing deposits of rich clay ideally adapted to the manufacture of superior face brick. A tunnel kiln recently completed gives a capacity of about 32,500,000 bricks annually. Large production and central location insure prompt and efficient service.

Information

"Greendale" distributors will be found in the principal cities where displays of brick may be seen and literature obtained. Samples are also on display at the Architects Samples Corporation, New York City. Inquiries addressed to our general offices at Logan, Ohio, will receive immediate attention. Samples and color cards on request.



"Greendale" 561 Full Range

A wall of this shade is a study in masonry with every harsh feature common to other light brick eliminated.
The same colors are produced in Semi-Smooth texture.



"Greendale" Seville

A blend of flashed, grayish brown shades, especially adapted to Spanish types of architecture.
The same colors are produced in Semi-Smooth texture.



"Greendale" Pontiac Pot-Pourri

The soft, mellow color tones of Pontiac Pot-Pourri give to the building a quiet elegance and refinement.

HYDRAULIC-PRESS BRICK COMPANY

Manufacturers and Distributors of Hy-tex Brick

ST. LOUIS, MO.

BRANCH OFFICES, EXHIBIT ROOMS AND DISTRIBUTING CENTERS

BALTIMORE, MD., Munsey Building
CHICAGO, ILL., Chamber of Commerce Building
CLEVELAND, OHIO, 5005 Euclid Avenue
DAVENPORT, IOWA, Putnam Building
DUBOIS, PA., Deposit National Bank Building
INDIANAPOLIS, IND., Board of Trade Building
KANSAS CITY, MO., Rialto Building

MINNEAPOLIS, MINN., Baker Building
NEW YORK, N. Y., FREDENBURG & LOUNSBURY, Representatives,
Architects Building
OMAHA, NEB., Woodmen of the World Building
PEORIA, ILL., Lehmann Building
PHILADELPHIA, PA., Otis Building
ROSEVILLE, OHIO

WASHINGTON, D. C., Colorado Building

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES

Products

The HY-TEX BRICK line embraces: Face Brick, Enamel Brick, Salt Glaze Brick, Equitable Brick, Paving Brick, Common Brick and Hollow Building Tile.

Hy-tex Brick

The Standard of Quality in Brick
TRADE-MARK

They have been used in many large buildings with complete satisfaction.

Hy-tex Salt Glaze Brick—Hy-tex Salt Glaze Brick, ranging from light straw to a golden brown,

as illustrated on next page, permits walls of light, medium, dark or mingled shades. The salt glaze which forms an integral part of the brick, will not scale or peel under the most severe conditions, and is proof against moisture, dust, smoke, stains, germs, and even acids. They are widely used as exterior brick in the business, wholesale and industrial sections of cities, and for interior uses where light reflection and bright, clean, sanitary surfaces are desired or necessary, as in corridors, stairways, vestibules, wainscots, light courts, gymnasiums, toilet rooms, engine rooms, food factories, garages, etc. The cost of Hy-tex Salt Glaze Brick closely approximates that of plastered and painted common brick, while its maintenance cost is less.

Hy-tex Equitables—This brick was originally created for the *Equitable Building* in New York City, and has since been available in white and grays in various speckled effects. They present a smooth impervious surface and wash with the rain to their original clean appearance; and do not craze, scale or discolor under the severest climatic conditions. Suitable for both exterior and interior requirements.

Hy-tex Face Brick

The Hy-tex color range runs in face brick from the lightest colored creams, grays and buffs to the darkest reds and browns in smooth, semi-smooth and rough textures. It offers literally hundreds of various tones in the gray, buff and red basal colors. No matter what your requirements, whether for exterior or interior use, you will find in the Hy-tex line just the brick you want.

Specialties

Hy-tex Enamel Brick—Hy-tex Enamel Brick are unapproached in quality and durability by any similar brick of domestic or foreign manufacture. The "double-burn" process, an improvement over European methods, used exclusively in manufacturing Hy-tex Enamel Brick, eliminates the uncertainties present where the enamel is spread on the green brick and both are burned together with practically no control over varying fusion points, unequal expansion and impurities burning out as bubbles in the glaze.

Hy-tex Enamel Brick in the white and ivory shades are absolutely opaque. Hy-tex Enamels will not craze, peel or discolor under the severest climatic tests, as proved by the experience of exacting architects in all parts of the country. They are made in white, ivory, green, brown, blue, jade, black, transparent speckled buff, transparent speckled brown, and are used extensively for facing large office buildings, theaters, stores, etc., as well as for hospitals, corridors, schools, gymnasiums, laundries, restaurants, bake ovens, garages, engine rooms, outdoor and indoor swimming pools, etc.

Hy-tex Enamel Court Brick are in every way the same brick, as to make and durability, as Hy-tex Enamels, except that, in sorting for first quality, these have been set aside because of slight surface defects which are not noticeable in courts or areas. Unless closely examined, they make the same appearance as Hy-tex Enamels and render exactly the same service.

Facilities

For over half a century the HYDRAULIC-PRESS BRICK COMPANY has been building the reputation which Hy-tex products enjoy today. During that time the Hy-tex organization has grown from one to twenty-two plants, scattered through the eight great clay-producing states. Branch office and agency distribution insures prompt and efficient service in all parts of the country.

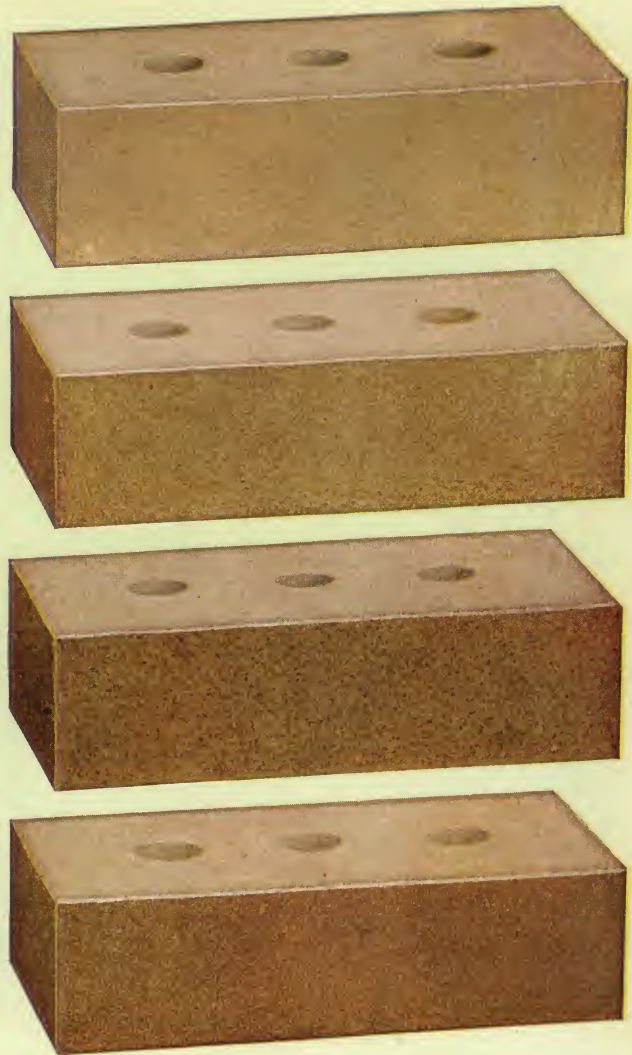
Literature

This company has issued booklets on Hy-tex Brick, Salt Glaze Brick, Hy-tex Enamel Brick and Equitable Brick; Brick Scales and Tables, a ready and convenient method of determining the number of courses and joints in all brickwork; Color Cards, and other material. For any of the above, apply to nearest branch office.



Hy-tex Enamel Brick

Top to bottom—White, Ivory, Green and Brown



Hy-tex Salt Glaze Brick

Top to bottom—Light, Medium, Dark and Brown

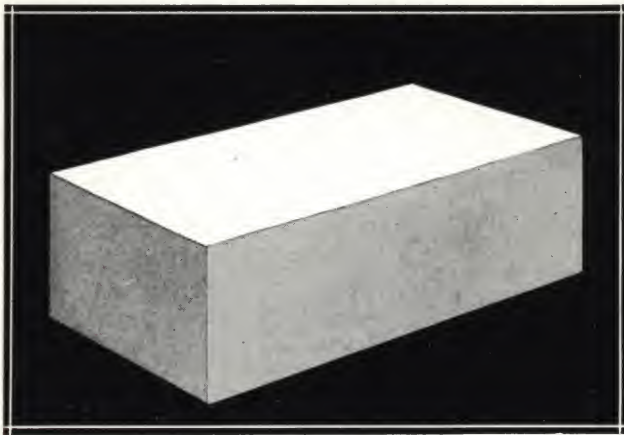


Color No. 100
Color No. 130



Color No. 110
Color No. 120

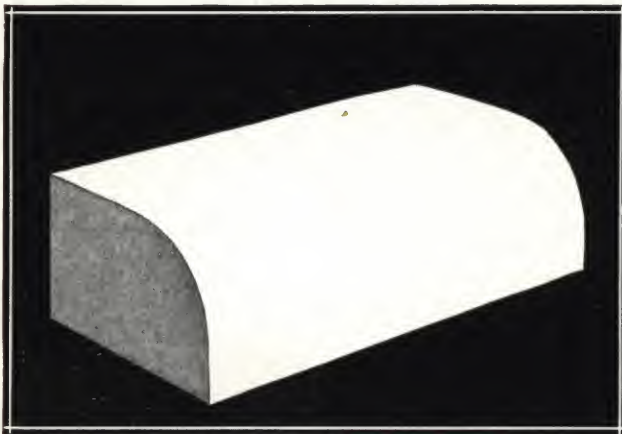
Hy-tex Equitable Brick



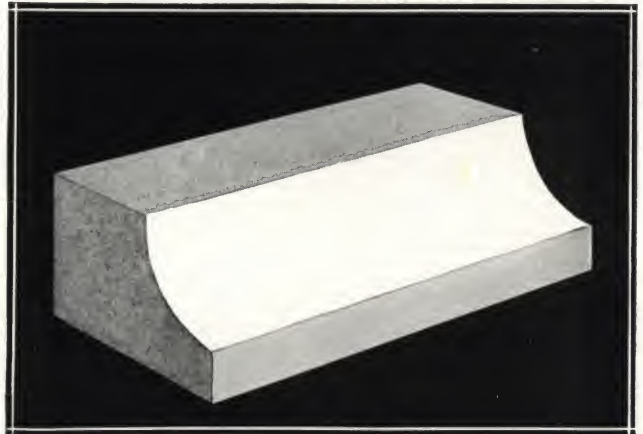
Flatter Stretcher



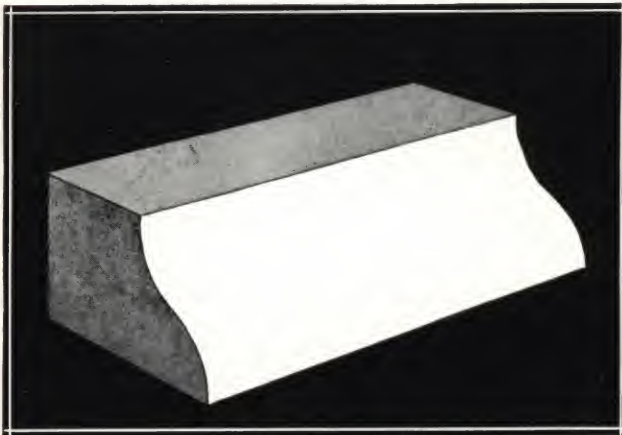
Bullnose External



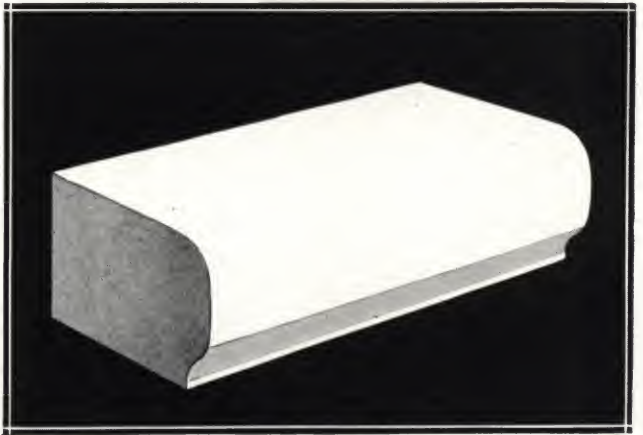
Bullnose Flat Stretcher



Cove Base Stretcher



Ogee Stretcher



Cap Mould Stretcher

Basic Shapes in Hy-tex Enamel Brick

The enameled surfaces and shapes shown here, together with the stretcher shown in the color group, form the seven basic shapes in Hy-tex Enamel Brick. The series is completed by furnishing for the plane surfaces the stretcher and flatter, the quoins, headers, and the over- and under-dipping of the abutting surfaces—either wholly or in part.

For the moulded shapes, in addition to this over-

and under-dipping which may be necessary to cover conditions arising in use, there are provided the complementary brick essential to their general use. These are headers, internal and external angle brick, returns and stops.

For detailed information, showing the various brick and combinations thereof, refer to shape book issued by this company.

THE METROPOLITAN PAVING BRICK CO.

Manufacturers of "Metro" Face Brick, Paving Brick and Hollow Tile
CANTON, OHIO

SEVEN PLANTS—CANTON, O.; MINERVA, O.; BESSEMER, PA.

Representatives in Principal Cities

Products

"METRO" FACE BRICK

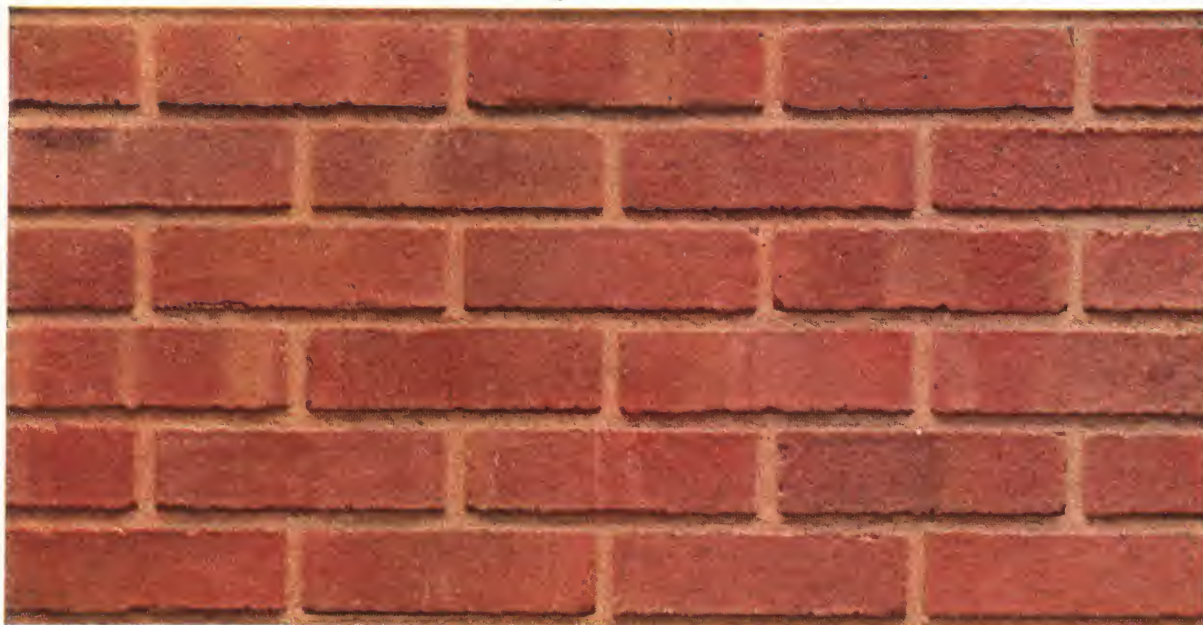
"Metro" Paving Brick and Hollow Tile.

"Metro" Vitrified Floor System for
Trickling Filters.



Samples

Samples of "Metro" products gladly
furnished on request.



"Metro Taverns" No. 1 Blend

These brick are semi-smooth and impervious. The color in this brick made it popular for large operations for fine tone effects. No glaze and remains clean.



"Metro Taverns" No. 2 Blend

When a mingled effect is required in a semi-smooth impervious brick, we offer the above. Suitable for Dutch Colonial, English and Colonial types.



"Metro Taverns" No. 3 Blend

Soft pastel shades produced on these semi-smooth brick give them a distinct Architectural appeal.



"Metro-English Art"

Delightful rough wall effects are obtainable with this brick. The undulating lines together with the light and shadow effects, produce a wall full of life and movement that is so desirable for exclusive work. Roughness or color as desired.



Full Range "Metro Mat-Tex." Shades Nos. 130-F to 180-F

We guarantee to ship any shade, percentage or mixture selected from the above, to produce any Architectural effects. Percentages can be varied, shades eliminated, at your discretion.

The Metropolitan Paving Brick Co.



"Metro" Ver-Tex—Shade 40-F.

When a straight shade vertically-scored brick is desired, the bright red of this brick is most distinctive.



"Metro" Smooth Colonial Full Range Mingle—Shades No. 230-F to 280-F

These brick are particularly adaptable to produce English or Colonial effects. The markings, and blend of color, give the weathered effect so desirable on this type of work.



"Metro" Mat-Tex Full Range Mingle—Shades No. 130-F to 180-F

We guarantee to ship any shade, percentage or mixture selected from the above, to produce any architectural effects. Percentages can be varied, shades eliminated, at your discretion.

THE MEDAL BRICK & TILE CO.

Manufacturers of Face Brick and Tile

MAIN OFFICE

4900 Euclid Avenue
CLEVELAND, OHIO

PLANTS AT WOOSTER, MALVERN AND CARROLTON, OHIO
DEALERS IN ALL PRINCIPAL CITIES

Products

MEDAL FACE BRICK in a variety of colorings and surface textures, including side cut mats, end cut mats, vertical, die cut and sanded textures. Wooster and Carrollton clays produce red ranges of charming variety. Malvern clays afford a brown, buff and ivory color sequence which is available in straight shades or any specified mingling of shades.

AGECROST OLDSTYLE BRICK, for reproducing the effect of antiquity found in classic models of European and Colonial building.

Also Medal Building Tile.

Surface Textures

Medal Brick are furnished in matt textures, vertical textures, and in a die cut as well as the distinctive Agecroft surface, which has been granted a United States patent for originality and merit.

Agecroft Oldstyle Medal Brick

This brick has the general aspect of an early, hand-made brick plus the effect of long weathering. The influence of its surface treatment upon color is to soften and harmonize the brilliant colorings of the Medal Range and to increase their richness. The surface is neither acutely smooth nor systematically roughened. Minor irregularities of outline are preserved without extremity or affectation.

Squared or Beveled Edges—Agecroft brick are furnished with squared edges, or with edges irregularly beveled or rounded, thus increasing the scope of effects obtainable by different joint treatments. Either type of edge has exhibited splendid effects with full mortared or recessed joints in white mortar or color. Perhaps the most prized advantage of the beveled brick is the appearance of a smaller face, when full mortared, without departure from standard dimensions. Thus a mixture of squared and beveled brick, full mortared, gives the effect of pleasing variety of size and the appearance of undulation in the mortar line, without disturbing actual bedding levels.

Agecroft Window Brick

These brick comprise more than thirty specials from which to erect window openings for metal casement windows or double hung windows in harmony with the general exterior treatment of the building. The $\frac{3}{8}$ -in. flange against which the window frame is set gives added security and complete weather protection around the window.

The general design of these windows is based on English precedent, and they afford a consistency not otherwise found in brick construction, as well as marked beauty. Detail drawings are shown for double and single splayed windows, while the lettered illustration on this page is of a simple double splayed window. Variations of these types, including the use of a double mullion for a major division in a large window, will suggest themselves to the architect as soon as he is familiar with the material. Every construction difficulty has been solved

and manufacture simplified so that these beautiful, chamfered brick windows can be specified with economy and certainty of result.

Bulletin and blue prints with full details of single, double and bay windows showing suggested application of trim for veneer and solid wall construction for casement or double hung frames, will be mailed to architects on request.

Agecroft Special Shapes

The architect will find many uses for the above window shapes, aside from window construction. Aside from these shapes, we are especially well equipped to execute orders to your own design for specials to construct chimneys, drip moulds, louvers, etc. The Agecroft surface treatment lends itself remarkably well to specials regardless of their shape.

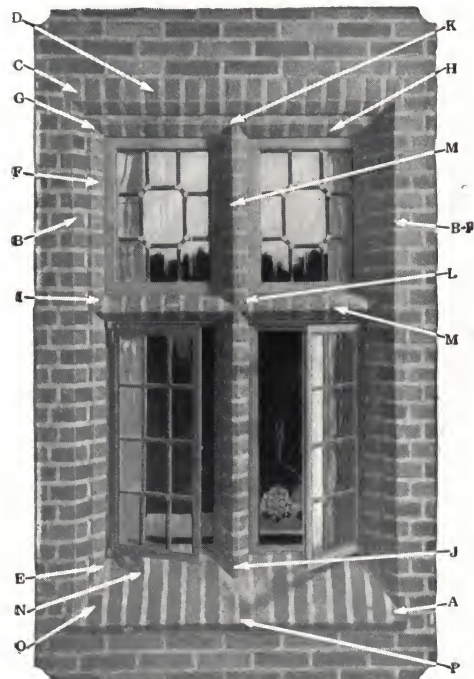
Color Control and Sorting

Medal Brick are offered in a wide variety of colors. An original system of color control is part of the Agecroft technique, yielding a rich assortment of lighter reds, salmons, ochres and orange tints. With these come deep greens, blues and polychromes with dark and medium reds. A separate Malvern range is offered, varying through warm browns into buff and ivory.

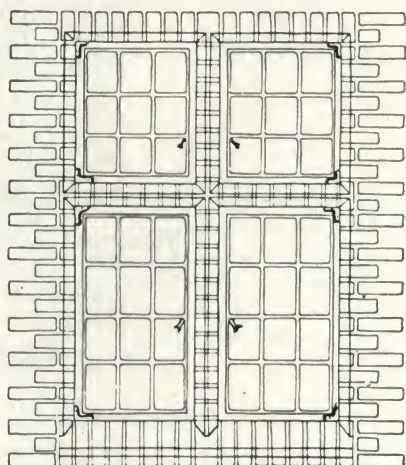
All Medal Brick are sorted on coming from the kiln into piles of like color and re-combined in definite color mingles according to specification.

Co-operative Service

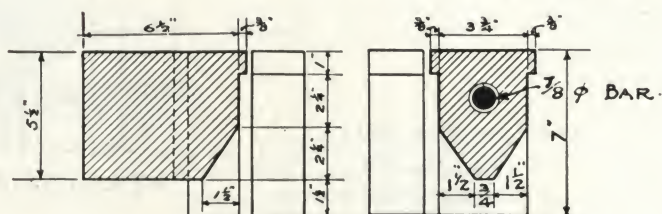
Factory representatives in all territories assist Medal dealers to solve special problems. Name of nearest dealer furnished on request.



• THE • MEDAL • BRICK • & • TILE • CO.:
• CLEVELAND • OHIO:

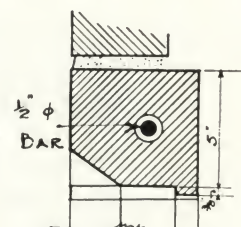


• ELEVATION •
• SINGLE • SPLAY • WINDOW •

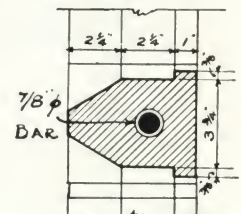


• JAMB •

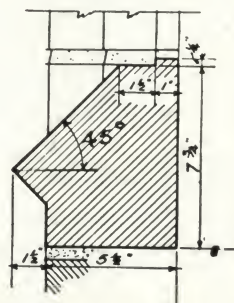
• MULLION •



• HEAD •



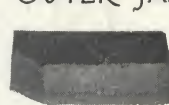
• TRANSOM •



• SILL •

FOR DOUBLE SPLAY WINDOW

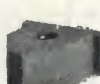
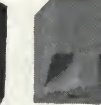
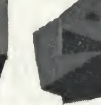
OUTER JAMB GROUP

A
Starter
(Made in R & L)B
Side JambC
Mitre
(Made in R & L)D
Head JambB-F
Outer & Inner
Jamb Brick

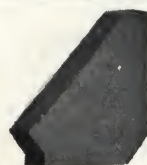
INNER JAMB GROUP

E
Starter
(Made in R & L)F
Side JambG
Mitre
(Made in R & L)H
Head JambI
Transom Intersector

MULLION AND TRANSOM BAR GROUP

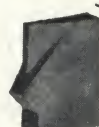
J
StarterK
Mullion
HeadL
IntersectorM
Mullion and
TransomF-M
Double Splay
MullionQ
Special
Mullion HeadR
Double Splay
Mullion Starter

SILL GROUP

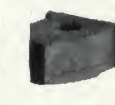
N
Sill BrickO
Brick under
Inner Jamb StarterP
Brick under
Mullion StarterS
Octagon

FOR SINGLE SPLAY WINDOW

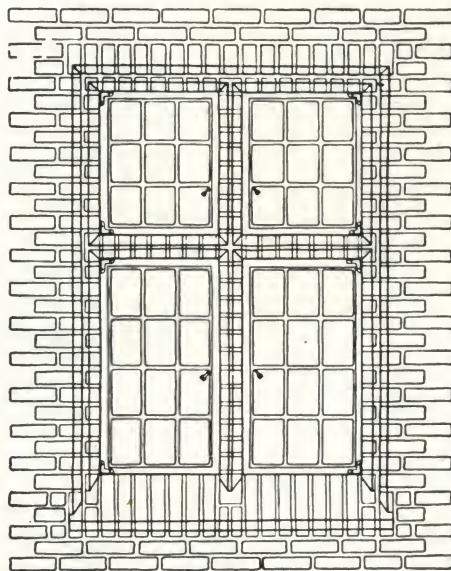
JAMB GROUP

A-1
Jamb Starter
(Made in R & L)B-1
Jamb BrickC-1
Mitre
(Made in R & L)D-1
Head JambP
Side Jamb

MULLION, TRANSOM & SILL GROUP

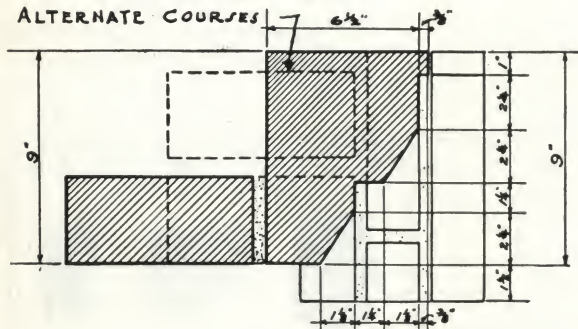
I
Transom
IntersectorJ-1
Mullion
StarterK-1
Mullion
HeadL
IntersectorM
Mullion and
Transom BrickN-1
Sill Brick

•THE•MEDAL•BRICK•&•TILE•CO:
•CLEVELAND•OHIO•

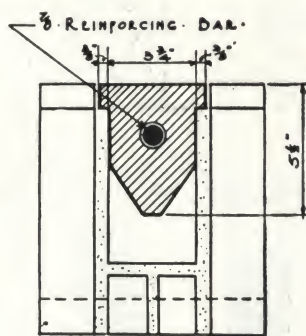


•ELEVATION•

•DOTTED LINES INDICATE
•ALTERNATE COURSES

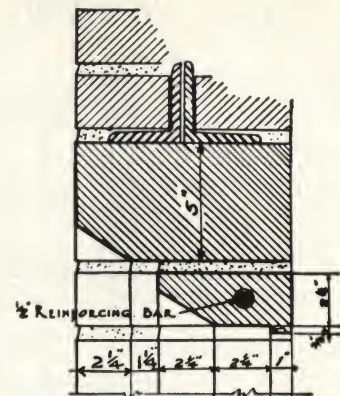


•JAMB•

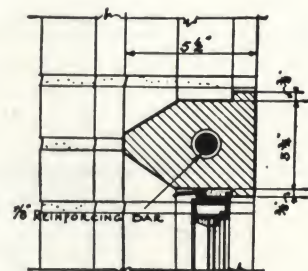


•MULLION•

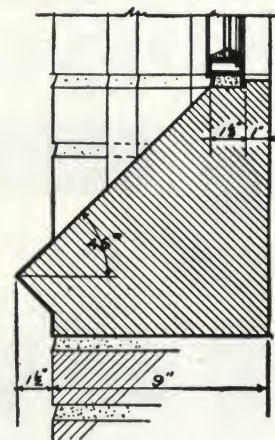
•DOUBLE SPLAY WINDOW•



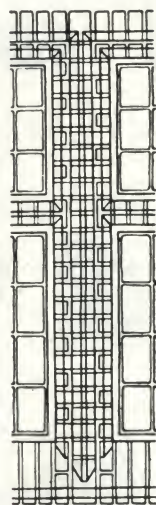
•HEAD•



•TRANSOM•

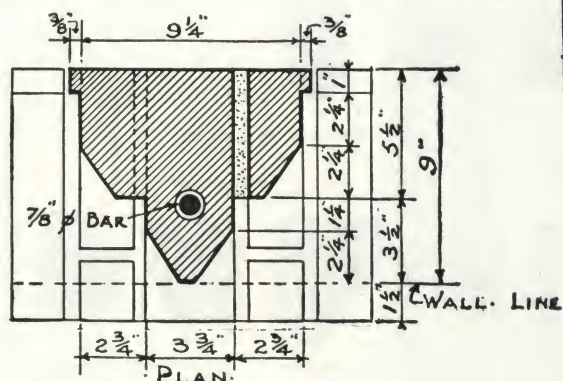


•SILL•



•ELEVATION•

•DOUBLE SPLAY MULLION
•USED IN CONNECTION WITH
•DOUBLE SPLAY WINDOW•



•PLAN•
•DOUBLE SPLAY MULLION•

•DETAILS AGE-CROST WINDOW BRICK•

•BRICK OPENINGS SHOULD BE INCREASED $\frac{1}{4}$ " IN.
•WIDTH & HEIGHT ABOVE SIZES SHOWN ON
•CASEMENT WINDOW SCHEDULES•

SAYRE & FISHER COMPANY

Manufacturers of All Kinds of Brick

261 Broadway (corner Warren Street)
NEW YORK, N. Y.

Products

FINE PRESSED FRONT BRICK; ENAMELED BRICK.

In the Red Brick Department: HARD BUILDING BRICK; SELECTED COLONIAL BRICK; "S. & F." CLINKER STRETCHERS; "RAIN-WASHED," "OLD ENGLISH" RED, REPPRESSED DOWN-DRAFT RED, and REPPRESSED UP-DRAFT RED STRETCHERS, and BLACK HEADERS for Facing; HOLLOW BRICK and FIRE BRICK.

Front Brick in Various Colors

Manufactured by this company in a great variety of colors: white, light and dark buff, red, gray, old gold, rough face Persian and mottled—other shades to order—enabling architects to select a material that, while fire resisting and easily handled, shall permit them to lighten and beautify and add strength and variety to a street façade.

Superior Enameled Brick

Superior enameled brick is manufactured in white and various colors. They are coming into more general use for a great variety of purposes, and are especially adapted for lining of waiting rooms of railroad stations, tunnels, markets, hospitals, engine and boiler rooms, kitchens, etc.

Porcelain (Dull Finish) Enameled Brick for Outside Work

Several million used in prominent city buildings.

Red Brick Department

Hard Building Brick—Hard burned, dark red color. Shipments in cargo lots, via our fleet of barges or schooners, or via rail to all points. A very economical building brick for heavy construction work.

Selected Colonial Brick—For facing. Of general dark red color and sufficiently varied in color and shape for "Harvard" work. These are very desirable for Colonial work.

"S. & F." Clinker Stretchers—These are also for facing. Sometimes called "Clinker Brick," because they are nearest the fire in the kilns and are burned black and twisted.

"Rain-washed" Red Stretchers—A pitted face

brick and laid either with or without Black Headers. A "chance" product caused by rain on the brick when in a green state in open yards.

"Old English" Red Stretchers—This product is something new and is about the size of the Old English Brick, made in dark red tone and measuring about $8\frac{7}{8} \times 2\frac{7}{8} \times 4$ in.

Over 600,000 in the new Curtis Publishing Company's Building in Philadelphia. Selected by the architects after searching the Old World for ideas that were unique and artistic.

Repressed Up-draft Red Stretchers—Same as the Down-draft, except that these show light and dark kiln marks on the stretcher side, which gives a diversified effect.

Repressed Down-draft Red Stretchers—These are of a dark cherry red color and very popular for face work.

Sears, Roebuck Company, Philadelphia, Pa., used 3,000,000.

Black Headers—Made to be used with the Selected Colonial Brick or Repressed Stretchers for the "Harvard" effect if desired.

Hollow Brick—Both stretchers and headers (Haverstraw size) of a very superior quality. They can be furnished in cargo lots.

Fire Brick

Three grades: "Sayre & Fisher Extra," No. 1 "Phoenix" and No. 1 "Flue." Very desirable for boiler settings, furnace linings, etc., in all standard sizes.

Shipping Facilities

The favorable location of the SAYRE & FISHER COMPANY works at deep water on the Raritan River, in New Jersey, permits the loading of vessels of large draught.

Shipments can also be made direct to all points connecting with any line of railroad.

Export Trade

With such adequate and satisfactory facilities for shipment, as well as such large and complete stock always on hand, our export trade has grown to great proportions and is still increasing.



BRICK WORKS OF THE SAYRE & FISHER COMPANY, SAYREVILLE (ON RARITAN RIVER), N. J.

THE STARK BRICK COMPANY

Manufacturers of Stark Salt Glazed Brick

CANTON, OHIO

FACTORY, EAST CANTON, OHIO

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Product

STARK SALT GLAZED BRICK.

A smooth standard size ($8 \times 2\frac{1}{4} \times 3\frac{7}{8}$ in.) fire clay brick, glazed on the face, back and both ends. The glaze is a thin coating of glass fused with the body of the brick, which renders these surfaces impervious.



TRADE-MARK

special purposes, such as the walls of basements, gymnasiums, powerhouses, schools, lavatories, corridors, creameries, and food product plants, laboratories, etc.

They can also be used effectively in fireplaces where the glaze makes them easy to keep clean.

Representation

In order to promptly and efficiently care for the needs of our customers, we have appointed agents in all the principal cities of the United States and Canada, who are constantly in touch with the factory.

A line from you will bring prices, samples, literature and any other information desired, from our nearest representative.

Colors

Stark Salt Glazed Brick are produced in a variety of colors. The glaze is applied during the burning process and being transparent, or nearly so, produces a very pleasing effect.

Shaded Brick—Brick as near as practicable a single color. These shades are designated by the following numbers: 50, 55, 60, 75, 80, 90, and 95. No. 50 is the light shade and No. 95 the dark.

Mingled Shades—A harmonious mixture of colors. We have three distinct mixtures as follows:

Gratones—A blend of gray colored brick.

Buftones—A blend of light buff colored brick.

Darctones—A blend of dark buff and mahogany colored brick.

In addition to the above shades and blends of first quality brick, we have:

Courts—Brick having small defects (mostly handling chips), mingled in shade, light and dark.

Commercials—Brick having larger defects, including factory and kiln marks. This quality is the least expensive and is also free from crooked or warped brick. Mingled in shade, light or dark.

Nature and Uses

The glazed surfaces of the brick may be cleaned with acid. Even such acids as hydrochloric, sulphuric or nitric in concentrated form, will not affect the glaze, although their use in the concentrated form as cleaning agents is not recommended, since they attack cement or lime mortar. An alkaline solution, such as caustic soda, is recommended for this purpose.

Because of the ease with which they can be cleaned, Stark Salt Glazed Brick are used for a variety of

Shape Brick

The illustrations on the following page show the various shapes carried in stock, and include bullnose, cap mould and cove shapes, with which almost any desired architectural effect can be produced. The 2-in. radius is standard.

Special shapes are made to order and require from two weeks to a month to produce.

Shipment of any of the standard shapes can be made immediately from yard stocks.

Our plant is one of the largest salt glaze brick manufactories in the world, having a normal capacity of three million brick per month.

Shipping Facilities

Our plant is located at East Canton, Ohio, on the Wheeling and Lake Erie Railroad, which is able to furnish abundant cars for all requirements. The Wheeling and Lake Erie makes direct connection with the Erie, New York Central, Nickel Plate, Baltimore & Ohio, Michigan Central, Pere Marquette, and other leading trunk lines.

References

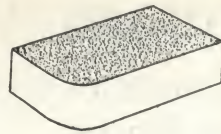
Stark Salt Glazed Brick have been widely used throughout the United States and Canada.

A few recent jobs are listed below:

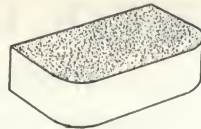
Ford Administration Building, Detroit, Mich.
Taylor-Allderdice High School, Pittsburgh, Pa.
Architectural Building, University of Michigan, Ann Arbor, Mich.
Illinois Steel Company, Gary, Ind.
Detroit Edison Power Company, Detroit, Mich.
Ohio State Armory, Canton, Ohio
Sing Sing Prison, Ossining, N. Y.
Merriman Ave. Fire Station, Asheville, N. C.
Shady Hollow Country Club, Massillon, Ohio
Central Alloy Steel Corp., Massillon, Ohio
Providence High School, Providence, R. I.
Peoples Gas Light Coke Co., Chicago, Ill.
Northern Electric Co., Wausaukee, Wis.
Alton High School, Alton, Ill.
Y. W. C. A., Jersey City, N. J.
Prescott High School, Lincoln, Neb.
Little Rock High School, Little Rock, Ark.
Stark County Tubercular Hospital, Canton, Ohio
The Animal House, Belle Isle, Detroit, Mich.
William & Mary College, Science Hall, Williamsburg, Va.
Hamilton General Hospital, Hamilton, Ont., Canada
London Collegiate, London, Ont., Canada



STANDARD



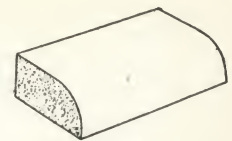
No. 1
BULLNOSE



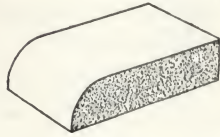
No. 2
DOUBLE BULLNOSE



No. 3
BULLNOSE INTERNAL



No. 4
BULLNOSE STRETCHER



No. 5
BULLNOSE HEADER



No. 6
BULLNOSE
EXTERNAL
CORNER,
SQUARE



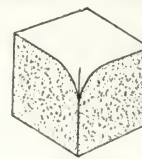
No. 7
BULLNOSE
EXTERNAL
CORNER,
SQUARE



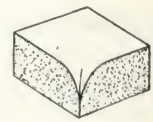
No. 8
BULLNOSE
EXTERNAL
CORNER,
ROUND



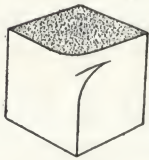
No. 9
BULLNOSE
EXTERNAL
CORNER,
ROUND



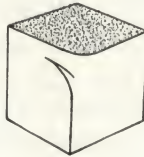
No. 10
BULLNOSE
INTERNAL
CORNER



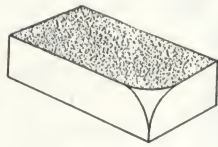
No. 11
BULLNOSE
INTERNAL
CORNER



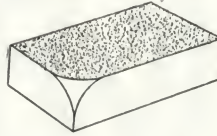
No. 12
BULLNOSE
SILL AND
JAMB MITRE,
LEFT



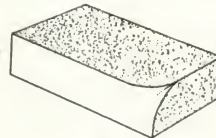
No. 13
BULLNOSE
SILL AND
JAMB MITRE,
RIGHT



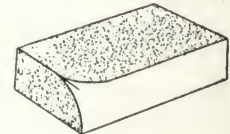
No. 14
BULLNOSE STARTER,
LEFT



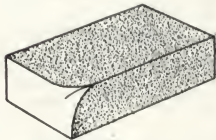
No. 15
BULLNOSE STARTER,
RIGHT



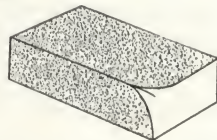
No. 16
BULLNOSE MITRE,
LEFT



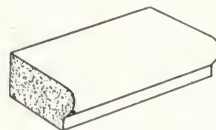
No. 17
BULLNOSE MITRE,
RIGHT



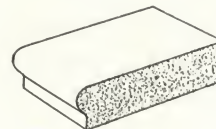
No. 18
BULLNOSE HEADER
MITRE, LEFT



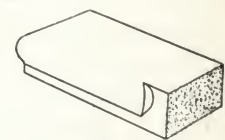
No. 19
BULLNOSE HEADER
MITRE, RIGHT



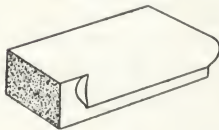
No. 20
CAP MOULD
STRETCHER



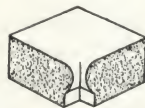
No. 21
CAP MOULD HEADER



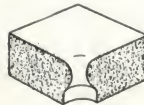
No. 22
CAP MOULD STARTER,
LEFT



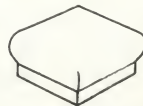
No. 23
CAP MOULD STARTER,
RIGHT



No. 24
CAP MOULD
INTERNAL
CORNER,
SQUARE



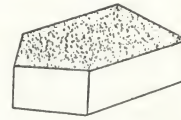
No. 25
CAP MOULD
INTERNAL
CORNER,
ROUND



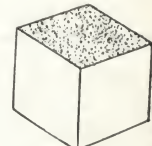
No. 26
CAP MOULD
EXTERNAL
CORNER,
SQUARE



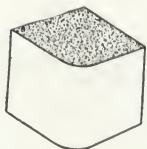
No. 27
CAP MOULD
EXTERNAL
CORNER,
ROUND



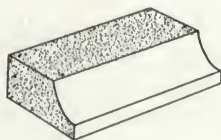
No. 28
OCTAGON



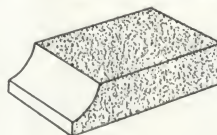
No. 29
SQUARE
ROWLOCK
CORNER
BLOCK



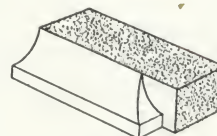
No. 30
BULLNOSE
ROWLOCK
CORNER BLOCK



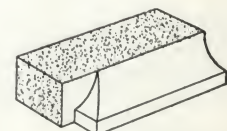
No. 31
COVE STRETCHER



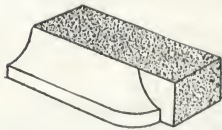
No. 32
COVE HEADER



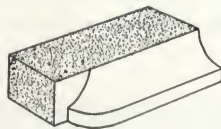
No. 33
SQUARE COVE STARTER,
LEFT



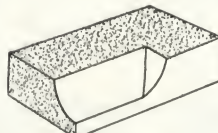
No. 34
SQUARE COVE STARTER,
RIGHT



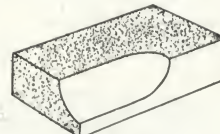
No. 35
ROUND COVE STARTER,
LEFT



No. 36
ROUND COVE STARTER,
RIGHT



No. 37
COVE INTERNAL
CORNER, SQUARE



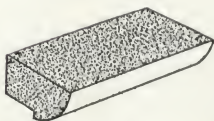
No. 38
COVE INTERNAL
CORNER, ROUND



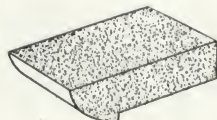
No. 39
COVE
EXTERNAL
CORNER,
SQUARE



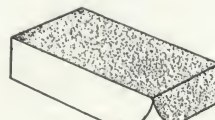
No. 40
COVE
EXTERNAL
CORNER,
ROUND



No. 41
LINTEL STRETCHER



No. 42
LINTEL HEADER



No. 43
LINTEL STARTER, LEFT



No. 44
LINTEL STARTER, RIGHT

Standard Shapes

WESTERN BRICK COMPANY

Manufacturers of Face Brick, Common Brick,
Haydite and Featherweight Blocks

GENERAL SALES OFFICE
1604 Builders Building, CHICAGO, ILL.

OFFICE AND FACTORIES
DANVILLE, ILL.

BRANCH SALES OFFICES
INDIANAPOLIS, IND., 804 Hume-Mansur Building
FT. WAYNE, IND., 805 First National Bank Building
REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE MIDDLE WEST

Facilities

The WESTERN BRICK COMPANY manufactures annually 135,000,000 brick and tile at its two plants.

The shale and clay supply for these factories is practically inexhaustible; fuel supply is owned by the company in sufficient quantities to last at least twenty-five years.

Shipping facilities are unequalled, as the product is distributed from Danville over seven railroads. Plants have side track room for about 75 cars, and ordinary daily shipments, during the building season, exceed 500,000.

Over 1,700,000,000 brick have been manufactured and marketed during the past twenty-seven years.

Western Haydite

Haydite, the material from which the Government's concrete ships were made during the war, is a lightweight, burned clay aggregate, specially manufactured for use in concrete and cement products in place of sand, gravel or crushed rock.



TRADE-MARK

"Western Haydite" weighs less than 1500 lb. per cu. yd. and the finished concrete, therefore, will average from 30 to 40% lighter than that made from regular aggregates.

It is burned in clinker form, then crushed and screened, which gives absolute control of the sizing, as well as producing particles of exceeding sharpness; therefore, it makes a concrete of great compressive and tensile strength.

This aggregate has so many advantages that it is impossible to describe them fully in this one page. Special literature is available, free, upon request.

Western Featherweight Concrete Building Blocks

All of the Western Building Blocks are manufactured from Haydite lightweight aggregate.

In addition to withstanding every test required, no matter how exacting, these blocks in 8x8x16-in. size weigh less than 30 lb. and nails can be driven into them with the assurance that they will not work loose.

This is a new product for 1928 and we expect to produce all standard sizes and shapes.

WESTERN STANDARD FACING BRICK

Colors	Stipple V	Gothic stippled	Doric stippled	Stipple X		Veetex vert. scored	Matte matte	Cloister smooth	Ivory smooth	Bronze smooth	Empire scratched and rolled
	Plant No. 3	Plant No. 1	Plant No. 3	Plant No. 1	Plant No. 3	Plant No. 1	Plant No. 3	Plant No. 1	Plant No. 3	Plant No. 3	Plant No. 1
Black to brown	861	71	871	271	811	321	841	410			Persian matte
Brown	862	72	872	272	812	322	842	422		1102	Plant No. 1
Brown to tan	863		873		813		843			1104	
Tan	864		874		814		844				Colonial distorted
Purplish brown		73		273							Plant No. 2
Reddish brown		74		274							
Green brown										1103	Sold in mingled shades of brown to red but percentages can be varied
Brown edge, red center		30		230		323		423			
Dark wine red						340		440			
Red						350		450			
Light red		35		235		355					
Very light red		36		236		360		460			
Tan to golden buff	866		876		816		846				
Golden buff	867		877		817		847				
Pinkish buff	868		878		818		848				
Pink	869		879		819		849				
Pearl gray									1016		
Mellow old ivory									1017		
Light ivory									1018		

Standard Blends: Doric Chicago; Dark Gothic; Stipple X; Stipple V; Stipple X Chicago; Stipple V Chicago; Dark Empire; Full Range Empire; Dark Persian; Full Range Persian; Dark Cloister; Red Cloister; Mosaic Mossblende.

WYANDOT CLAY PRODUCTS CO.

Manufacturers of Genuine Sand Molded Brick

UPPER SANDUSKY, OHIO

Wyandot Colonials

Wyandot Colonials are genuine sand molded brick, with beautiful color flashing. They have a smooth velvety texture in a color range of blue-black, brown, bright red hearts, dark cherry red, a lighter shade of clear red and a shade of russet bronze.

An exceptionally fine Harvard effect is obtained with this brick.

It is ideal and most consistent for Colonial work and the Tudor and Georgian types of Old English architecture.

Method of Preparing Clay and Plant Construction

The clay deposit at the WYANDOT CLAY PRODUCTS Co. plant is of fine quality and handled to make the finest textured brick possible. It is taken from the pit or storage directly to the huge rotary drying cylinder, where it is thoroughly dried. It then goes to the dry pan crusher, where it is pulverized and then screened through agitating fine mesh screens, which eliminate all foreign substances, reaching the pug-mill in a smooth, fine consistency, where it is molded into a brick of very dense texture and entirely free from laminations.

The brick are hard burned at very high temperature and, while being highly vitrified, the exterior remains smooth and velvety, of beautiful color harmony, but with no glaze or shine.

A huge clay storage shed in which five months' supply of clay is stored, which is used during the winter months, enables the plant to operate all year around, insuring service in any season of the year.

Shipping Facilities

Shipping facilities of the WYANDOT CLAY PRODUCTS Co. are ideal. The plant is located on the Hocking Valley R. R., a few hundred yards from the main line of the Pennsylvania R. R. The Hocking Valley connects directly with all the other east and west main trunk lines north of the Ohio River.

Examples for Reference Are Offered at the Following Locations

- T. K. Harris Residence, Canton, Ohio, Albrecht, Wilhelm and Kelly, Architects
- Germantown Hospital, Germantown, Pa., A. H. Brockie, Architect
- South High School, Glencoe, Ill., Franz Warner and W. F. McCornack and J. Archibald Armstrong, Architects
- Atkins Residence, Indianapolis, Ind., James Gamble Rogers, Architect
- Unitarian Church, Albany, N. Y., John W. Eames, Architect
- Harry S. Black Residence, Mansfield, Ohio, Louis Andre Lamoreux, Architect
- King Residence, Mansfield, Ohio, Clarence Mack, Architect
- Lamb Residence, Mt. Vernon, Ohio
- Fourth Junior High School, Trenton, N. J., Ernest Sibley and W. A. Klemann, Architects
- Elks' Home, Patchogue, L. I., N. Y., Louis E. Jallade, Architect
- New York Central Power Station, Scarsdale, N. Y., A. F. Halderman, Architect
- New York Central Power Station, Wakefield, N. Y., A. F. Halderman, Architect
- First National Bank Building, Louisville, Ky., Carl Zeigler, Architect
- St. Paul's Lutheran Church, Upper Sandusky, Ohio, Edwin F. Pruitt and Co., Architects
- Apartment Hotel, Washington, D. C.
- Rosemary Remembrance House, Columbus, Ohio, built by Ohio State Journal, J. Edgar Outcalt, Architect
- Moorestown Trust Co. Bank Building, Moorestown, N. J., Davis, Dunlap and Barney, Architects



Henry C. Atkins Residence, Indianapolis, Ind.
JAMES GAMBLE ROGERS, Architect



Harry Black Residence, Mansfield, Ohio
LOUIS ANDRE LAMOREUX, Architect



Russell Young Residence, Zanesville, Ohio
CHARLES INSCHO, Architect



Rex Lamb Residence, Mt. Vernon, Ohio
HOWELL & THOMAS, Architects

ESTABLISHED 1877

THE DELAWARE CLAY COMPANY

Manufacturers of Hollow Brick

DELAWARE, OHIO

EASTERN REPRESENTATIVES

CAMBRIDGE, MASS., E. G. CHISHOLM & Co.,
128 Sidney StreetPHILADELPHIA, PA., O. W. KETCHAM, 121
North 18th StreetWASHINGTON, D. C., O. W. KETCHAM,
Metropolitan Bank Building

Elsewhere, address the Company at Delaware, Ohio

Products

HOLLOW BRICK, HOLLOW BRICK HEADERS.

Also Standard Hollow Backing Tiles, Denison Interlocking Tile; Drain Tile, 3 to 30 in. diameter, inclusive.

Hollow Brick

Delaware Hollow Brick and Headers are standard brick size of design as illustrated. Their purpose is to back-up brick walls where insulation against dampness, heat and cold is desired. Also to lighten the loads on steel work and to eliminate furring, etc.

As hollow brick represent the safe medium between solid brick and hollow tile, partaking of the advantages of both, their use provides insulation without admitting the larger units of hollow backing tiles.

Supply

Having originated, developed and introduced hollow brick in the 90's, we built in 1901 a separate, especially designed factory to make this one article exclusively. The factory has operated continuously since then, turning out annually the largest hollow brick output in the world. Specializing in hollow brick alone in

large volume, this plant has become headquarters for this product throughout the country.

Quality

To satisfy a general preference on the part of contractors for a moderately porous hollow brick, as it aids in stabilizing the wall when laid in unfavorable weather and provides the best type of plastering surface, we manufacture Delaware Hollow Brick from clay, instead of shale or fire-clay, by a special steam-press moulding process, under extreme pressure. Sufficient compression is obtained upon walls and webs to permit comparatively large voids without sacrifice of strength, which provide maximum insulation by increased dead air cells.

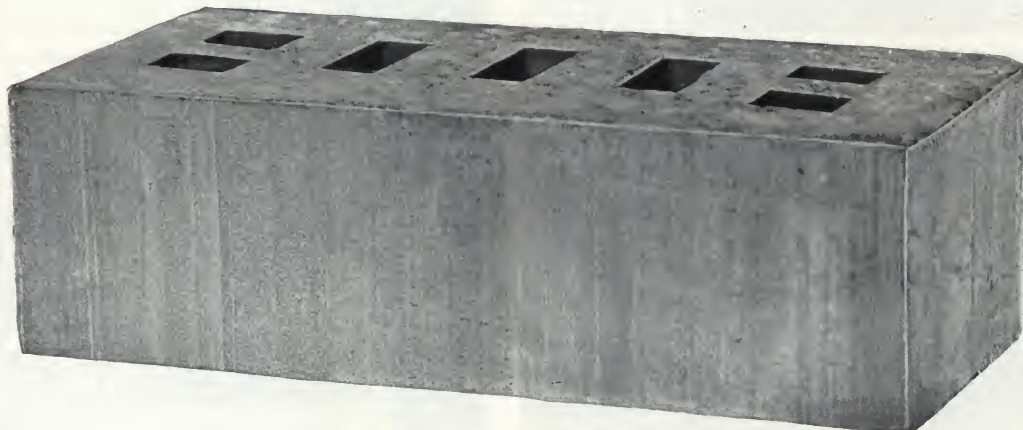
Cost

Delaware Hollow Brick weigh about 3 lb. each and may be shipped long distances economically. This company maintains at all times a lower price on Delaware Hollow Brick f.o.b. factory than current price on common brick. Therefore, the architect is safeguarded in specifying them.

Headers are furnished for header courses where required at the same price as stretchers f.o.b. factory.



Delaware Hollow Brick Stretcher
Standard Brick Size



Delaware Hollow Brick Header
Standard Brick Size

VITRIFIED CLAY PRODUCTS

Clay Products Association
Chamber of Commerce Building
CHICAGO, ILL.

Eastern Clay Products Association
Colonial Trust Building
PHILADELPHIA, PA.

Products

VITRIFIED SALT-GLAZED CLAY WALL COPING.
FIRE CLAY FLUE LINING.

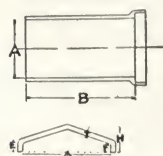
Vitrified Salt-glazed Clay Wall Coping

Vitrified clay wall coping can not wear out. Sun's heat and frost can not harm it. Moisture can not seep into and disintegrate it. Time can not discolor it.

The soft color of this wall coping blends well with almost any exterior treatment.

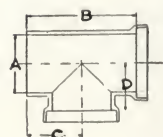
To give a smart finished look to the completed work and to insure its walls against decay for all time, specify vitrified salt-glazed clay wall coping.

Following are tables of standard sizes:



DOUBLE SLANT STYLE—STRAIGHT SECTIONS

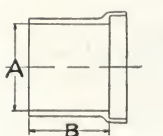
A In.	B In.	E In.	F In.	G In.	H In.	T In.
9	24	1 1/2	3/4	10 3/4	3 1/4	3/4
13	24	2 1/4	1 1/2	15 1/4	4	7/8
18	24	2 1/2	1 3/4	21	6	1



T-SECTIONS

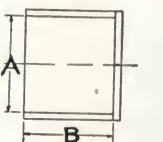
A In.	B In.	C In.	D In.
9	24	12	7 1/4
13	24	12	10
18	24	12	13

Dimensions C and D are approximate.



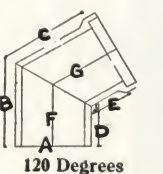
ENDS

A In.	B In.
9	24
13	24
18	24



STARTERS

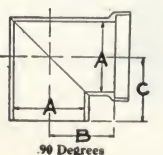
A In.	B In.
9	24
13	24
18	24



120 Degrees

CORNERS, RIGHT AND LEFT—120°

A In.	B In.	C In.	D In.	E In.	F In.	G In.
9	12	12	5 3/4	5 3/4	9	9
13	12	12	3 1/2	3 1/2	7 3/4	7 3/4
18	12	12	3/4	3/4	6 1/2	6 1/2



90 Degrees

CORNERS, RIGHT AND LEFT—90°

A In.	B In.	C In.
9	7 1/4	8 3/4
13	10	11 1/2
18	13	15

Fire Clay Flue Linings

According to insurance and fire marshall's reports, at least three out of every ten residence fires start at the chimney—the unreliable chimney is the greatest single cause of residence fires. The architect can completely cut out that hazard in the work he designs by specifying fire clay flue linings for all chimneys and chimney openings and connections.

Following are tables of standard sizes:



RECTANGULAR FLUE LINING

Outside dimensions, in.	Approximate weight per foot, lb.	Minimum thickness, in.	Length, ft.
4 1/2 x 8 1/2	14	5/8	2
4 1/2 x 13	19	3/4	2
8 1/2 x 8 1/2	19	3/4	2
8 1/2 x 13	28	7/8	2
8 1/2 x 17 1/2	37	1	2
13 x 13	36	1	2
13 x 17 1/2	52	1 1/8	2
17 1/2 x 17 1/2	70	1 1/4	2



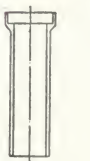
CIRCULAR FLUES

Inside diameter, in.	Approximate weight per foot, lb.	Minimum thickness, in.	Length, ft.
6	12	5/8	2
8	20	3/4	2
10	28	7/8	2
12	39	1	2
15	54	1 1/8	2
18	71	1 1/4	2
21	108	1 5/8	2
24	130	1 3/4	2



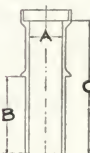
FIRE CLAY THIMBLES

Diameter, in.	Length, in.	Minimum thickness, in.
6	4 1/2, 6, 9 and 12	5/8
7	4 1/2, 6, 9 and 12	11/16
8	4 1/2, 6, 9 and 12	3/4
10	4 1/2, 6, 9 and 12	7/8
12	4 1/2, 6, 9 and 12	1



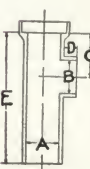
FLUE PIPE

Diameter.....in.	6	7	8
Length.....ft.	2	2	2



FLUE PIPE FITTINGS—BOTTOMS

A In.	B In. approx.	C Ft.
6	14	2
7	14	2
8	14	2



FLUE PIPE FITTINGS—OPENINGS

A In.	B In.	C In.	D In.	E Ft.
6 x 6		8	2 1/2	2
7 x 7		8	2 1/2	2
8 x 6		8	2 1/2	2
8 x 8		8	2 1/2	2

Dimensions C, D and E are approximate.

THE CARNEY COMPANY

MANKATO, MINN.

DISTRICT SALES OFFICES

CLEVELAND, OHIO, Leader-News Building
CHICAGO, ILL., Builders' Building

MINNEAPOLIS, MINN., Builders' Exchange

ST. LOUIS, MO., Louderman Building
DETROIT, MICH., Book Building

MILLS: MANKATO, MINN.; CARNEY, MINN.

QUARRIES: CARNEY, MINN.

Product

CARNEY CEMENT.

Description

THE CARNEY COMPANY has manufactured cement since 1883.

Carney Cement is unlike others used in brick and tile construction. It is made from a peculiar deposit of stone found only at Mankato, Minn. This stone contains the correct proportion of lime combined chemically, so that, when the stone is burned and ground, it needs nothing but sand and water to form a smooth working mortar.

Advantages

Carney Cement is lighter in weight, and is easier handled. It is packed in cloth or paper sacks, each containing 1 cu. ft. and weighing 50 lb. Users of Carney Cement are not required to buy lime, hence labor of slaking and mixing is eliminated. Carney Cement requires nothing but sand and water in mixing.

The simple mixing formula saves time and labor and eliminates the danger of carelessness. Addition of too much sand or adulteration at the mortar box interferes with the plastic, smooth-working properties of the cement and is immediately noticed by the masons.

Because of the plastic and smoother working properties masons can lay more brick per man per day. Carney Cement lays the maximum number of brick per barrel.

Carney mortar has no waste. Mortar left over at

CARNEY CEMENT

for Brick and Tile Mortar

the end of a day or when a job is delayed can be used the next day by re-tempering with water.

Because of its slower set there is no tamping of brick or

re-tempering on the mortar board.

Carney Cement can be used winter and summer. Frost does not affect the strength of Carney mortar in the wall. Printed directions on tags attached to the cement bags provide for its proper use in cold weather.

In the wall, Carney mortar returns to its native hardness, becoming harder than the brick it joins and, as the mortar is absorbed into the brick because of its slower setting properties, it exerts a tremendous gripping power. It makes one solid wall of masonry.

Specifications for Brick, Tile and Terra Cotta Mortar

Plain Mortar—For all brick, tile and terra cotta mortar above grade, use 1 part Carney Cement to 3 or 4 parts sand, depending upon quality of sand in accordance with the manufacturer's directions attached to the cement bags. Carney Cement mortar can be used for brick walls faced with Bedford stone without danger of staining the stone.

Colored Mortar—Use a good, double strength mortar color, and mix according to manufacturer's instructions.

Catalogue and Descriptive Literature

A catalogue covering every point on Carney Cement will be sent on request.

A list of buildings near you that have been laid up in Carney Cement, together with the names and addresses of the architects and contractors, will also be sent, if requested. We list a few below.

A Few Buildings Laid Up in Carney Cement

BUILDING	LOCATION	ARCHITECT*	CONTRACTOR*
American Furniture Mart.	Chicago, Ill.	Henry Raeder; Assoc. Geo. C. Nimmons & Co. and N. Max Dunning.	Wells Brothers Const. Co.
American Sugar Refinery	Baltimore, Md.	Chas. T. Main, Boston, Mass.	Stone & Webster, Inc., Boston, Mass.
A. T. & S. F. Office Bldg.	Topeka, Kan.	E. A. Harrison, Chicago, Ill.	Swenson Const. Co., Kansas City, Mo.
Athletic Club	Buffalo, N. Y.	Edw. B. Green & Sons.	John W. Cowper Co.
Athletic Club	Indianapolis, Ind.	Robert Frost Daggett.	Bedford Stone & Const. Co.
Bankers Reserve Life Insurance Co. Bldg.	Omaha, Neb.	F. A. Henninger.	Selden Breck Const. Co.
Buhl Bldg.	Detroit, Mich.	Smith, Hinchman & Grylls.	Davis & McGonigle Co.
Builders Exchange Bldg.	St. Paul, Minn.	Toltz-King & Day.	Lovering & Longbotham
City Club	St. Louis, Mo.	T. P. Barnett.	Ætna Bricklaying & Const. Co.
Coca Cola Factory	Atlanta, Ga.	Arthur Tufts Co.	Arthur Tufts Co.
Cregg Bldg.	Lawrence, Mass.	James E. Allen.	Louis Cyr
Etchison's Apartment Bldg.	Washington, D. C.	Stern & Tomlinson.	Maurice Wolfe
Exchange National Bank	Pittsburgh, Pa.	Weary & Alford, Chicago, Ill.	S. M. Seisel, Milwaukee, Wis.
Farmer's National Bank	Oklahoma City, Okla.	Hawk & Parr	Gross Const. Co.
Federal Reserve Bank	Chicago, Ill.	Graham, Anderson, Probst & White.	John Griffith & Son
Federal Reserve Bank	Kansas City, Mo.	Graham, Anderson, Probst & White, Chicago, Ill.	Geo. A. Fuller Co., Chicago, Ill.
Francis Marion Hotel	Charleston, S. C.	W. L. Stoddart, New York, N. Y.	John W. Cowper Co., Buffalo, N. Y.
Kentucky Military Institute	Louisville, Ky.	Nevin, Wischmeyer & Morgan.	Geo. A. Hoertz
Maison Blanche Store	New Orleans, La.	Emile Weil.	J. V. & R. T. Burkes
Memorial Stadium, University of Minnesota	Minneapolis, Minn.	Frederick Mann.	James Leck Co.
Peabody Hotel	Memphis, Tenn.	Walter W. Ahlschlager, Chicago, Ill.	B. W. Constr. Co., Chicago, Ill.
Scottish Rite Cathedral	Miami, Fla.	Kiehnel & Elliott, Pittsburgh, Pa.	John B. Orr
Union Bank Bldg.	Huntington, W. Va.	Meanor & Handloser.	Geo. A. Fuller Co., Washington, D. C.
Union Trust Co. Bldg.	Cleveland, Ohio.	Graham, Anderson, Probst & White, Chicago, Ill.	Thompson-Starrett Co., Chicago, Ill.
Union Trust Co. Bldg.	Dubuque, Iowa.	Weary & Alford, Chicago, Ill.	Stuffings Bros. Co., Chicago, Ill.
University of Virginia Gymnasium	Charlottesville, Va.	Fiske Kimball; Assoc. Peebles & Ferguson, Norfolk, Va.	King Lumber Co.

*Where address is omitted it is the same city as location of building.

Clinton Metallic Paint Company

Mortar Colors, Cement Colors, Protective Paints and Roofing Cement

100 Clinton Road
CLINTON, N.Y.

Branch Office: New York, N.Y., 19 Liberty Street. Telephone, John 3369

Products

Manufacturers of CLINTON MORTAR COLORS and CLINTON CEMENT COLORS.

Also manufacturers of Clinton Iron Oxide Protective Paints and Clinton Silk Fibre Elastic Roof Cement.

Experience

Ever since 1887, the CLINTON METALLIC PAINT COMPANY has served the architectural profession and the building trade. Over 40 years of scientific research and generations of manufacturing experience are reflected in the uniform excellence of Clinton products.

Clinton Mortar Colors

Nature's Permanent Colors—Made Since 1887—at Clinton, N.Y.

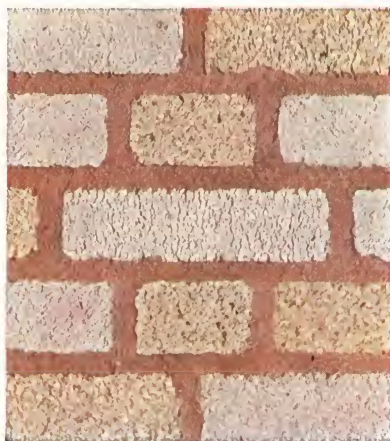
Permanent and Uniform

Clinton Mortar Colors are mineral colors, as permanent as the colors in natural rock. Rigid laboratory tests keep them absolutely uniform from shipment to shipment and from year to year.

oratory tests keep them absolutely uniform from shipment to shipment and from year to year.

Directions for Estimating and Using Clinton Mortar Colors

To get a mortar joint of intense color it is advisable to use approximately 100 lbs. of dry mortar color per 1000 brick laid in running or common bond, with half-inch mortar joints. If mortar joints are wider or narrower, or if a bond requiring more or less mortar



Mortar Colored with Clinton Pompeian Buff No. 600



Mortar Colored with Clinton Double Strength Olive Green No. 1503



Mortar Colored with Clinton Special Chocolate No. 404



Mortar Colored with Clinton Colonial Buff No. 700

Clinton Metallic Paint Company

per 1000 brick is used, the amount of mortar color required per 1000 brick should be increased or decreased proportionately.

Following are two formulas for mortar of deep intense color:

Cement Mortar

Clinton Mortar Color (dry)	25 lbs.
Portland cement	1 bag (1 cu. ft.)
Sand	3 cu. ft.
Hydrated lime	1/10 sack

The above is sufficient to lay approximately 250 brick in running or common bond with half-inch mortar joints.

Cement Lime Mortar

Clinton Mortar Color (dry)	30 lbs.
Portland cement	1 bucket (16 qts.)
Hydrated lime	1 bucket (16 qts.)
Sand	6 buckets (96 quarts)

The second formula is sufficient to lay approximately 300 brick in running or common bond with half-inch mortar joints.

As it is not always convenient to weigh the color on the job, we tabulate below the various shades of Clinton Mortar Color, showing in separate columns the number of quarts of dry Clinton Mortar Color (*struck measure*) which are equivalent to 25 lbs. and 30 lbs.

Caution: This table applies only to genuine Clinton Mortar Colors.

	Number of quarts	
	Equiva- lent to 25 lbs.	Equiva- lent to 30 lbs.
Clinton Hematite Red No. 10	10	12
Clinton Mortar Brown No. 400	8½	10½
Clinton D. S. Chocolate No. 402	9	11
Clinton Special Chocolate No. 404	9	11
Clinton Colonial Buff No. 700	19	23
Clinton Pompeian Buff No. 600	19	23
Clinton Dark Buff No. 717	16½	20
Clinton Mortar Black No. 900	18½	22½
Clinton D. S. Black No. 800	19	23
Clinton D. S. Olive Green No. 1503	17½	21

Pearl Gray Mortar may be produced by using one-eighth as much Clinton Double Strength Black No. 800 as is recommended above to produce intense black mortar.

Clinton Mortar Black No. 900 or Single Strength Black, as it is sometimes called, will not give a jet black mortar. For best work use Clinton Double Strength Black No. 800.

If a clear buff mortar is desired a cement-lime mortar is recommended. Light colored cement and sand also tend to make the color of the mortar more brilliant. If a deep buff mortar is

desired it will be obtained most readily by using a cement mortar with cement and sand of dark color.

Many contractors get good results with smaller proportions of Clinton Mortar Colors than those above recommended. This is possible if coarse sand is used and all ingredients are mixed, remixed, then mixed again. Experience, however, proves that the amounts of color recommended will give good results under all conditions and we cannot assure satisfaction if less color is used. *Money spent for a little extra color more than pays for itself, in power and wages saved at the mixer and in the owner's satisfaction with the finished job.*

Coloring of Stucco

The fact that stucco may be tinted has added much to its popularity as a facing material. By use of various Clinton Mortar Colors, it is possible to color stucco in many pleasing tones.

The following formula is suggested:

1 quart Clinton Color
10 quarts <i>White</i> Portland Cement
30 quarts White Sand or Marble Dust

This batch covers about 125 sq. ft. finish coat. Only the finish coat need be colored. Not to exceed one quart of Hydrated Lime may be added to this batch, if desired.

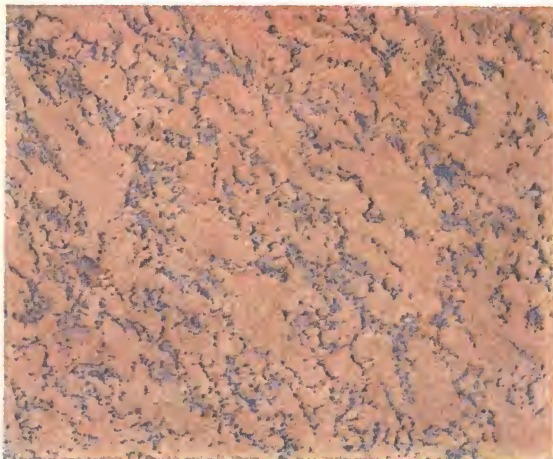
Shade Produced

Name of Clinton Color to be used.		Approximate weight per quart
Rich Red	Clinton Red Cement Color No. 92	2½ lbs.
Rich Pink	Clinton Hematite Red No. 10	2¾ lbs.
Pinkish Brown	Clinton Mortar Brown No. 400	3 lbs.
Seal Brown	Clinton Brown Cement Color No. 1150	1½ lbs.
Pinkish Buff	Clinton Pompeian Buff No. 600	1½ lbs.
Light Cream	Clinton Colonial Buff No. 700	1½ lbs.
Brilliant Yellow	Clinton Yellow Cement Color No. 715	1 lb.
Deep Buff	Clinton Dark Buff No. 717	1¾ lbs.
Turquoise Green	Clinton Green Cement Color No. 1502	2 lbs.
Light Blue	Clinton Blue Cement Color No. 1601	1¼ lbs.
Light Gray	Clinton Mortar Black No. 900	1½ lbs.
Deep Gray	Clinton Double Strength Black No. 800	1½ lbs.

Folder No. 300 including above data and additional practical information concerning mixing and use of Clinton Colors will be gladly sent upon request.

Specification

All coloring material to be manufactured by Clinton Metallic Paint Co., Clinton, N. Y., to be delivered on the job in original packages bearing their labels, and to be used according to directions which they will furnish.



Duo- and Multi-colored Stucco

Here are illustrated two panels of duo-colored stucco made with Clinton Colors. Folder No. 301 containing instructions for producing these effects together with more detailed instructions concerning the use of Clinton Colors in stucco will be gladly sent if requested.



KOSMOS PORTLAND CEMENT COMPANY

INCORPORATED

SALES OFFICE

LOUISVILLE, KY.

MILL: KOSMOSDALE, KY.

Products

KOSMORTAR, and KOSMOS PORTLAND CEMENT.

Kosmortar

A very smooth working cement for masonry of all kinds. Mixed with sand and water only, by hand or machine, it is ready for immediate use. No slaking. No additions. Minimum labor.



Characteristics of Kosmortar

Strength—Ample for all masonry. Makes mortar of about the same strength as a 50% mixture of portland cement and lime with much better working qualities.

Appearance—The natural color of Kosmortar is a light gray. It contains nothing that will react unfavorably on mortar colors, or cause efflorescence. Joints cut clean, giving a neat effect, and saving much labor. For practical purposes it is non-staining with Bedford stone.

Durability—Kosmortar passes the same soundness test as portland cement. Every step in its manufacture is under complete control and it may be depended upon for uniformity. Joints made with Kosmortar are water repellant to a high degree.

Set—Kosmortar is made slow setting to permit placing in the wall without rettempering, which is never necessary with Kosmortar under proper management. Rettempering a mason's cement sacrifices the advantages of strength, speed and labor saving that are the chief reasons for using this modern substitute for lime. It may be done but it should not be done, and Kosmortar is so made that it is not necessary. The set is accelerated somewhat for winter shipments.

Package—Kosmortar is packed only in multiwall paper sacks which give the maximum protection and allow no refilling. A sack weighs 75 lb. The unit of sale is a barrel of 300 lb., which means four sacks. Directions for use on each sack.

Amount Required—This varies with the sand used and the ideas of the various bricklayers. A good average is 1 barrel (4 sacks) of Kosmortar to 1000 brick. In tests as many as 1284 brick have been laid (slushed joints) with a barrel of Kosmortar without detracting from the strength or plasticity.

Opinions of Kosmortar

Architect—"Kosmortar joints are hard and durable, providing an excellent bond."

JOSEPH AND JOSEPH, Architects, Louisville, Ky.

Brick Manufacturer—"We believe Kosmortar is the best of the mason's cements and are especially enthusiastic about its performance with mortar colors in connection with our face brick".

DECATUR BRICK COMPANY, Decatur, Ill.

Contractor—"Our brick foremen believe that your product is the best of the patented cement mortars from the standpoint of economy and fast brick laying. The masons particularly like Kosmortar because of the ease of handling, and our experience with it on numerous jobs justifies their belief."

THE MIDDLE STATES CONSTRUCTION COMPANY,
Columbus, Ohio

Report of Kosmortar Tests

(1) Made by Robert W. Hunt & Co., Chicago, Ill., from sample received March 23, 1923.

Soundness O.K.

Time of Setting:

Initial 6 hr. 00 min.

Final 17 hr. 30 min.

Fineness:

Passing 100 mesh..... 95.80%

Passing 200 mesh..... 81.40%

Tensile Strength (1 part Kosmortar, 3 parts sand):

Average 7 days..... 70 lb. per sq. in.

Average 28 days..... 155 lb. per sq. in.

(2) Made by H. C. Nutting Co., Cincinnati, Ohio, from sample received February 20, 1924.

Compression Strength (1 part Kosmortar to 3 parts sand):

28-day test..... 1376 lb. per sq. in.

Tests of Kosmortar along with other mortars for working qualities, color and strength, are welcomed. Kosmortar excels other prepared mortars in working qualities and will give at least 50% more strength.

Kosmos Portland Cement

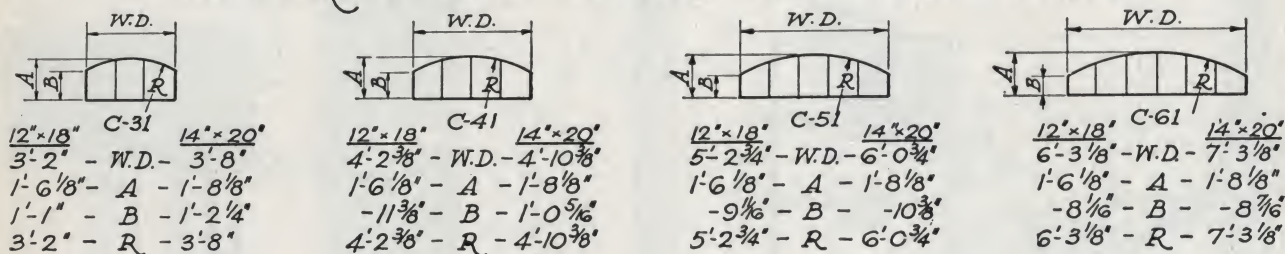
Many twenty-year old buildings of all sorts prove its durability. It responds exceptionally well to modern methods of concrete making for high early strength.

In July, 1927, a piece of roadway near Kosmosdale, required for immediate use, was laid with Kosmos cement, using a 1 : 2 : 3 mix and 5 gal. of water to a sack, giving a 1-in. slump. In 21 hours after laying, loaded trucks of a gross weight of 11½ tons were run over this roadway and have been using it ever since without sign of failure.

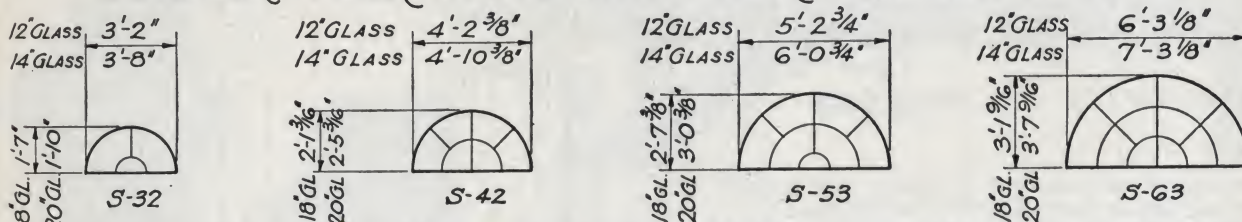
Cylinders of this concrete gave strength in compression of 1256 lb. per sq. in. in 24 hours,



• CAMBER • HEAD • UNITS • ONE • PANE • HIGH •



• SEMICIRCULAR • UNITS • NOT • OVER • SIX • PANES • WIDE •



• ALL ABOVE CAMBER HEAD AND SEMICIRCULAR UNITS HAVE NO. 70 SECTION AT SILL FOR ATTACHMENT TO TOP OF SINGLE SQUARE HEAD SASH, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. -1- BELOW.

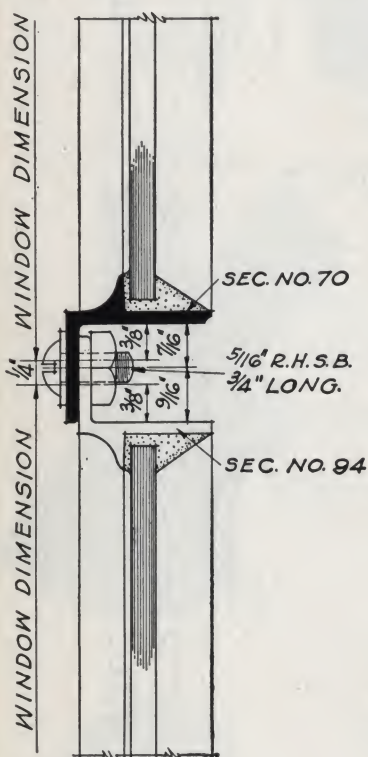


FIG. -1

SECTION THRU UNIT
UP TO AND INCLUDING
SIX PANES IN WIDTH.

• DETAILS • SCALE: HALF • FULL • SIZE •

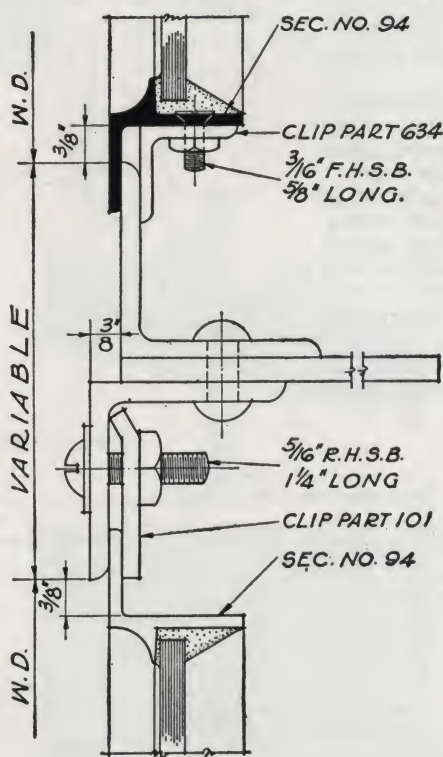
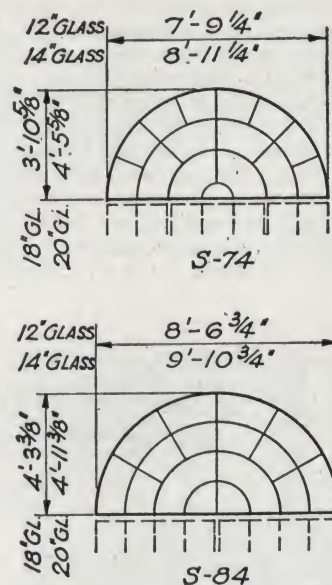


FIG. -2

SECTION THRU UNIT OVER SIX
PANES IN WIDTH. FOR SIZE OF
STRUCTURAL MULLION SEE PLATE L-107

• SEMICIRCULAR • UNITS • MORE • THAN • SIX • PANES • WIDE •

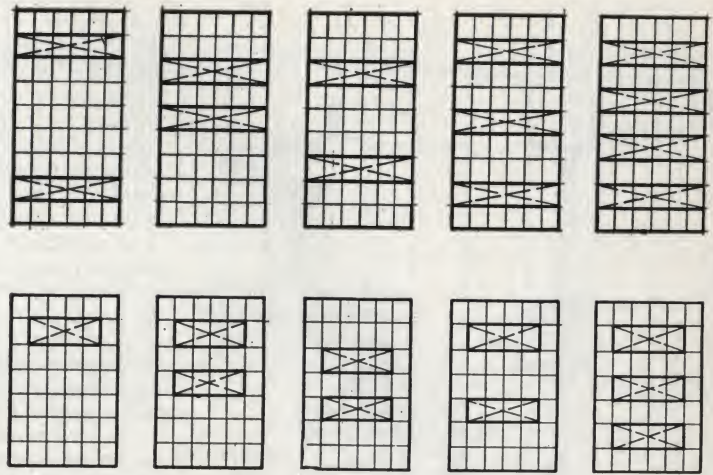
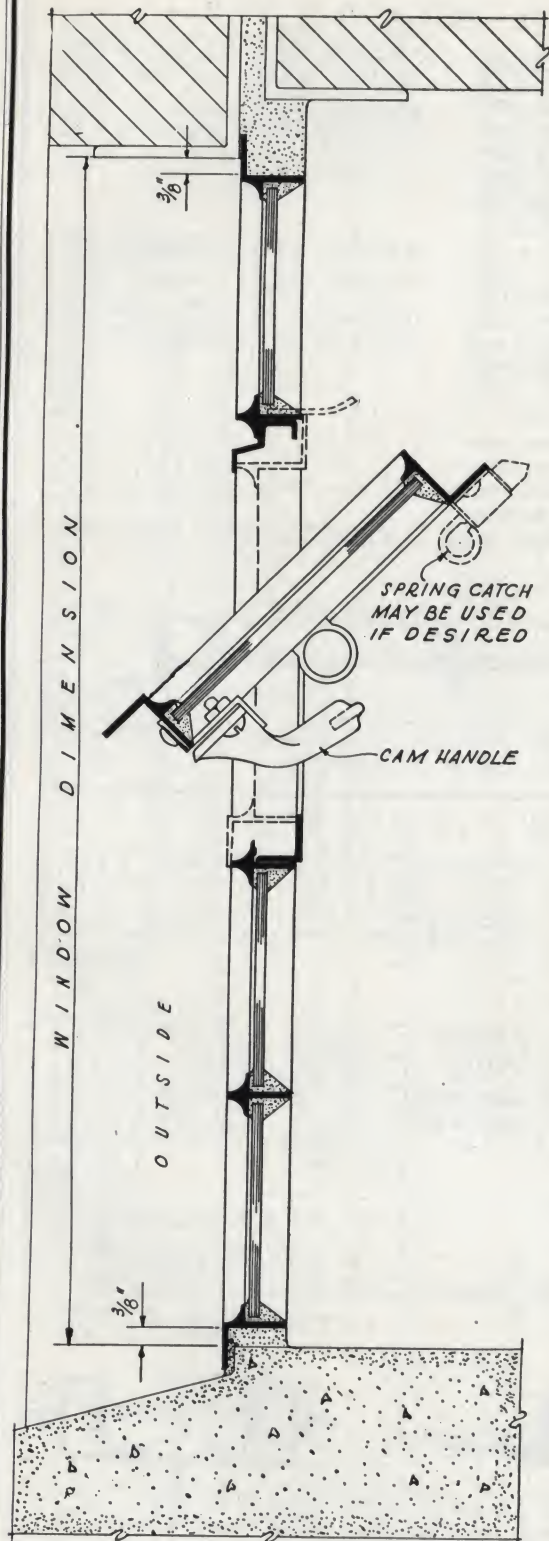


SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE HAVE NO. 94 SECTION AT SILL FOR ATTACHMENT TO MULTIPLE UNIT OPENING WITH STRUCTURAL HORIZONTAL MULLION, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. 2

Fenestra
August 1927

Horizontally Pivoted Windows
Camber and Semi-Circular Heads

Plate No
L-109



SUGGESTED VENTILATOR ARRANGEMENTS
 VENTILATORS MUST HAVE FIXED PANE BETWEEN

NOTES

DESIGNED TO ACT AS A COMBINATION STEEL WINDOW AND STEEL GRATING IN PRISONS, HOSPITALS, PENITENTIARIES AND REFORM SCHOOLS.

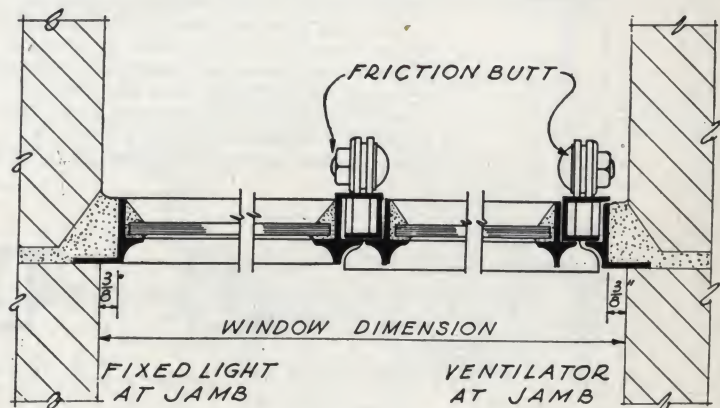
GLASS LIGHTS USUALLY 7'9\"

VENTILATORS MAY OPERATE INDIVIDUALLY OR IN MULTIPLE RUNS CONTROLLED MECHANICALLY FROM ONE OR MORE CENTRALLY LOCATED STATIONS.

FIXED LIGHT WINDOWS OF THIS TYPE FREQUENTLY USED UNGLAZED AS GRATINGS OUTSIDE MOVABLE WOOD WINDOWS.

NO STANDARDIZED TYPES OR SIZES. SUGGESTED VENTILATOR ARRANGEMENTS SHOWN ABOVE.

TABLE OF SIZES	
WIDTHS	
4 PANES	2'-6 3/8"
5 PANES	3'-1 3/4"
6 PANES	3'-9 1/8"
7 PANES	4'-4 1/2"
8 PANES	4'-11 7/8"
HEIGHTS	
4 PANES	3'-2 3/8"
5 PANES	3'-11 3/4"
6 PANES	4'-9 1/8"
7 PANES	5'-6 1/2"
8 PANES	6'-3 7/8"
9 PANES	7'-1 1/4"



VERTICAL SECTION

HORIZONTAL SECTION

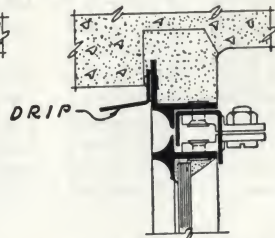
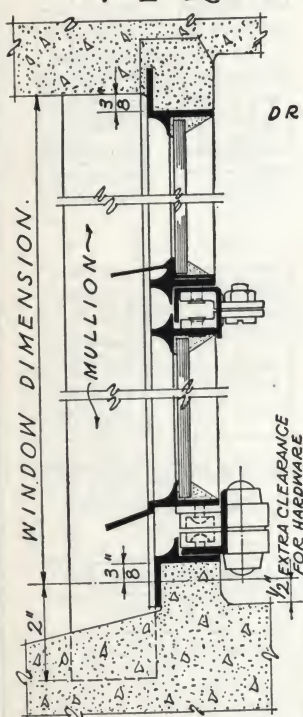
SCALE: 3'-1'-0"

Fenestra
 August 1927

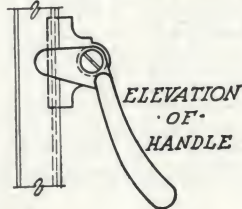
Steel Detention Windows
 Types and Cross Sections

Plate No
 L-201

VERTICALLY PIVOTED WINDOWS



•DETAIL WHEN
VENT COMES TO
HEAD OF WINDOW•



ELEVATION
OF
HANDLE

NOTE - VERTICALLY PIVOTED WINDOWS ARE MADE ONLY IN THE TYPES SHOWN IN ELEVATION.

RIGHT HAND SIDE OF WINDOW, VIEWED FROM OUTSIDE WILL SWING OUT IN ALL CASES.

A SINGLE LOCKING HANDLE WILL BE USED FOR ALL VENTILATORS AND WILL BE LOCATED 4" ABOVE CENTER FOR TWO PANE HIGH AND ON CENTERLINE ON ALL THREE PANE HIGH TYPES.

THESE WINDOWS MAY ALSO BE USED IN STEEL CONSTRUCTION. FOR DETAILS SEE INSTALLATION DETAILS FOR STEEL ON PLATE L-105

2 PANES HIGH
18" GL - 3'-1 7/8"
20" GL - 3'-5 7/8" 22 1/4

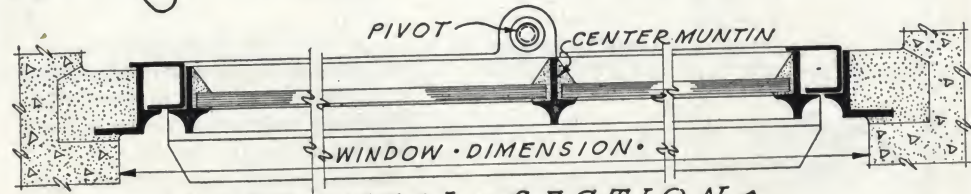
3 PANES HIGH
18" GL - 4'-8"
20" GL - 5'-2" 23 1/6

4 PANES HIGH
18" GL - 6'-2 3/8"
20" GL - 6'-10 3/8" 24 1/6

5 PANES HIGH
18" GL - 7'-8 3/4"
20" GL - 8'-6 3/4" 25 1/6

2 PANES WIDE
12" GLASS - 2'-1 7/8"
14" GLASS - 2'-5 5/8"

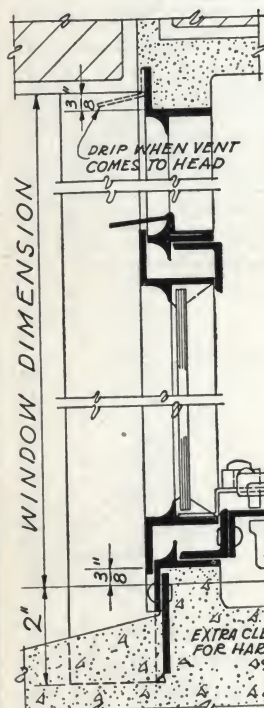
•STANDARD TYPES•



•VERTICAL SECTION•

•HORIZONTAL SECTION•

SIDE HINGED WINDOWS



NOTE - SIDE HINGED OPEN OUT WINDOWS ARE MADE ONLY IN THE TYPES SHOWN IN ELEVATION. ALL HAVE THE VENTILATORS COMING TO THE JAMB OF THE WINDOW.

WHEN MULLIONS ARE USED BETWEEN TWO UNITS, IT IS NECESSARY THAT THE VENTILATORS BE HINGED AT THE MASONRY JAMB AND NOT AT THE MULLION JAMB DUE TO THE HINGE INTERFERING WITH MULLION.

JAMB PLATES ARE RECOMMENDED AND SHOULD BE USED AT BOTH JAMBS AND SILL FOR SINGLE OPENINGS AND ON MASONRY JAMBS AND SILL FOR DOUBLE OPENINGS.

A SINGLE LOCKING HANDLE WILL BE USED FOR ALL VENTILATORS AND WILL BE LOCATED 4" ABOVE CENTER FOR TWO PANE HIGH AND ON CENTERLINE FOR THREE PANE HIGH TYPES.

THESE WINDOWS MAY ALSO BE USED IN STEEL CONSTRUCTION. FOR DETAILS SEE INSTALLATION DETAILS ON PLATE NO. L-105

2 PANES HIGH
18" GL - 3'-1 7/8"
20" GL - 3'-5 7/8" 22 1/4 L 22 1/4 R

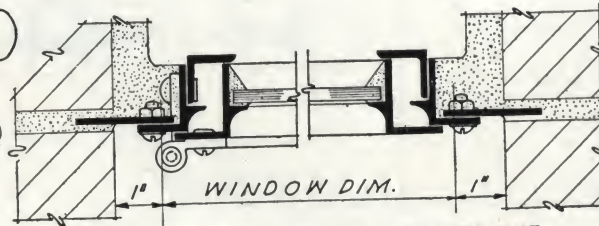
3 PANES HIGH
18" GL - 4'-8"
20" GL - 5'-2" 23 1/6 L 23 1/6 R

4 PANES HIGH
18" GL - 6'-2 3/8"
20" GL - 6'-10 3/8" 24 1/6 L 24 1/6 R

5 PANES HIGH
18" GL - 7'-8 3/4"
20" GL - 8'-6 3/4" 25 1/6 L 25 1/6 R

2 PANES WIDE
12" GLASS - 2'-1 7/8"
14" GLASS - 2'-5 5/8"

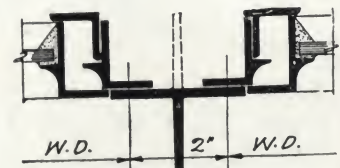
•STANDARD TYPES•



•VERTICAL SECTION•

•HORIZONTAL SECTION•

•SCALE: 3" = 1'-0"•



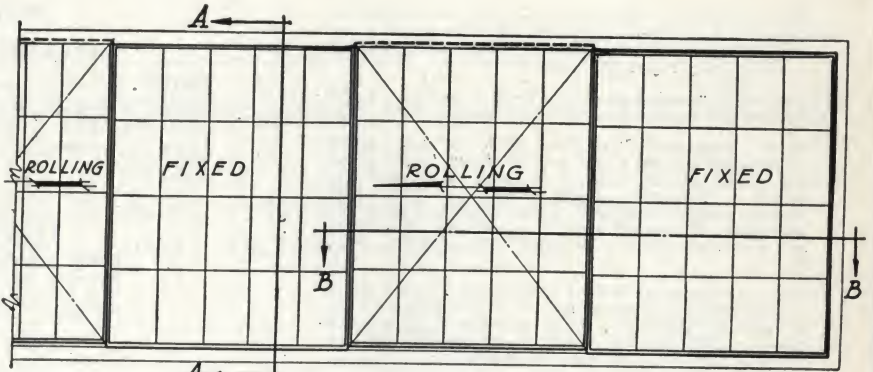
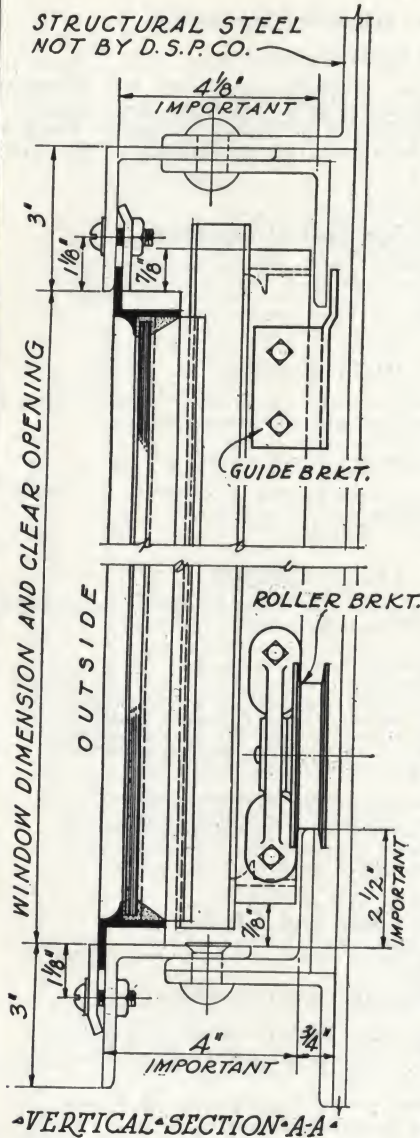
•MULLION•

Fenestra
August 1927

Vertically Pivoted Windows
Side Hinged Windows

Plate No
L-301

STRUCTURAL STEEL
NOT BY D.S.P.CO.



• TYPICAL • ELEVATION •

• STANDARD • TYPES •

4'-8" 18" GL. 20" GL.	33	43	53	6'-2 3/8" 18" GL. 20" GL.	34	44	54
12" GL. 3'-2" 14" GL. 3'-6"		4'-2 3/8" 4'-10 3/8"	5'-2 3/4" 6'-0 3/4"	12" GL. 3'-2" 14" GL. 3'-8"		4'-2 3/8" 4'-10 3/8"	5'-2 3/4" 6'-0 3/4"

• N O T E •

HORIZONTALLY ROLLING WINDOWS ARE FURNISHED ONLY IN THE TYPES AND SIZES SHOWN ABOVE.

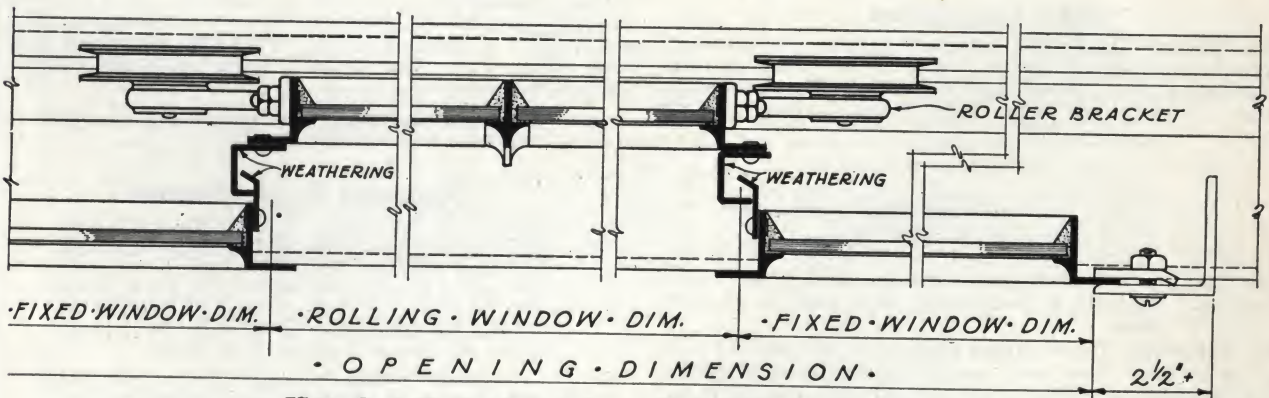
WE DO NOT RECOMMEND THIS CONSTRUCTION WHERE WEATHERTIGHTNESS IS REQUIRED.

THE GUIDE BRACKETS ARE ATTACHED IN SHOP AND THE ROLLER BRACKETS SHIPPED LOOSE TO BE ATTACHED AT ERECTION.

TO DETERMINE THE TOTAL OPENING DIMENSION MULTIPLY THE WINDOW DIMENSION BY THE NUMBER OF UNITS USED.

THE STRUCTURAL STEEL FRAMING AND TRACK, FURNISHED BY OTHERS, MUST BE OF SUFFICIENT STRENGTH OR BRACED SECURELY BETWEEN SPANS TO SUPPORT WINDOWS AND PREVENT SAGGING.

THE DIMENSIONS MARKED 'IMPORTANT' MUST BE FOLLOWED CLOSELY FOR THIS TYPE OF WINDOW.



• HORIZONTAL • SECTION • B-B •

• SCALE : 3" = 1'-0" •

Fenestra,
August 1927

Horizontally Rolling Windows
Typical Details

Plate No
L-401

(P) CONTINUOUS TOP HUNG WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Structural Steel Truss spacing, best adapted to the use of standard Continuous Window units, is in multiples of 4' (16', 20', 24') to accommodate standard 4' centering for girt butt attachment.

Note: Intermediate structural vertical members should be provided approximately 8' to 12' apart.

Note: Structural Steel Girts, at heads and sills of Continuous Windows, are not furnished by the Window Manufacturer, and are so noted on the window details. These girts should be provided for in the Structural Steel Specifications including punching for attachment of window butts in accordance with standard Fenestra punching details. (See Fenestra, Page 51.)

Note: Sheet metal flashing at heads, sills, and ends of runs at building construction, is not furnished by the Window Manufacturer, and is so noted on the window details. This flashing should be provided for in the Roofing and Sheet Metal Specifications.

(P-1) Work Included

Note: List and locate. (See paragraph 13, Fenestra Page 2.)

(P-2) General

Continuous Top Hung Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

Note: Fenestra Continuous Windows are particularly designed for use in monitor and sawtooth roof construction where the plane of the windows is on a slope. They may be used in vertical planes where necessary. The chief advantage of this type of window lies in the fact that it provides for an easily and rapidly operated continuous opening from one end of the building to the other.

Note: Standard units of Continuous Windows measure 20' in length (dimension points equal the clear opening). We recommend, for the economical arrangement of operator arms and to permit girt punching on even 4' centers for butt attachment, that units vary on multiples of 4' (8', 12', 16'). Smaller units may be used, if necessary, in widths varying in multiples of 2' (8', 10', 12', 14', 16', 18').

(P-3) Materials

(P-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(P-3b) Head and End Jamb Members—Head and end jamb members shall be special angles.

(P-3c) Muntins—Muntins shall be special Ts 1½" deep.

(P-3d) Sills—Sills shall be special design sections with a long down-standing leg bent at the end to make close contact with the building construction. Provide weep holes for drainage.

(P-4) Construction

(P-4a) Window Units—All members of the window shall be accurately fitted and rigidly riveted at the joints to form standard panel units. Panels shall be joined, end to end midway between T muntins, by splice plates bolted to head and sill members.

Note: Panels are joined at the time of erection.

Note: Riveted assembly assures a strong, tight joining of members, with sufficient flexibility to withstand unusual strain thus obviating the danger of breaks due to imperfect welds.

(P-4b) Stationary End Sections—At the ends of all swing sections next the building construction there shall be provided stationary 1' panels.

(P-4c) Stationary Intermediate Sections—Between the ends of swing sections there shall be provided stationary 2' panels.

(P-4d) Weathering Caps—The joint between ends of swing sections and stationary end sections (and stationary intermediate sections) shall be covered and protected by a specially formed, 14 gauge, steel channel with one leg secured to the end angle of the swing section and designed to overlap the end angle of the stationary section.

(P-4e) Storm Panels—Where so indicated, provide 2' wide storm panels secured to stationary end (and intermediate) panels with a steel plate and to the sill by sill clips. Panels shall underlap the swing window section and shall be provided at sill with a formed continuous drip board, set over the sill flashing.

(P-5) Attached Hardware

Note: Attached at factory.

Butts—All Continuous Windows shall be top hung on heavy malleable iron butts, with ⅜" brass pins, spaced 4' apart on centers. Butts shall be rigidly riveted to the head angle and furnished with bolts for attachment to the building girts.

(P-6) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 55 to 59. In selecting type best adapted to the particular conditions, we advise consultation with our representative.

(P-7) Erection

All Continuous Windows shall be erected by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

All windows shall be erected in a thoroughly, workmanlike manner ready for glazing.

(P-8) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(P-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(P-9a) Glass—Glass shall be (¼" rough wire glass).

(P-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(P-9c) Glazing—All continuous windows shall be glazed from the outside. All glass shall be set in a heavy bed of putty and secured at muntins and end angles by angle clips secured with bolts. Face putty at sills, applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. (See note Paragraph P-8.)

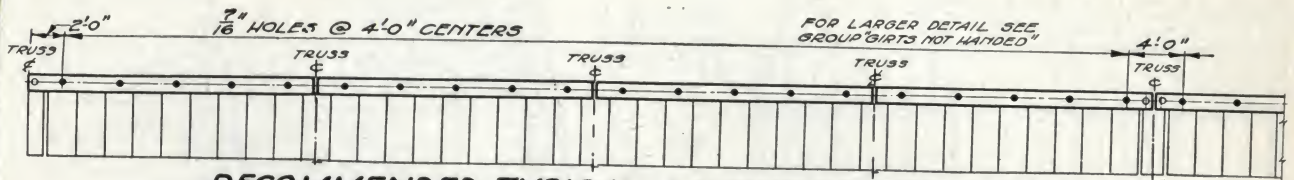
Continuous Fixed Windows

Note: The specification for Continuous Fixed Windows is the same as that for Continuous Top Hung Windows except that all window units are stationary (no swing sections). Heavy steel angle clips bolted to the window head and the building girts are substituted for the butts. Steel sill clips, furnished with the window and shipped flat, are bolted to the sill of the window and bent around the steel sill girt to rigidly secure the window in position at the bottom.

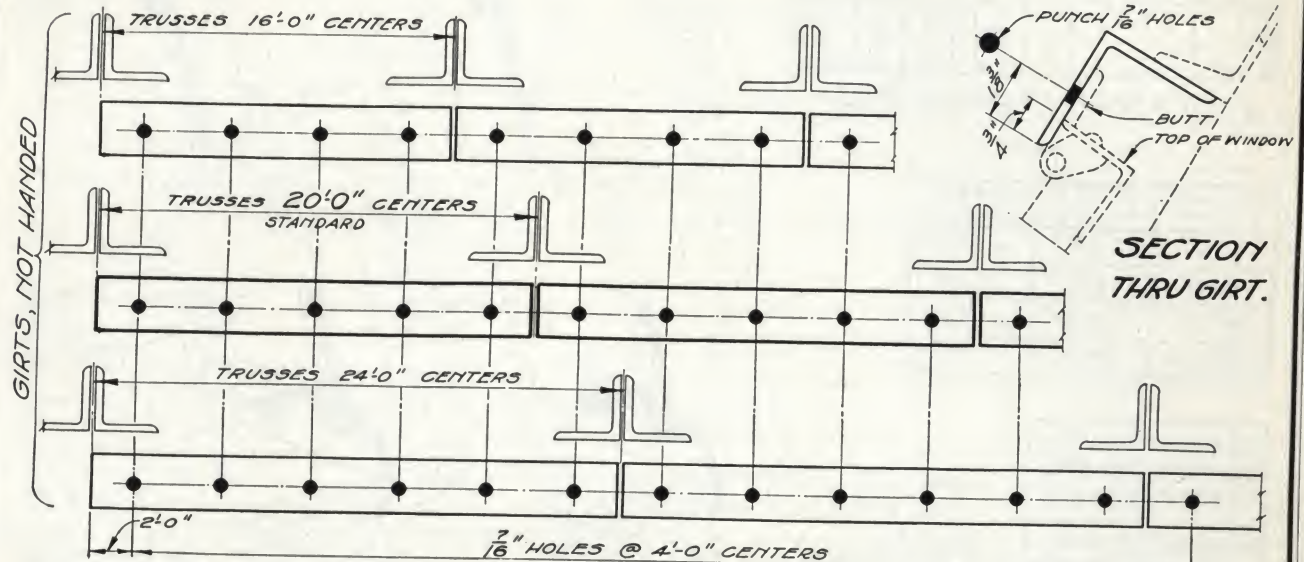
Continuous Bottom Hung Windows

Note: In general the specification for Continuous Bottom Hung Windows is the same as that for Continuous Top Hung Windows except in the following particulars:

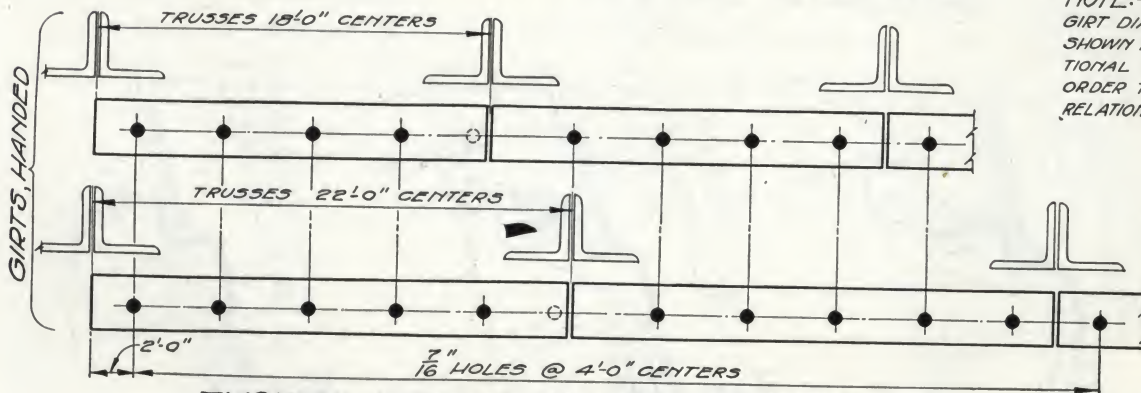
- The head section is a special T.
- The sill section is a special angle designed to take the butts attached to a special sill girt.
- The weathering caps are attached, with the legs out, to the fixed end or intermediate panels instead of to the swing sections.
- The windows are glazed on the inside with face putty at both head and sill.



**RECOMMENDED TYPICAL LAYOUT OF GIRT PUNCHING
FOR STANDARD 20'-0" TRUSS CENTERS.**



**TYPICAL LAYOUT OF GIRT PUNCHING FOR
TRUSS CENTERS OF 16, 20 AND 24'-0"**



**TYPICAL LAYOUT OF GIRT PUNCHING FOR
TRUSS CENTERS OF 18 AND 22'-0"**

NOTE:-TRUSSES ON GIRT DIAGRAM ARE SHOWN IN A CONVENTIONAL MANNER IN ORDER TO SHOW THE RELATIONSHIP TO GIRTS.

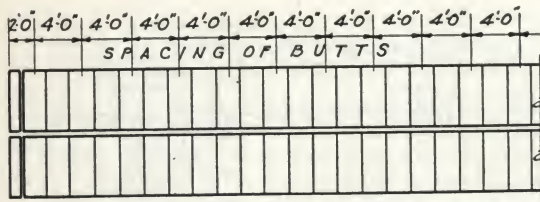
SPACING OF TRUSS CENTERS:-
TRUSS CENTERS OF 17, 19, 21, 23 AND 25 FEET REQUIRE FOUR STYLES OF GIRT PUNCHING (TWO RIGHT AND TWO LEFT) AND SHOULD THEREFORE BE AVOIDED.

GIRT PUNCHING:-
HOLES OCCURRING AT JOINT OF GIRTS SHOULD BE OMITTED. SUCH HOLES WILL BE LOCATED AND PUNCHED BY WINDOW ERECTORS

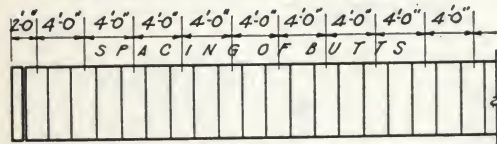
Fenestra,
August 1927

**Continuous Windows, Top Hung
Girt Punching**

Plate No
P-101



ELEVATION-DOUBLE RUN



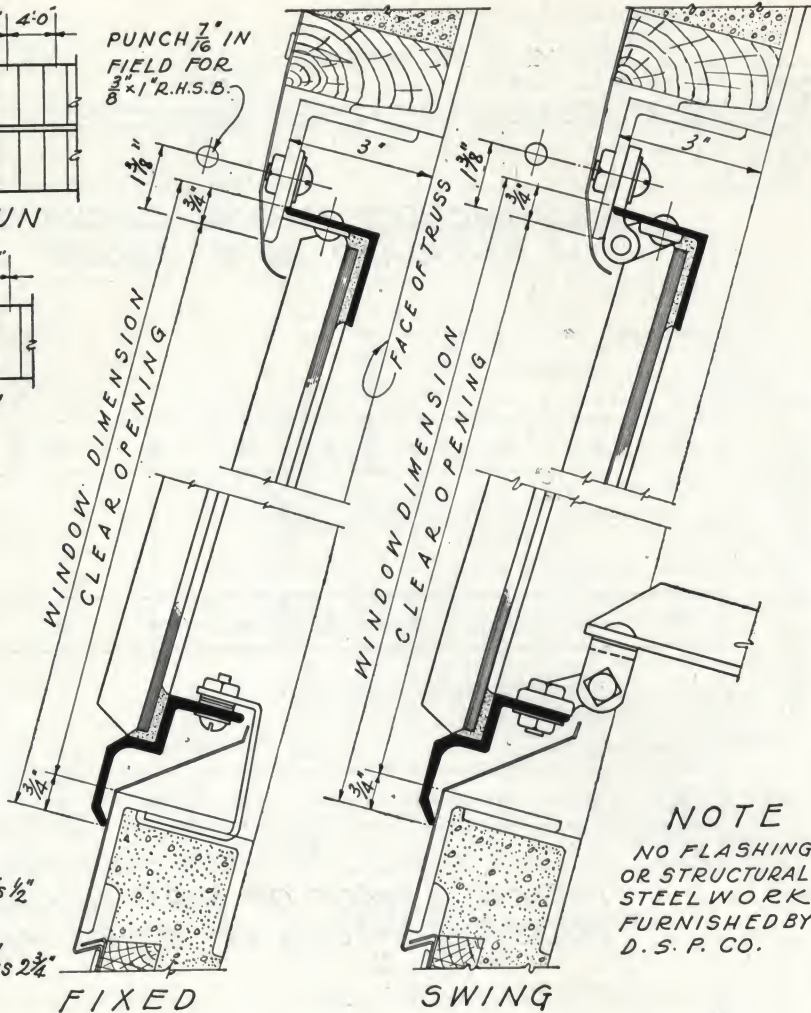
ELEVATION-SINGLE RUN

WINDOW HEIGHT	GLASS WIDTH	GLASS HEIGHT
3'-0"	23 1/2"	2'-9 1/4"
4'-0"	23 1/2"	3'-9 1/4"
5'-0"	23 1/2"	4'-9 1/4"
6'-0"	23 1/2"	5'-9 1/4"

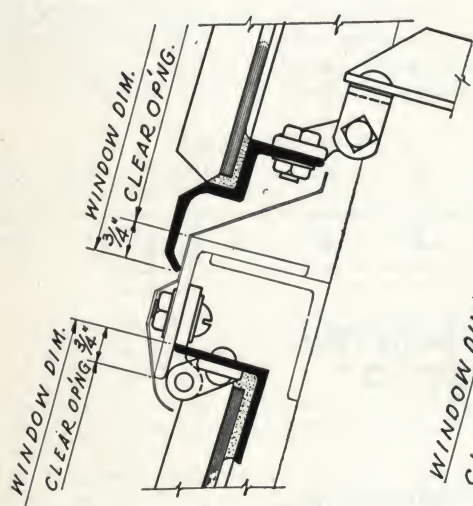
TABLE OF WINDOW DIMENSIONS AND CLEAR OPENINGS.

WINDOW-D.	CLEAR O.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"

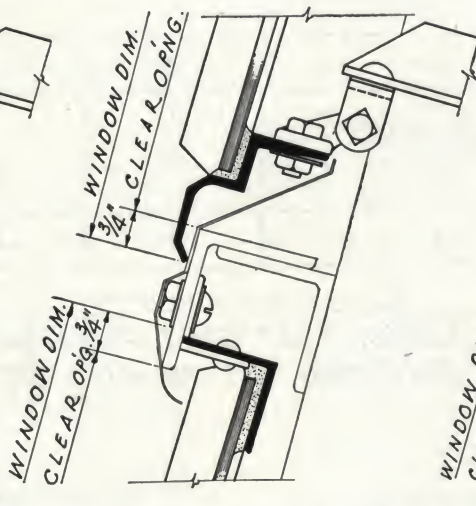
GLASS SIZES

WIDTH
EQUALS BAR
CENTERS MINUS 1/2"HEIGHT
EQUALS SASH
DIMENSION MINUS 2 3/4"PUNCH 7/16" IN
FIELD FOR
3/8" x 1" R.H.S.B.

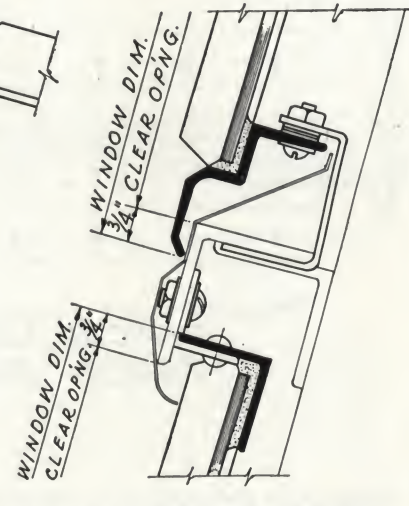
NOTE
NO FLASHING
OR STRUCTURAL
STEEL WORK
FURNISHED BY
D. S. P. CO.



SWING OVER SWING



SWING OVER FIXED



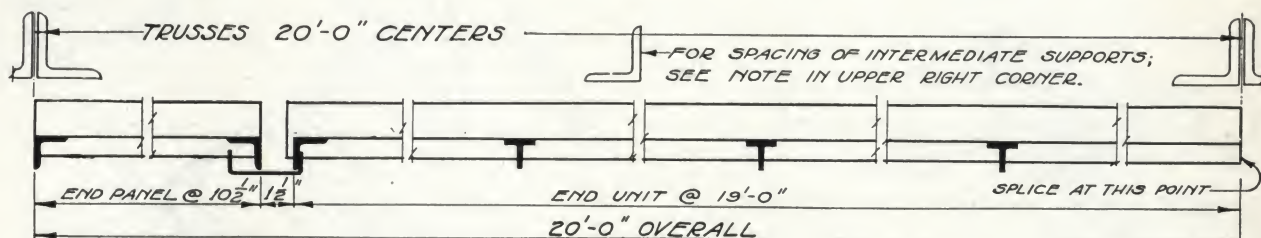
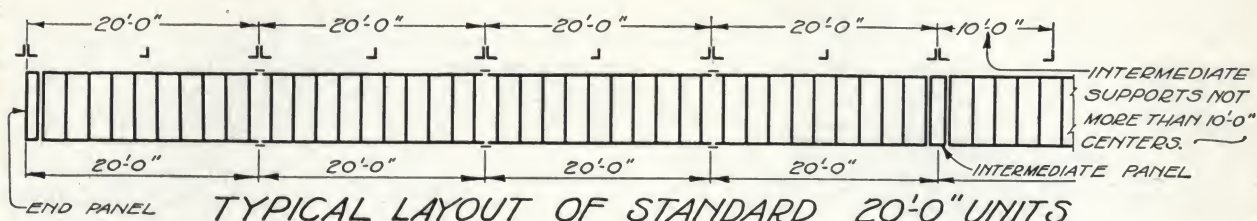
FIXED OVER FIXED

SCALE: 3"=1'-0"

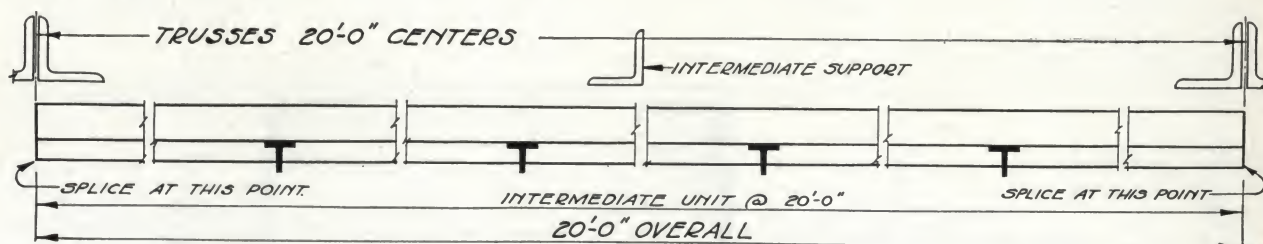
Fenestra
August 1927

Continuous Windows, Top Hung
Typical Cross Sections

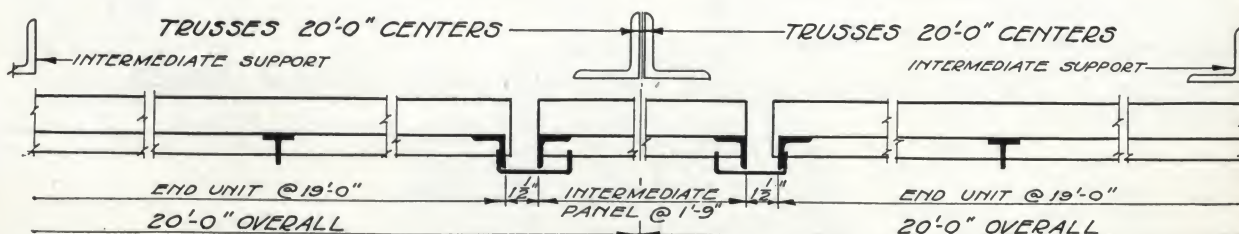
Plate No
P-102



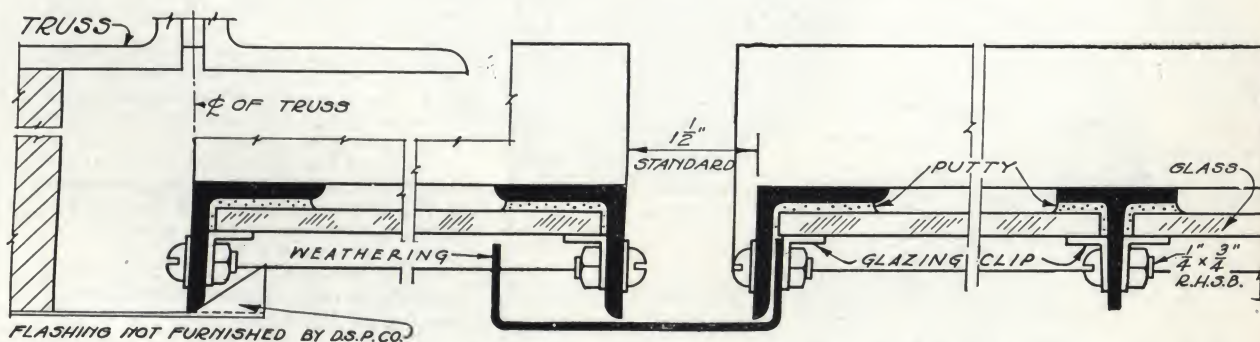
TYPICAL END UNIT WITH PANEL



TYPICAL INTERMEDIATE UNIT WITHOUT PANELS



TYPICAL INTERMEDIATE UNITS WITH PANEL

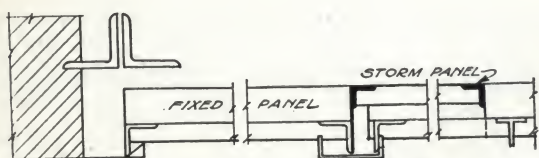


HORIZONTAL SECTION AT END OF RUN
— SCALE: HALF-FULL SIZE —

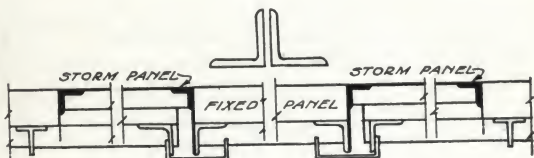
Fenestra
August 1927

Continuous Windows, Top Hung
Details of Typical Units

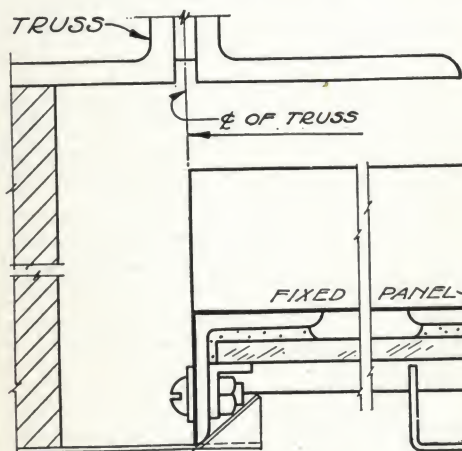
Plate No
P-103



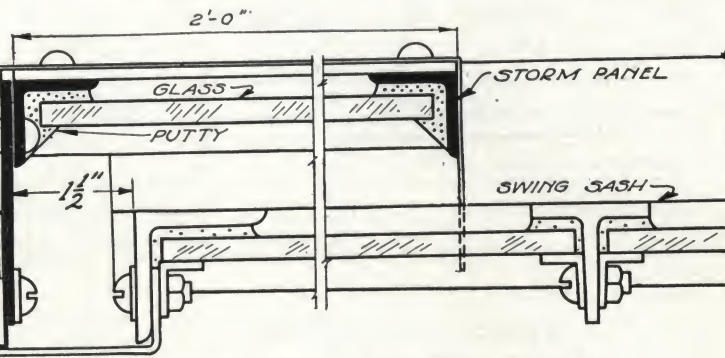
TYPICAL DETAIL AT END OF SWING RUN



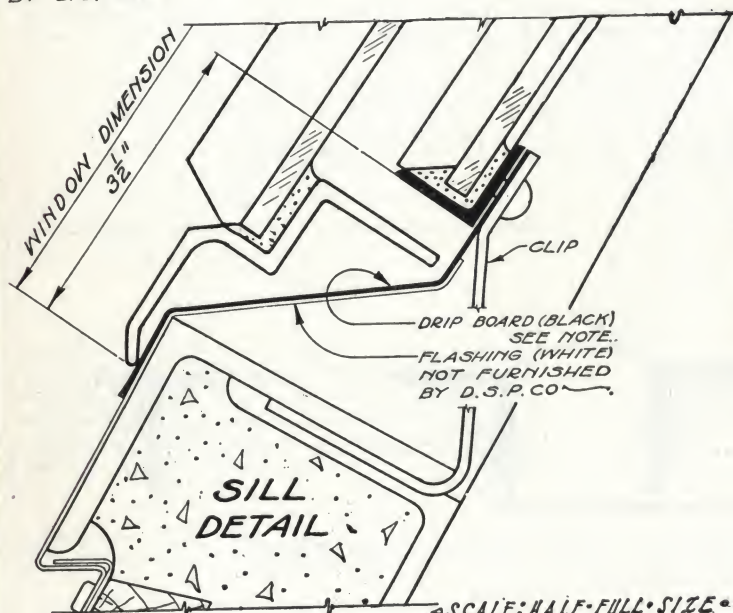
TYPICAL DETAIL BETWEEN SWING RUNS

FLASHING NOT
FURNISHED
BY D.S.P.CO.

TYPICAL HORIZONTAL SECTION THRU STORM PANEL

FLASHING NOT
FURNISHED BY
D.S.P.CO.WINDOW
DIMENSION

SEE NOTE BELOW

HEAD
DETAIL

SCALE: HALF-FULL-SIZE

NOTE

STORM PANELS CAN BE USED ONLY WITH TOP HUNG WINDOWS. THEY ARE RECOMMENDED ONLY FOR WINDOWS 30° OR LESS OFF THE VERTICAL.

WHEN PANELS ARE USED IN FRONT OF VERTICAL STEEL MEMBERS A GIRT ANGLE OF 3" OR MORE IS REQ'D TO PROVIDE SUFFICIENT SPACE BETWEEN TRUSS AND WINDOW.

A DRIP BOARD (SHOWN IN BLACK AT SILL) IS FURNISHED AS PART OF PANEL. THIS DRIP SHOULD NOT BE CONFUSED WITH FLASHING AT SILL WHICH IS NOT FURNISHED BY D.S.P.CO.

THE HEIGHT OF GLASS IN PANEL IS EQUAL TO WINDOW DIMENSION, MINUS 4". THE GLASS WIDTH IS 1'-11 1/2".

Fenestra
August 1927

Continuous Windows, Top Hung
Storm and End Panels

Plate No
P-104

MECHANICAL OPERATING DEVICES

While the designing of mechanical operators for the various types of Fenestra windows is not in any sense complicated, so many different building conditions are encountered that it is impossible to lay down hard and fast rules, limits and specifications which the architect may use without first consulting a Fenestra representative.

The following specifications and plates therefore should be regarded as explanatory and advisory only.

Fenestra operators are not sold as separate and distinct products, but rather as a method of securing the satisfactory opening and closing of Fenestra windows by mechanical means. Therefore, any mechanical operators recommended by Fenestra representatives are

just as dependable as the Fenestra butt or cam handle or any other standard device which the architect himself might specify.

All operating equipment, and especially electrically controlled equipment, needs occasional inspection and lubrication. Therefore, provision should be made by which powers and motors may be reached without undue inconvenience. A "cat walk" or a movable platform is suggested where ladders are impractical.

A plate door is sometimes installed in the fixed panels between the runs of Continuous Windows so that the powers may be reached from the roof. Such doors may be had at added cost if specified.

(SA) WORM AND GEAR OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed primarily for horizontally pivoted ventilators but may, in some cases, be used on top pivoted ventilators.

(SA-1) Work Included

Note: List and locate. (See paragraph 13, Fenestra Page 2.)

(SA-2) General

All operators, so indicated, shall be Fenestra Worm and Gear as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SA-3) Material

(SA-3a) Power—Power shall be a machine cut, cast iron worm operating a cast iron segmental worm gear assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to eliminate friction. The hub of the segment gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes or other obstructions.

Note: The power may be located at either end of the run or at any intermediate point. Recommended limits are given on Fenestra Page 61.

(SA-3b) Power Transmission—Power line shall be 1" black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions. Line shall be supported on adjustable steel brackets, bolted to the window mullions or to the building construction. Adjustable steel operating arms (one to each ventilator) shall be rigidly clamped to the line and pivoted to steel arm extensions attached to the ventilators through steel hinge brackets.

(SA-3c) Manual Operation—

Note: Select type.



Power for Worm and Gear Operator

(1) Chain—Power shall be operated by a chain, operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SA-3a) to clear obstructions or to make the ventilators visible from the operating station, chain may be carried over idlers to any convenient point.

(2) Pipe—Power shall be operated by a 1" black, wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4' above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SA-3a) the pipe may be offset through the use of universal joints.

(SA-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1), at reasonable added cost will do field painting after erection. If required, so specify, including specifications for paint and its application.

(SA-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SB) RACK AND PINION OPERATOR—Specifications

Notes are explanatory or advisory only, and need not be included in the specifications.

Note: This operator is primarily adapted for use on ventilators pivoted 4" from the top, but can be used successfully on horizontally pivoted ventilators.

(SB-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(SB-2) General

All Operators, so indicated, shall be Fenestra Rack and Pinion as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SB-3) Material

(SB-3a) Power—

Note: Three types of power are available. Select and specify that best adapted to the condition.

Note: Power may be located at either end of the run or at any intermediate point of the run. Recommended limits are given on Fenestra Pages 62 and 63.

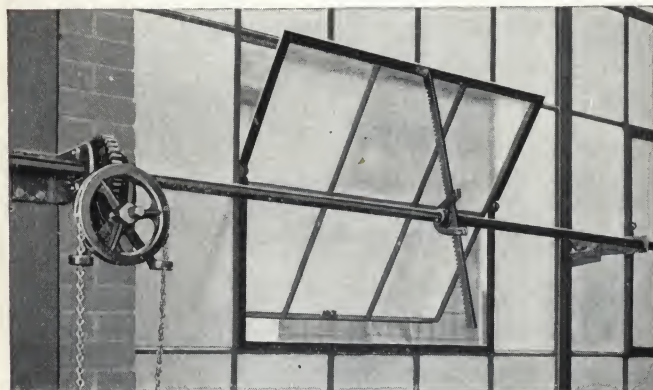
(1) Light Power—Light Power shall be a 32 to 1 reduction, machine cut steel, worm operating a semisteel worm gear

assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.

(2) **Heavy Power**—Heavy Power shall be a 45 to 1 reduction machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line to which it shall be securely attached so as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.



Rack and Pinion Operator, Manually Controlled

(3) **Electrical Power**—Electrical Power shall be a 71 to 1 reduction, machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. The power shall be operated by a cast iron sprocket wheel keyed to the worm shaft and motor driven through a chain drive. The electrical equipment shall be mounted directly beneath and joined to the power gear case forming a complete power unit. The power unit shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 59 and should be included here.

(SB-3b) **Power Transmission**—Power Transmission lines shall be 1" black, wrought iron pipe joined into a continuous

line by steel pipe plugs, with a drive fit, riveted in two directions.

Lines shall be supported on adjustable, steel brackets, bolted to window mullions or to building construction. Operating arms (one to each ventilator) shall be straight steel racks, clamped in mesh with pinions, rigidly secured to the line. (Arms shall be attached at the head of horizontally pivoted ventilators to pressed steel hinge brackets, and shall pull in.) (Arms shall be attached at the sill of top pivoted ventilators to Z bar brackets through pressed steel hinge brackets and shall push out.)

Note: Specify either or both arm attachments as required.

(SB-3c) Manual Operation—

Note: Select either type for "Light" or "Heavy" Power. Omit if Electric Power is used.

(1) **Chain**—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through the end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SB-3a) to clear obstructions or to make the ventilators visible from the operating station, the chain may be carried over idlers to any convenient point.

(2) **Pipe**—Power shall be operated by a 1" black wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4' above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SB-3a), the pipe may be offset through the use of universal joints.

(SB-3d) **Electrical Operation**—Power shall be electric, motor operated.

Note: See Electrical Power (SB-3a3).

(SB-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY, (see Paragraph 5, Fenestra Page 1,) at reasonable added cost, will do field painting after erection. If required so specify here, including specifications for paint and its application.

(SB-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect operating condition.

(SC) SCREW TYPE OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: This operator is designed primarily for use on exceptionally high openings such as those in power houses, entirely filled with windows and structural mullions. It may be used on either horizontally pivoted ventilators or ventilators pivoted 4" from the top in individual bays, either within or beyond reach from the floor. The operator lies close to the inside face of the window out of the way of cranes and other obstructions. Where so provided for, powers and electrical mechanism may be concealed within the wall.

(SC-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(SC-2) General

All Operators, so indicated, shall be Fenestra Screw Type as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SC-3) Material

(SC-3a) Power—

Note: Two types of power are available. Select and specify that best adapted to the condition.

Note: The power may be located at either side of the opening or at any intermediate point. Recommended limits are given on Fenestra Pages 64 and 65.

Note: In bays of extreme width and height, flexibility of ventilator control may be secured by operating the upper runs from one power and the lower runs from another.

(1) **Manual Power**—Power shall be applied through open bevel gears to operate a $\frac{3}{4}$ " vertical threaded, steel shaft in an upward and downward direction.

Note: The operation is similar to that of an automobile jack.

Gears shall be operated by a hand wheel provided with a handle.

The power shall be assembled within and shall be supported by an open, cast iron housing adapted to rigid attachment to the window mullion or building construction.

Provide a guide secured to the vertical shaft which shall fit over a guide T, attached to the window mullion. Guide T shall be provided with stops which shall limit the travel of the guide and shaft.

(2) **Electrical Power**—Power shall be applied through bevel gears to operate a $\frac{3}{4}$ " vertical threaded, steel shaft in an upward and downward direction. The gears shall be assembled and oil-encased in a dust-proof gear-box. Gears shall be operated by electrical power either direct connected through a universal joint or by means of a cast iron sprocket and chain drive.

The electrical equipment and the gear case shall be mounted to form a complete unit on a heavy steel bracket plate adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 59 and should be included here.

(SC-3b) **Power Transmission**—Power transmission lines shall be 1" black wrought iron pipe joined into a continuous line by steel plugs, with a drive fit riveted in two directions. Lines shall be supported close to the face of the win-

dow on heavy cast iron brackets rigidly attached to the mullions and building construction. Cast iron pivoted lever arms (two to each ventilator) shall be rigidly clamped to the power lines and attached to the ventilator jamb bars with malleable iron hinge brackets.

Heavy cast iron cross heads, secured to the vertical power shaft, shall operate attached cast iron rocker arms rigidly clamped to the power lines. When the power is applied the rocker arms shall rotate the power lines.

(SC-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

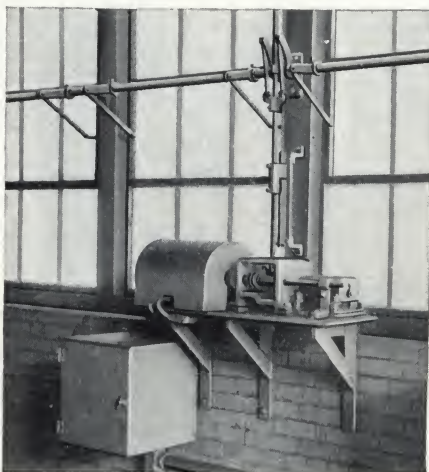
Note: Where desired the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.

(SC-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.



Screw Type Operator, Electrically Controlled

(SD) TENSION OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Tension Operators are in general design and operation similar to Continuous Operators. They are made for use on long runs of horizontally pivoted windows. The chief difference is in the design of operating arms and the chief advantages lie in its easy operation and the fact that windows up to 300' may be operated from one power.

Note: To avoid repetition where the specifications are the same as that for Continuous Operator this is so noted. Where not identical, use clauses here given. For specification for Continuous Operator, see Fenestra Page 58.

(SD-1) Work Included

Note: Same as (SE-1).

(SD-2) General

All horizontally pivoted ventilator operators, so indicated, shall be Fenestra Tension Operators as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SD-3) Material

(SD-3a) Power—

Note: Same as (SE-3a).

(SD-3b) Stops—

Note: Include only, where Manual operation is used.

On either side of the power case, the worm shaft shall extend to receive rigidly attached, double, steel, stop clutches (two in all). As the operator opens the window an auxiliary stop attached to the rack shall strike the upper end of a steel lever (pivoted to a bracket on the power case) causing the lower end of the lever (which is broached over the worm shaft) to engage one of the stop clutches and cut off the power. When the operator closes the window, a similar arrangement shall function to automatically cut off power at the proper point. Levers and clutches for each stop shall be automatically disengaged by coil springs. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SD-3c) Power Supports—

Note: Same as (SE-3c).

(SD-3d) Power Transmission—

Note: Same as (SE-3d).

(SD-3e) **Operating Arms**—Operating arms shall be adjustable, straight, steel channels. Arms shall be rigidly attached, through a malleable iron and steel universal swivel clamp, to the tension line and the other end shall be secured to the top of the window through a steel pivoted hinge. Arms shall operate to pull the window in from the top.

(SD-3f) Manual Operation—

Note: Same as (SE-3f).

(SD-3g) Electrical Operation—

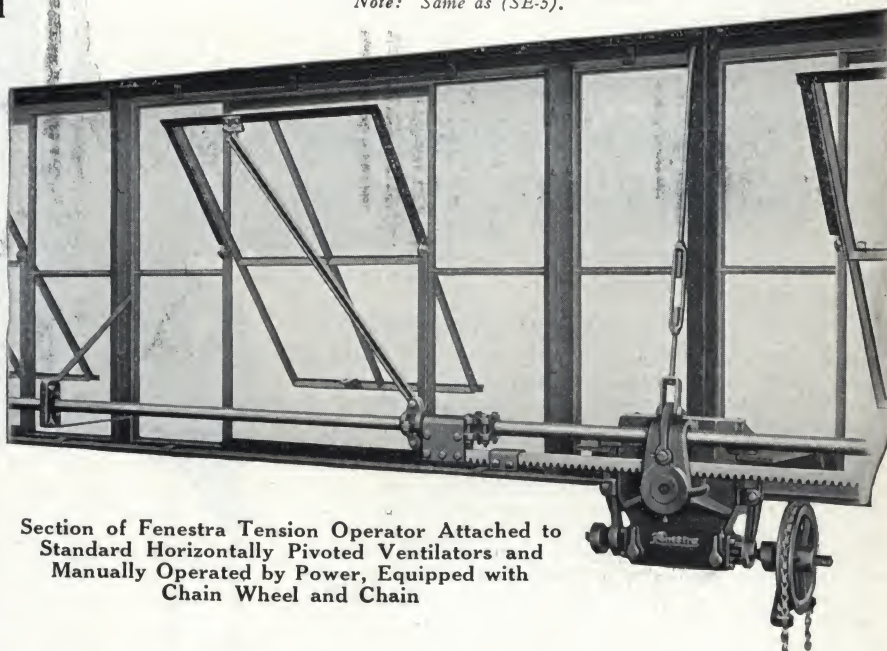
Note: Same as (SE-3g).

(SD-4) Painting

Note: Same as (SE-4).

(SD-5) Erection

Note: Same as (SE-5).



Section of Fenestra Tension Operator Attached to Standard Horizontally Pivoted Ventilators and Manually Operated by Power, Equipped with Chain Wheel and Chain

(SE) CONTINUOUS OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed to operate from a single power, one or several continuous windows in line (top hung, or bottom hung) located in either vertical or sloping planes.

Note: The power developed through the tension line is applied to the window through straight motion levers so arranged that the leverage increases faster than the load thus making the operation continuously easier as the window opens. This is a basic principle exclusive in Fenestra Continuous Operator.

Note: The unusually heavy construction, and the extreme care with which all material is selected and fitted, give this power exceptional strength and reliability.

(SE-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2).

(SE-2) General

All continuous window operators shall be Fenestra Continuous Operators as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(SE-3) Material

(SE-3a) Power—Power shall consist of a case hardened, machine cut, high carbon steel worm operating a special alloy, non-ferrous bronze, worm gear with straight face, machine cut teeth and extra heavy hub and rim. Worm and gear shall be oil-encased, assembled in an accurately machined, oil-tight box. Worm and worm shaft shall be turned down from a solid steel bar. The worm shaft shall be made with long radial bearing surfaces and shall be provided with ball thrust, friction reducing bearings.

Note: The unusual length of the worm shaft radial bearing surfaces assures gear alignment and ease of operation without binding.

The worm gear shall fit tightly over a 1" squared, steel shaft which shall extend to drive a high carbon steel, heat treated pinion in mesh with a rack.

Worm gear and pinion shall be separated by a spacer and all three shall be broached out to accurately fit the shaft with the permanence and reliability of a single piece.

The rack shall be of high carbon steel with machine-cut teeth of stub tooth design. The rack shall be suspended at each end from the power transmission tension line, by rigid rack hangers which thrust against clamps securely attached to the line, thus transmitting the power in a horizontal direction.

Note: The length of runs which may be operated from a single power can only be determined by consultation with a Fenestra representative since numerous factors must be considered, such as: the type of windows (top hung, bottom hung, etc.), their location (vertical or horizontal plane), their height, the degree of opening desired, the time permitted for opening or closing, and, if manually operated, the effort to be exerted on the chain.

(tension) line shall be 1" black, wrought iron pipe in lengths not to exceed 20', joined into a continuous line by solid steel plugs, with a drive fit, riveted in two directions.

Tension line shall be supported on 2"x3" steel angle brackets with legs turned down, spaced approximately 10' apart and rigidly attached to the building construction.

Brackets shall be slotted to permit adjustment and shall carry at their upper, outer ends, cast iron roller housings and solid steel rollers to support the tension line.

(SE-3e) Operating Arms—Operating arms or levers shall be steel angles consisting of two arms, one twice as long as the other.

Note: The operating arm assemblies are spaced in conjunction with the tension line brackets, approximately 10' apart.

One end of the long arm shall be rigidly clamped through a universal pivoted joint, to the tension line and the other end shall be secured to the window through a universal pivoted joint bracket. One end of the short arm shall be attached through a universal pivoted joint to the top of the cast iron roller housing on the tension line support bracket, the other end being pivoted to the center of the long arm.

All universal joints shall be provided with bronze bushings.

(SE-3f) Manual Operation—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the extended, flattened end of the worm shaft and shall be secured by a set screw, a cotter pin through the end of the shaft providing additional protection.

Note: To clear obstructions or make the windows visible from the operating station, chain may be carried over idlers to any convenient point.

(SE-3g) Electrical Operation—Power shall be operated by an electrical power unit operating through a sprocket and chain. Hub of sprocket shall be keyed to the extended end of the worm shaft. Electrical power unit shall be mounted beneath and secured to the power by rigidly attached auxiliary steel brackets.

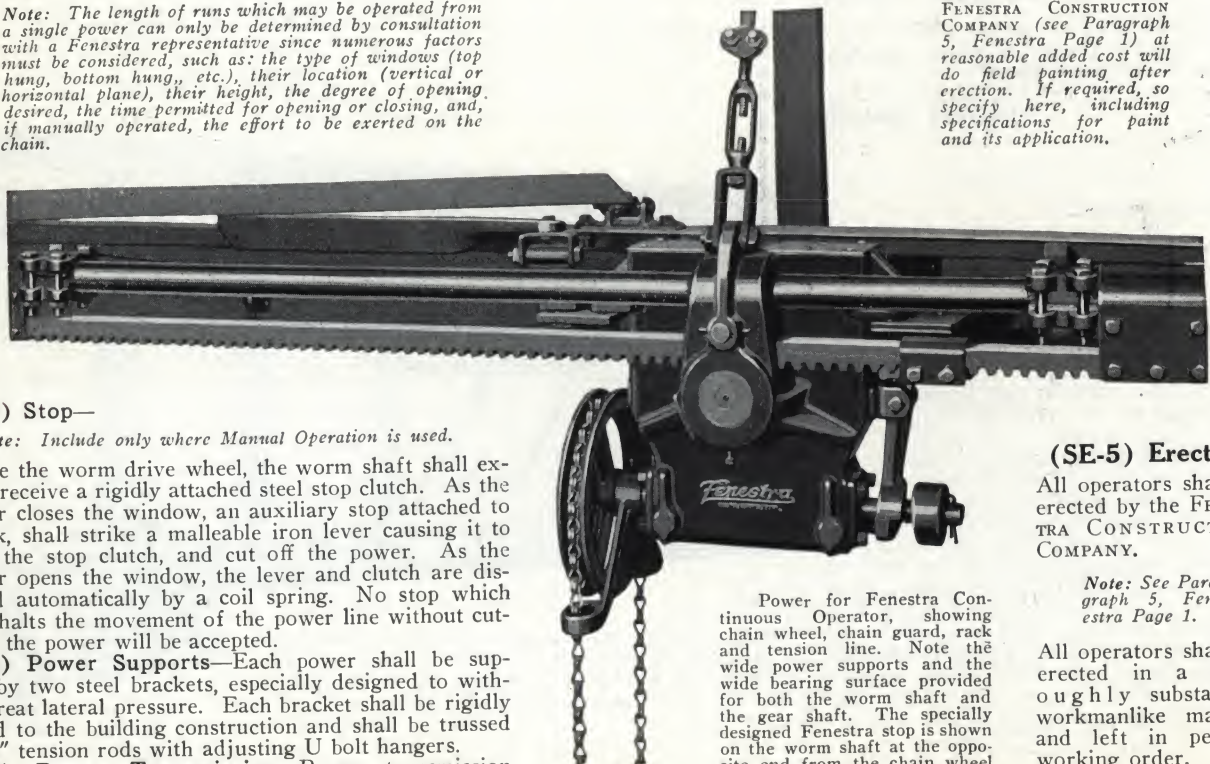
Note: Complete specifications of Electrical Equipment given on Fenestra Page 59, should be included here.

(SE-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.



(SE-3b) Stop—

Note: Include only where Manual Operation is used.

Opposite the worm drive wheel, the worm shaft shall extend to receive a rigidly attached steel stop clutch. As the operator closes the window, an auxiliary stop attached to the rack, shall strike a malleable iron lever causing it to engage the stop clutch, and cut off the power. As the operator opens the window, the lever and clutch are disengaged automatically by a coil spring. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SE-3c) Power Supports—Each power shall be supported by two steel brackets, especially designed to withstand great lateral pressure. Each bracket shall be rigidly attached to the building construction and shall be trussed with ½" tension rods with adjusting U bolt hangers.

(SE-3d) Power Transmission—Power transmission

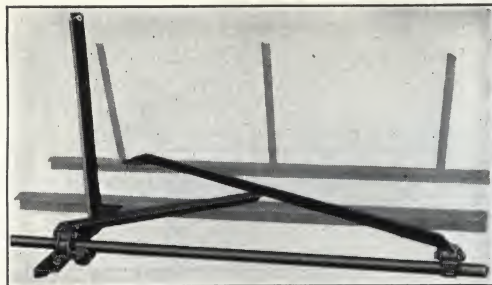
Power for Fenestra Continuous Operator, showing chain wheel, chain guard, rack and tension line. Note the wide power supports and the wide bearing surface provided for both the worm shaft and the gear shaft. The specially designed Fenestra stop is shown on the worm shaft at the opposite end from the chain wheel

(SE-5) Erection

All operators shall be erected by the FENESTRA CONSTRUCTION COMPANY.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.



Above is shown a "close up" of the power transmission on Fenestra Continuous Operator. Note the 2x3 in. steel angle bracket supporting the line; the two operating arms, one twice as long as the other: one end of the long arm clamped to the pipe through a universal joint and the other attached to the window. The short arm is attached to the top of the cast iron roller housing while the other end is pivoted to the center of the long arm. For detailed description, see Paragraph SE-3e, Fenestra Page 58



At the right is shown part of two runs of Fenestra Continuous Operator as installed in the plant of the Commonwealth Steel Co., Granite City, Ill. The upper run of windows is closed while the lower run is partially open. This picture illustrates very well the operation of long runs of continuous top hung windows from a single power

CONTINUOUS WINDOW OPERATOR(CABLE TYPE)

Note: This operator is primarily adapted to use on Vertically Pivoted Windows.

The operator is designed for either hand or electrical operation and is identical to the continuous window mechanical operator except in one respect. Both ends of the transmission line are connected to chains which pass over roller bearing idlers rigidly supported on steel idler brackets (guyed to the building construction where possible) and are attached to continuous steel rods. The steel rods are carried directly beneath the transmission tension line and are supported through holes in the tension line brackets. The ends of the steel rods next the power are connected to either end of the power rack. The proper tension in rods is accomplished through turn buckles furnished in the rod lines.

In this operator the transmission line (the 1" pipe) is always in tension both when opening and closing the windows. For details, see Fenestra Page 72.

(SF) ELECTRICAL EQUIPMENT FOR OPERATORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(SF-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

(SF-2) General

All Mechanical Operators, electrically controlled, shall be provided by the Operator Manufacturer, with complete electrical equipment, as hereinafter specified. The operator manufacturer shall provide complete wiring diagrams.

(SF-3) Electrical Equipment

(SF-3a) Motors—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: Motors operating on 220 volt or 440 volt, 60 cycle, 3 phase alternating current are recommended. Direct current motors are not carried in stock, but if alternating current is not available, a special motor for 230 volt, direct current, can be supplied.

Note: Specify current furnished.

(SF-3b) Power Connections—Motors shall be connected to power by means of sprockets and chains, or direct connected through universal joints as best adapted to power requirements.

(SF-3c) Reversing Switches—Standard Magnetic Reversing Switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator, either in opening or closing may be stopped or started at any point by manipulation of push buttons.

(SF-3d) Limit Switches—Limit Switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed,

yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

(SF-3e) Push Button Stations—Push Button Stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidentally operated.

(SF-4) Electrical Construction

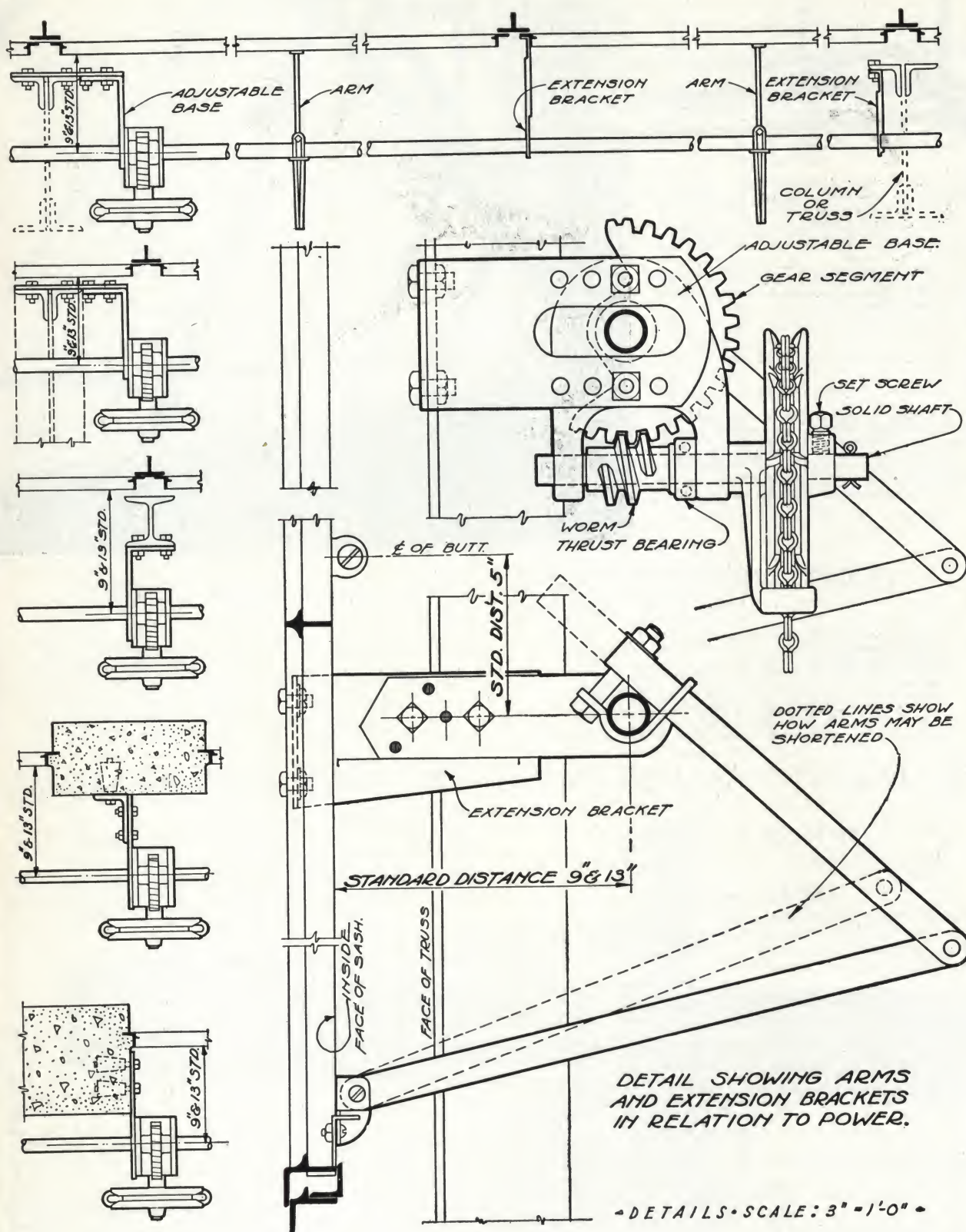
Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the Electrical Equipment furnished by the Window Operator Manufacturer and that furnished by himself.

All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, slightly manner, parallel with structural features of the building and rigidly and neatly secured. Where walls are plastered, conduit shall be concealed.

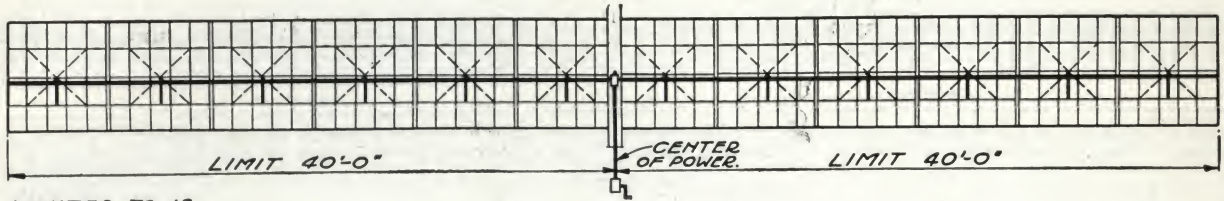
The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him, developing during the above named period shall be promptly and satisfactorily made good at his expense.



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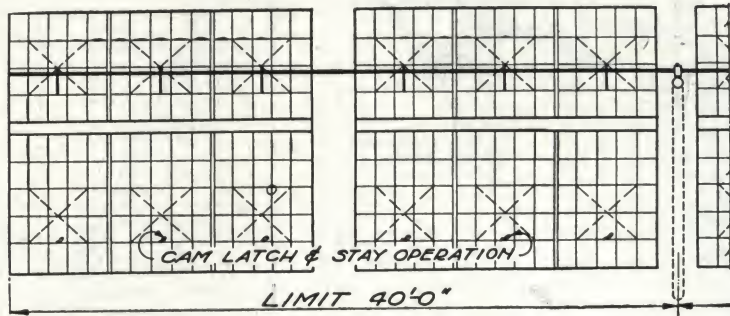
Worm and Gear Operator Typical Details

Plate No
S-101



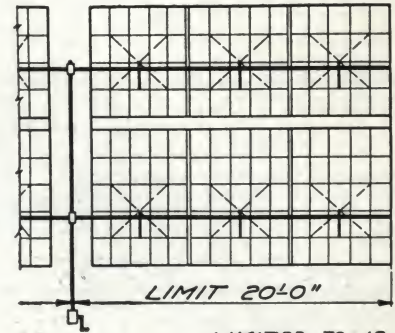
LIMITED TO 12
STANDARD 2
PANE HIGH VENTS.

TYPICAL SINGLE RUN



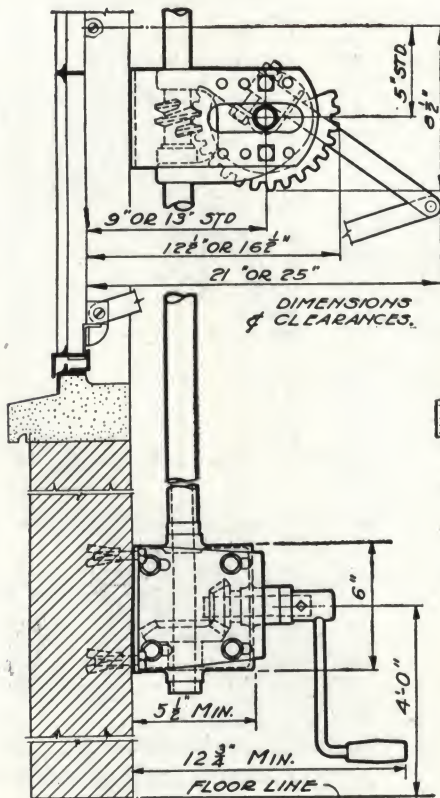
LIMITED TO 12
STANDARD 2
PANE HIGH VENTS.

TYPICAL SINGLE RUN

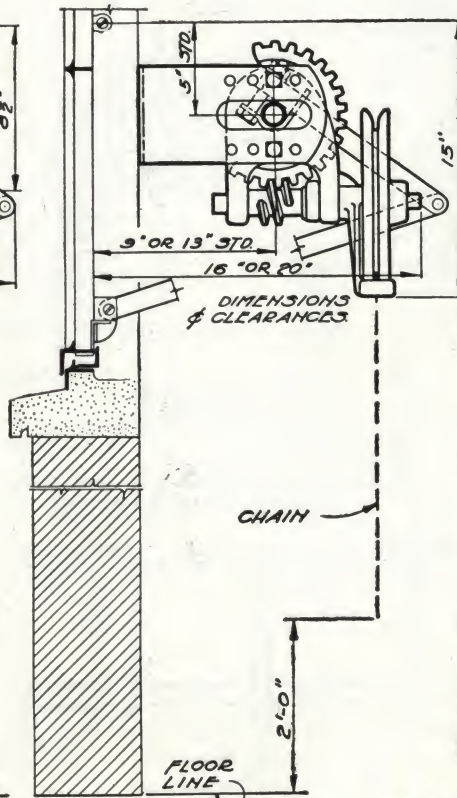


LIMITED TO 12
STANDARD 2
PANE HIGH VENTS

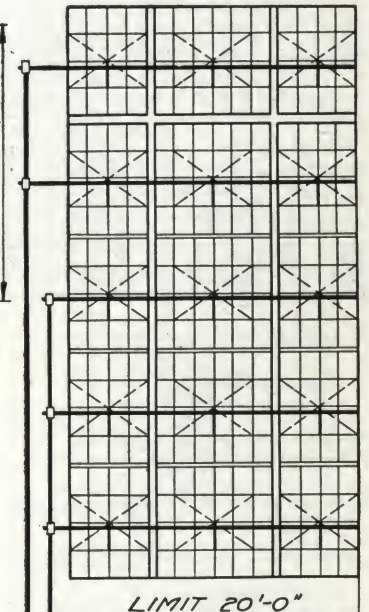
TYPICAL DOUBLE RUN



MITER GEAR OPERATION



CHAIN OPERATION



LIMITED TO 9 STANDARD
2 PANE HIGH VENTS
FOR EACH MITER
GEAR CONTROL.

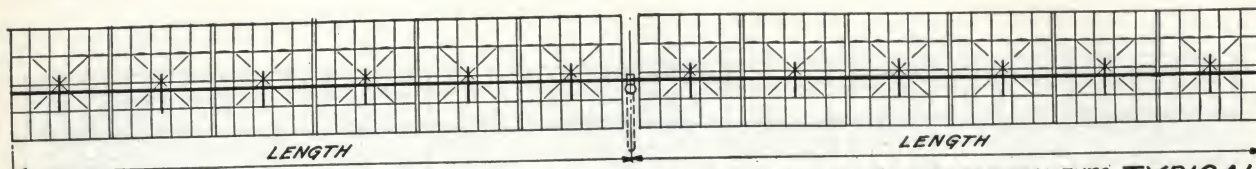
TYPICAL MULTIPLE RUNS
OPERATED IN SINGLE BAYS.

• DETAILS • SCALE: 1 1/2" = 1'-0" •

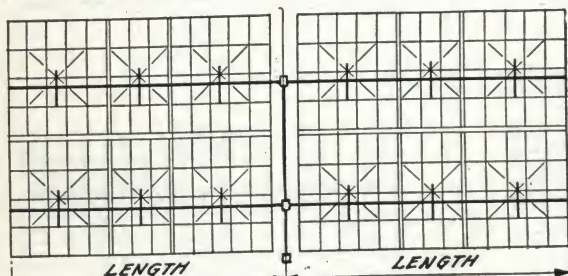
Fenestra
August 1927

**Worm and Gear Operator
Bay Operation**

Plate No
S-102



HEAVY POWER-LIMIT EACH SIDE, 150'-0" AND 30 HORIZONTALLY PIV. VENTS OR 100'-0" AND 20 TOP PIV. VENTS. **TYPICAL SINGLE RUN**
 LIGHT POWER-LIMIT EACH SIDE, 100'-0" AND 20 HORIZONTALLY PIV. VENTS OR 60'-0" AND 10 TOP PIV. VENTS.



LENGTH LIMITED TO HALF THAT OF SINGLE RUNS WITH TOTAL NUMBER OF VENTS THE SAME. **TYPICAL DOUBLE RUN**

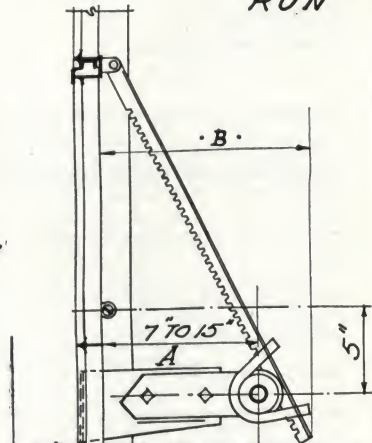
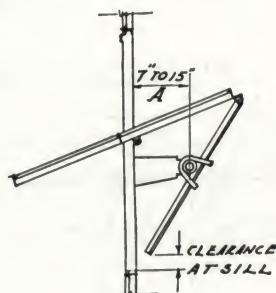
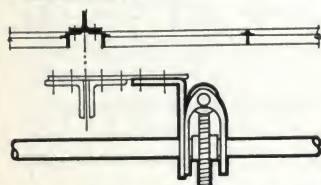


TABLE OF CLEARANCES
 TWO PANE HIGH VENTILATORS
 PIVOTED 2" ABOVE CENTER

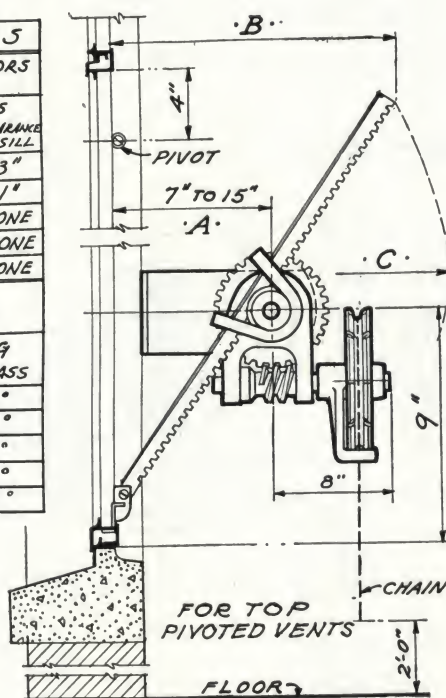
18" GLASS				20" GLASS			
A	B	ANGLE OF OPENING	CLEARANCE AT SILL	B	ANGLE OF OPENING	CLEARANCE AT SILL	
7	12	60°	NONE	11	90°	3"	
9	14 1/2	70°	NONE	13 1/2	90°	1"	
11	16 1/2	80°	NONE	15 1/2	80°	NONE	
13	18 1/2	90°	NONE	17 1/2	90°	NONE	
15	21	90°	NONE	20	90°	NONE	

TWO PANE HIGH TOP PIVOTED VENTILATORS

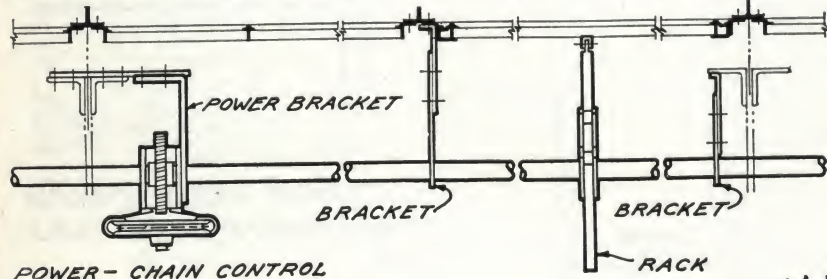
A	B	C	ANGLE OF OPENING	
			18" GLASS	20" GLASS
7	24 1/2	28	60°	50°
9	29 1/2	30	60°	50°
11	31 1/2	31	50°	50°
13	33 1/2	33	50°	40°
15	35 1/2	35	40°	40°



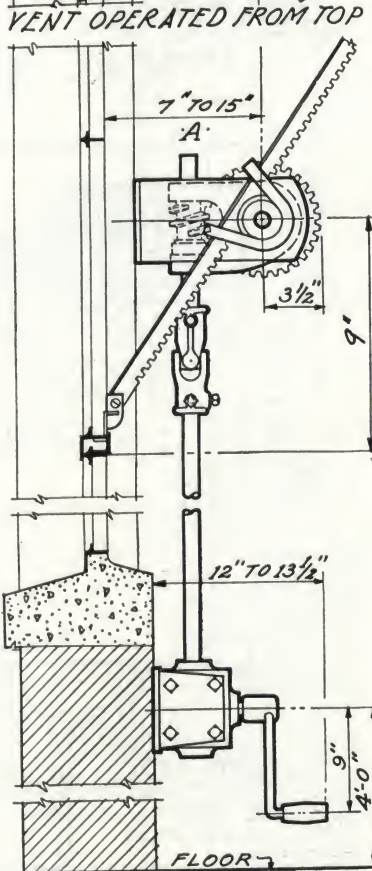
POWER SET FOR MITER GEAR CONTROL



CHAIN OPERATION



POWER-CHAIN CONTROL



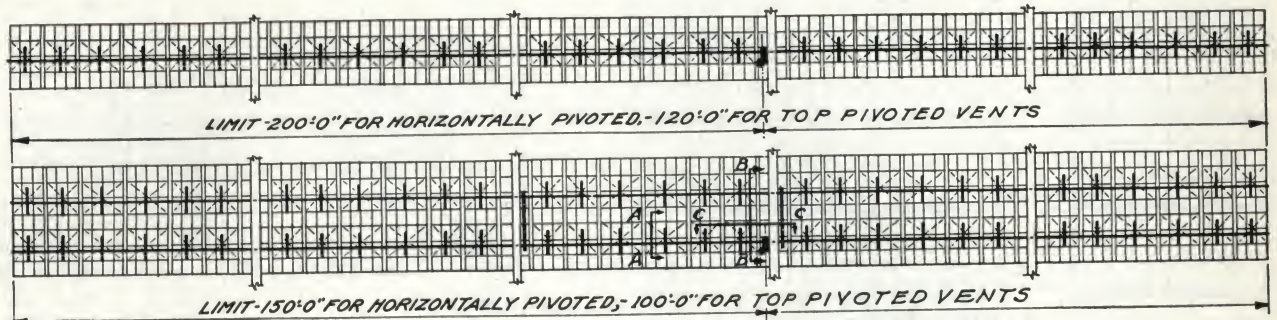
MITER GEAR OPERATION

* DETAILS SCALE: 3/4" = 1'-0"

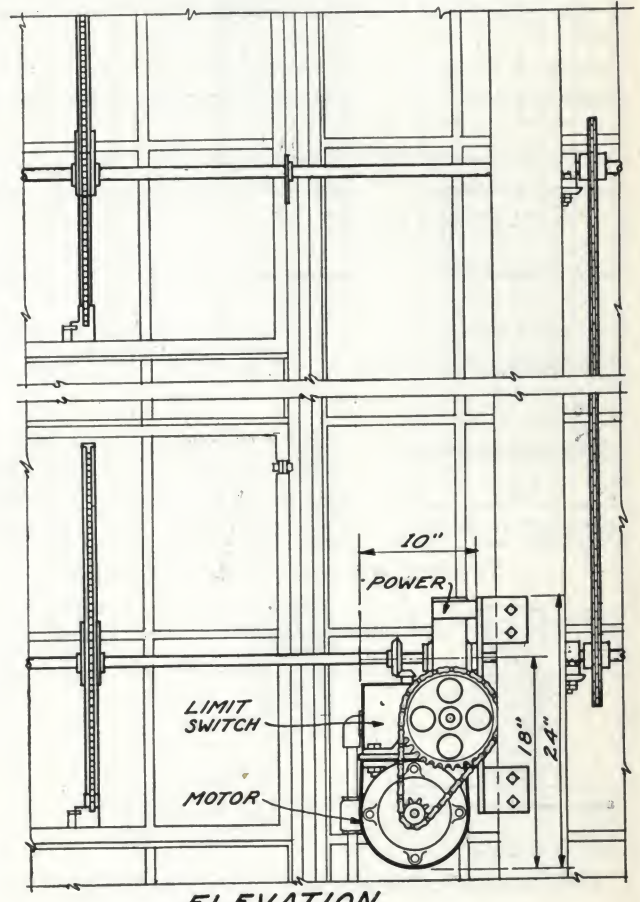
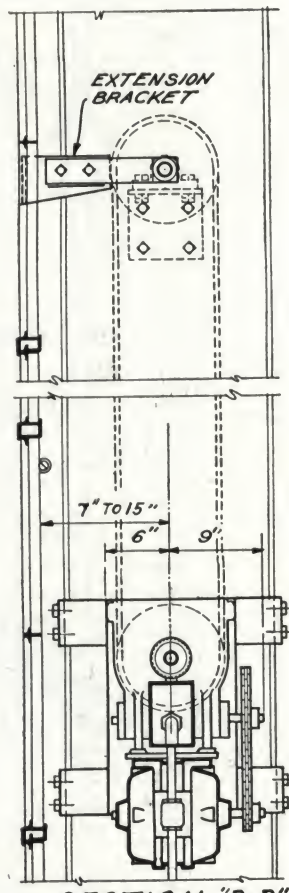
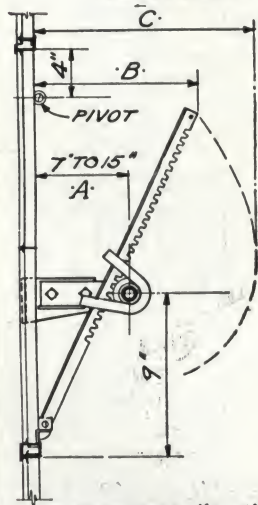
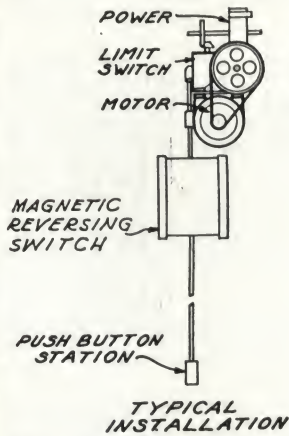
Fenestra
 August 1927

Rack and Pinion Operator
 Typical Details

Plate No
 S-201

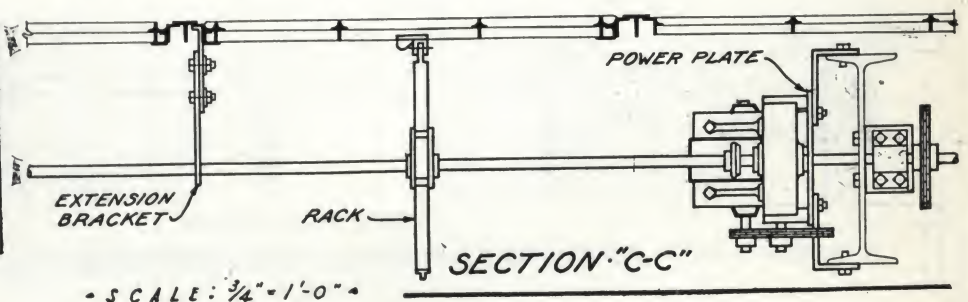


TYPICAL SINGLE AND DOUBLE RUNS.



CLEARANCES FOR RACK TWO PANE HIGH TOP PIVOTED VENTS.

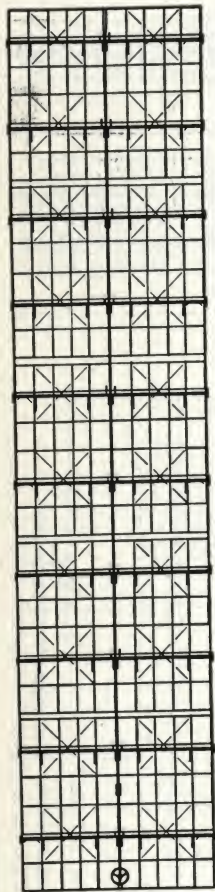
A	B	C	OPENING ANGLE	18" GLASS	20" GLASS
7	24 1/2	28	60°	50°	
9	29 1/2	30	60°	50°	
11	31 1/2	31	50°	50°	
13	33 1/2	33	50°	40°	
15	35 1/2	35	40°	40°	



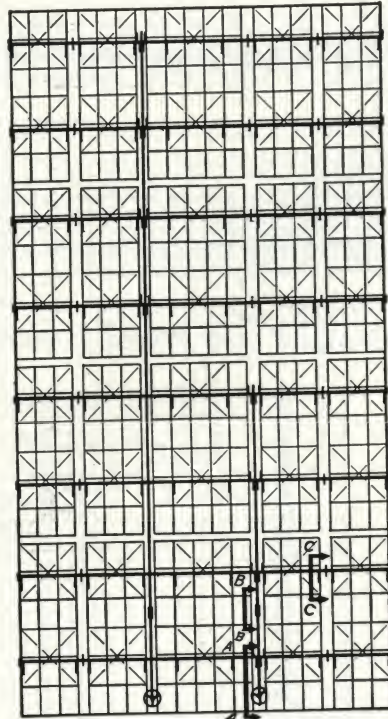
Fenestra
August 1927

Rack and Pinion Operator
Electrically Controlled

Plate No
S-202



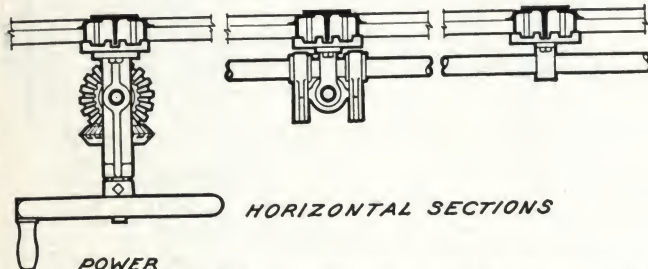
OPERATOR ATTACHED
TO T-BAR MULLION



OPERATOR ATTACHED TO
STRUCTURAL MULLION

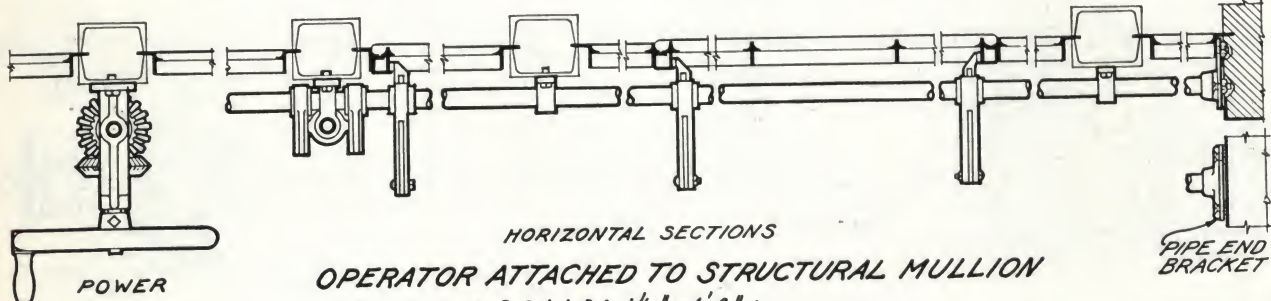
NOTE:
ONE POWER IS LIMITED TO
OPERATE TWENTY TWO PANE HIGH
TOP PIVOTED VENTS TO OPEN
OUT; OR FIFTY TWO PANE HIGH
VENTS PIVOTED 2" ABOVE CENTER.
ONE FIXED PANE AT SILL REQUIRED
FOR POWER CLEARANCE.

TYPICAL INSTALLATIONS



HORIZONTAL SECTIONS

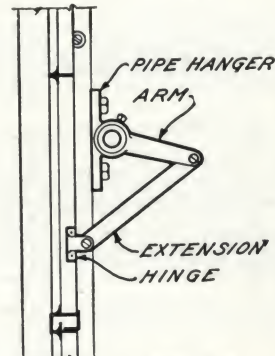
POWER
OPERATOR ATTACHED TO T-BAR MULLION



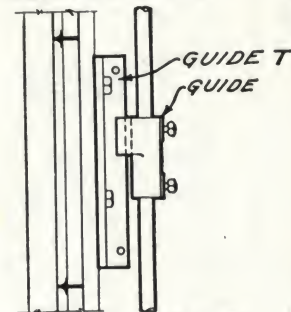
HORIZONTAL SECTIONS

OPERATOR ATTACHED TO STRUCTURAL MULLION

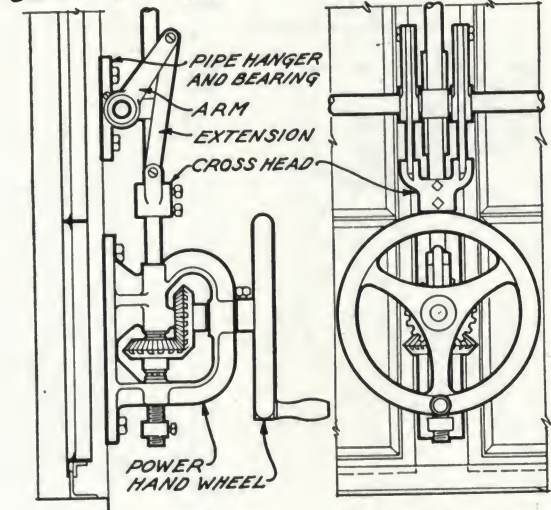
SCALE: 1/2" = 1'-0"



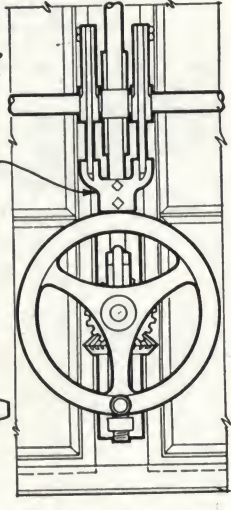
SECTION "C-C"



SECTION "B-B"



SECTION "A-A"

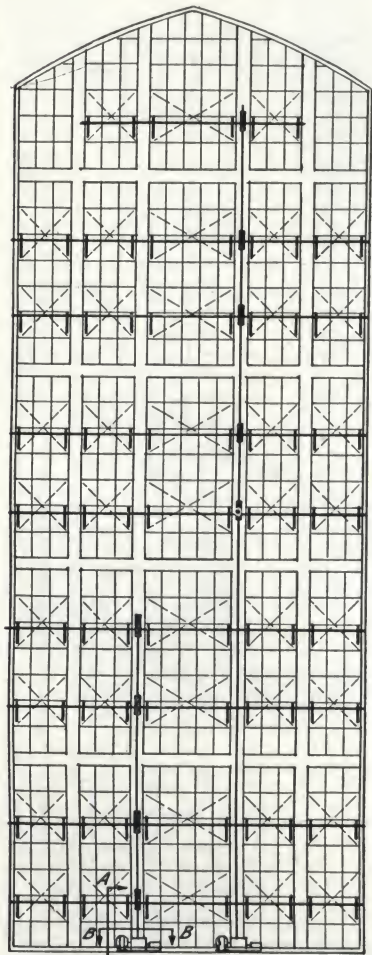
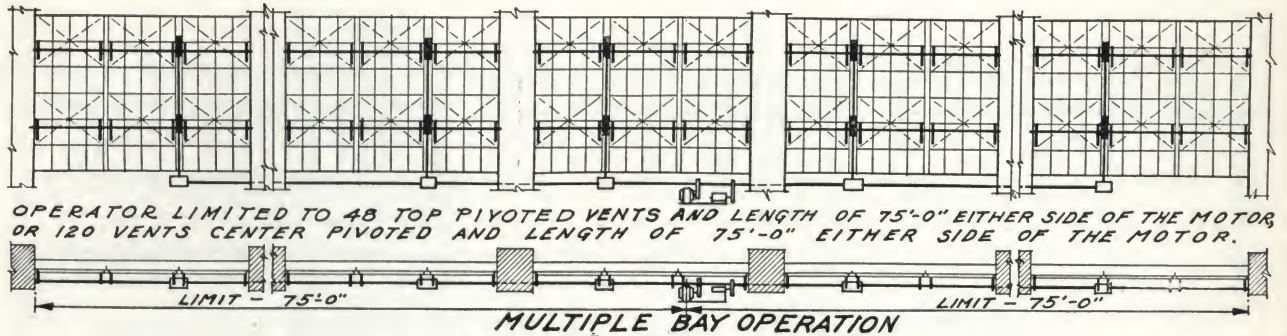


ELEVATION

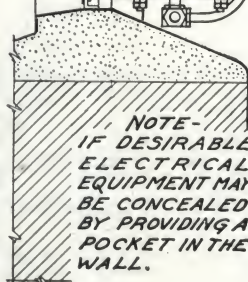
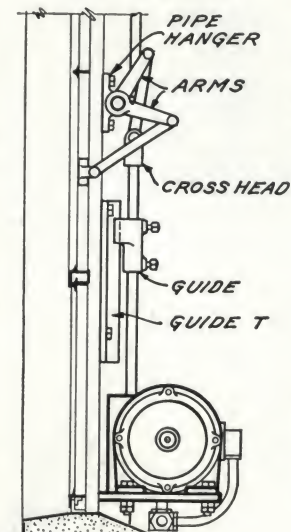
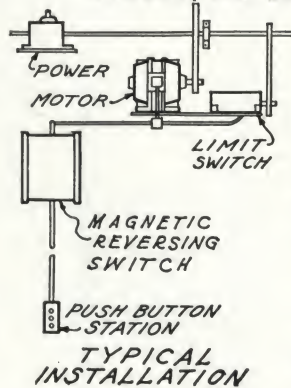
Fenestra
August 1927

Screw Type Operator
Typical Details

Plate No
S-301

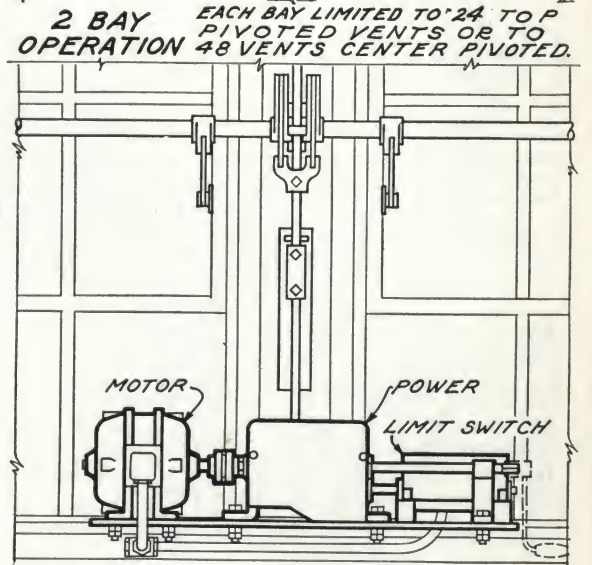
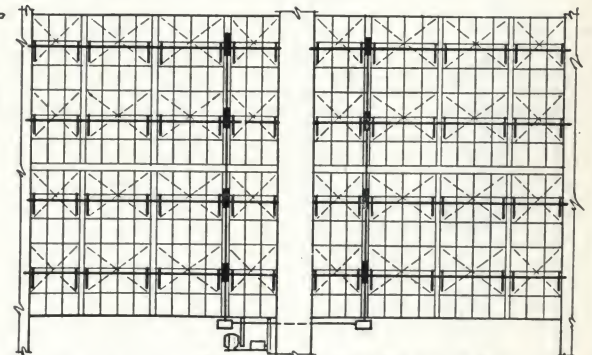


PLAN

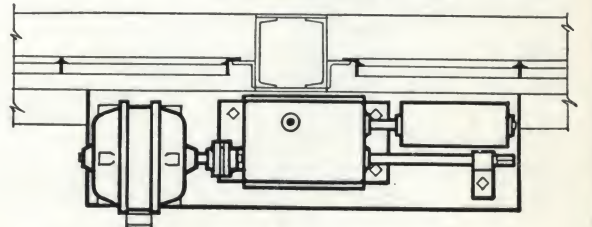


NOTE - IF DESIRABLE ELECTRICAL EQUIPMENT MAY BE CONCEALED BY PROVIDING A POCKET IN THE WALL.

SECTION "A-A"



POWER FOR LARGE OPENINGS

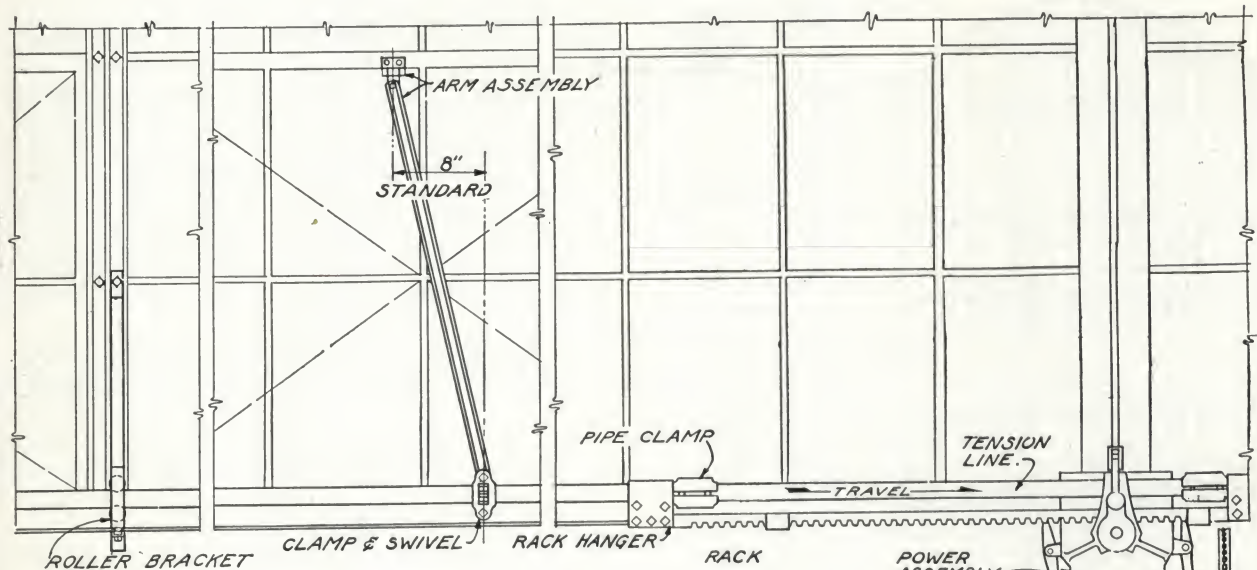
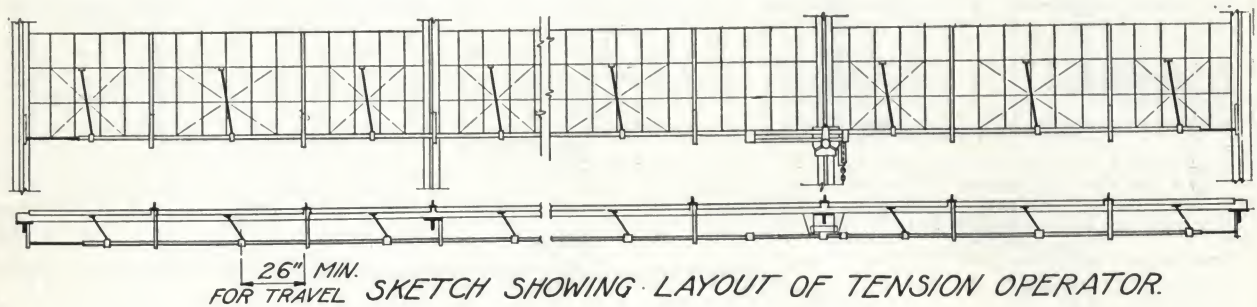


SCALE: 3/4" = 1'-0"

Fenestra
August 1927

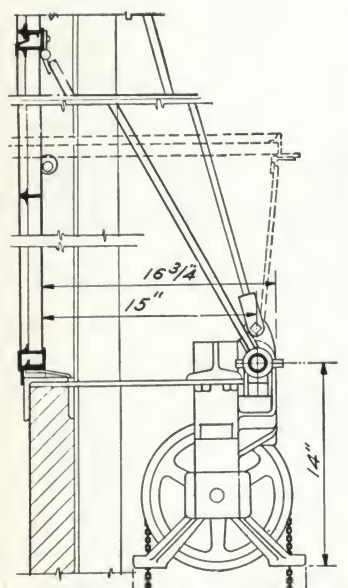
Screw Type Operator
Electrically Controlled

Plate No
S-302

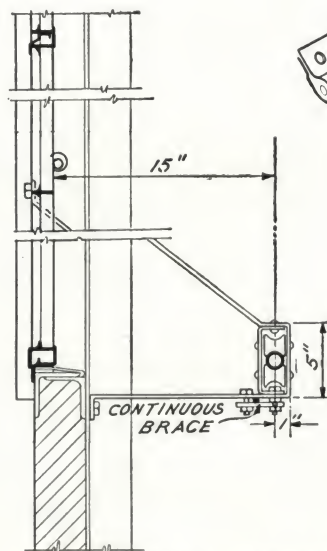


ENGAGES WHEN
SASH IS OPENED
TO LIMIT.

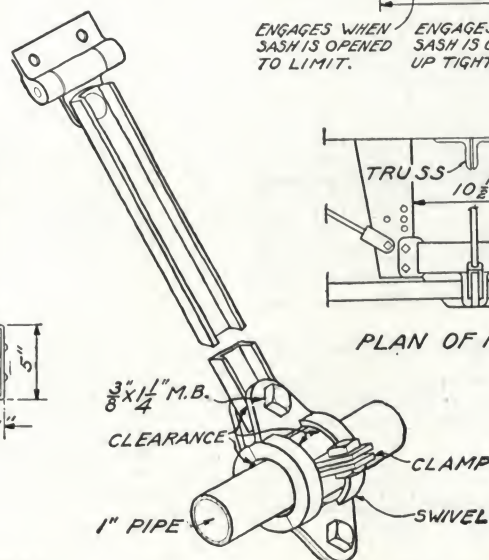
ENGAGES WHEN
SASH IS CLOSED
UP TIGHT



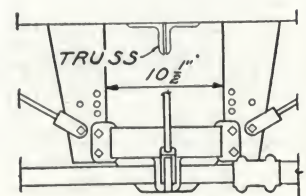
CLEARANCE FOR OPERATOR



DETAIL SHOWING LOCATION
OF ROLLER BRACKETS
AND THEIR CLEARANCES.



DETAIL SHOWING
DESIGN OF SWIVEL

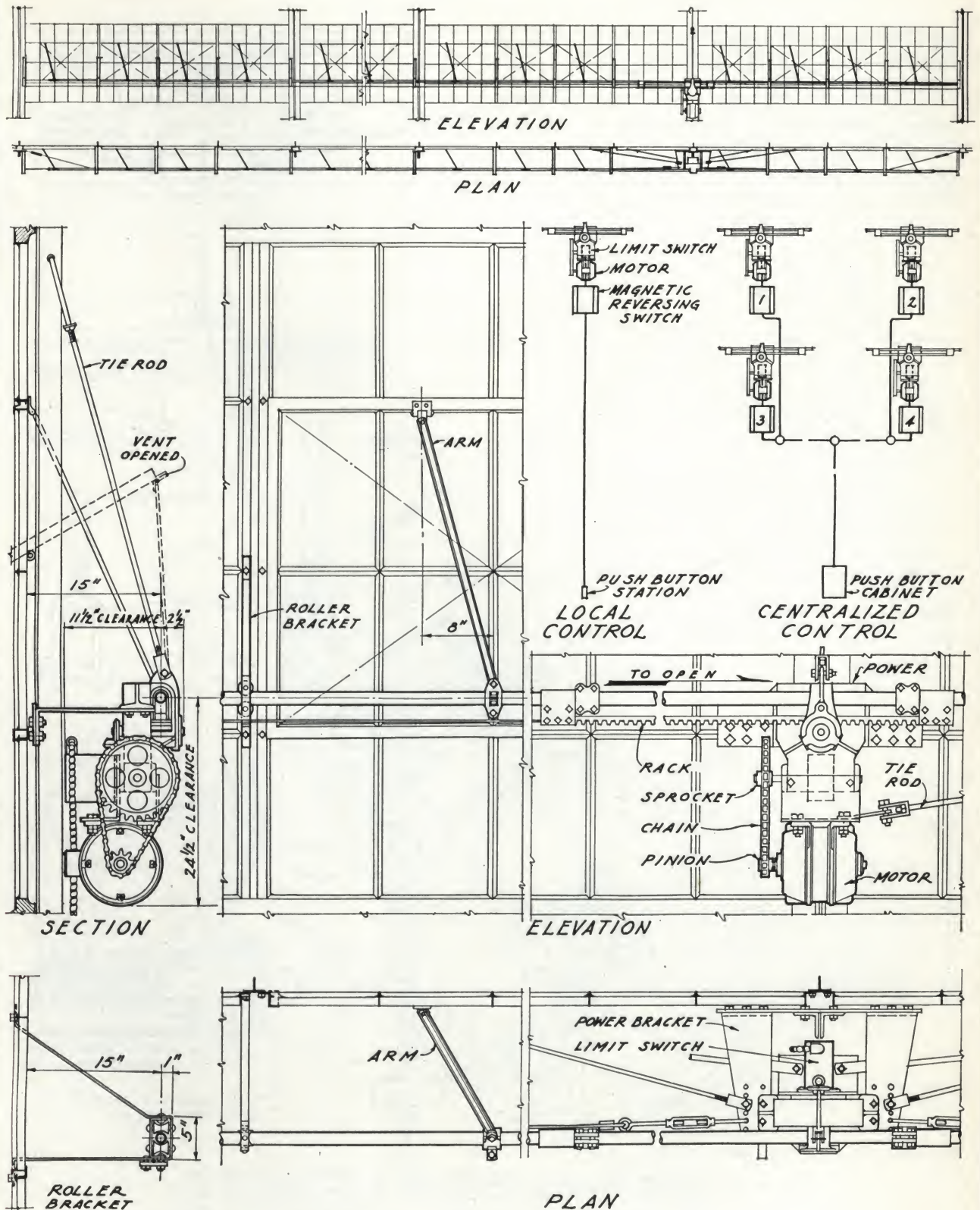


PLAN OF POWER.

Fenestra
August 1927

Tension Type Operator Typical Details

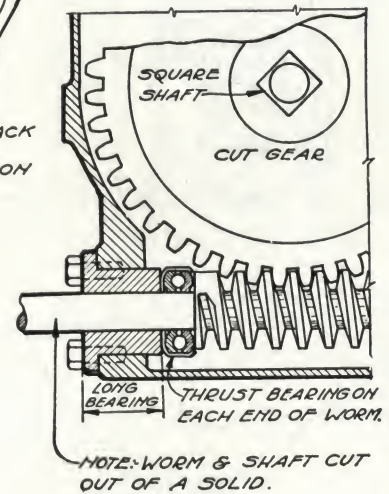
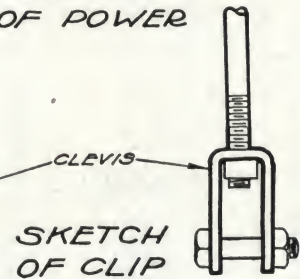
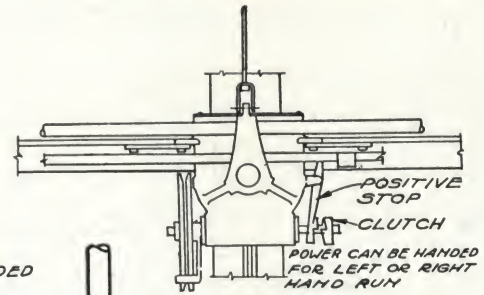
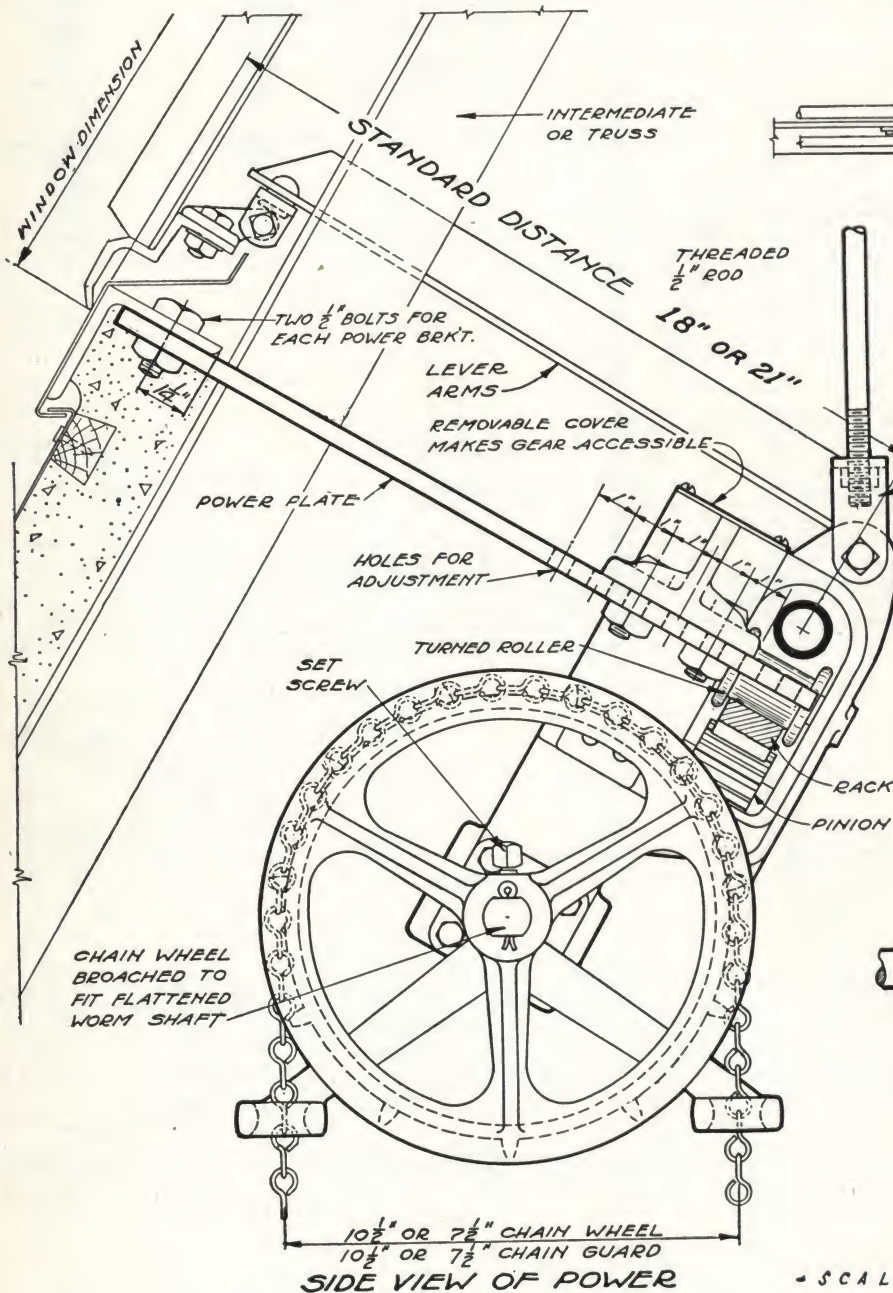
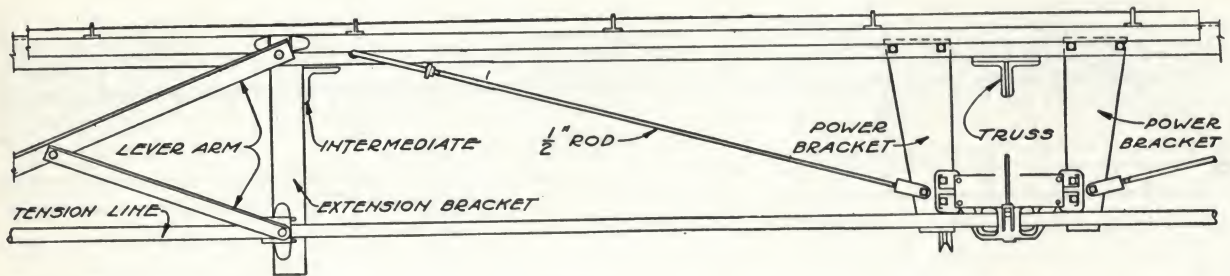
Plate No
S-401



Fenestra
August 1927

Tension Type Operator
Electrically Controlled

Plate No
S-402



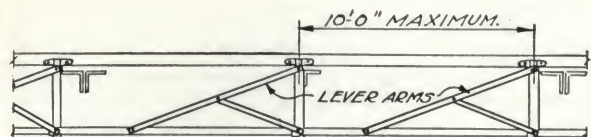
NOTE: WORM & SHAFT CUT OUT OF A SOLID.

• SCALE: HALF-FULL-SIZE •

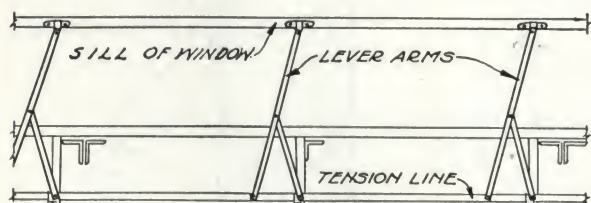
Fenestra
August 1927

Continuous Type Operator
Typical Details

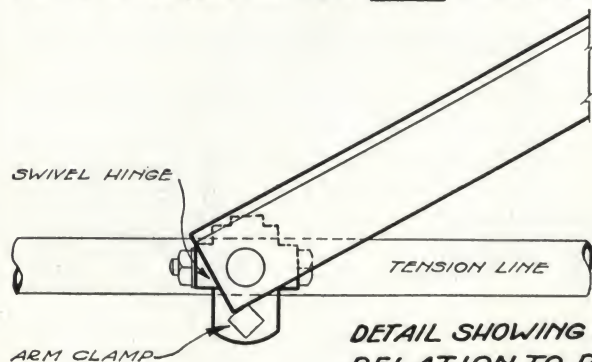
Plate No
S-501



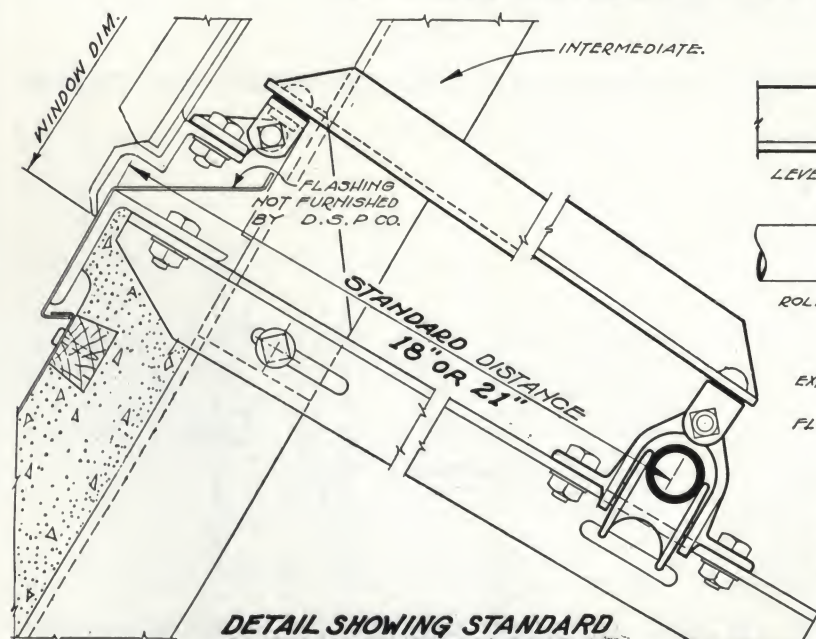
DETAIL OF LEVER ARMS IN CLOSED POSITION



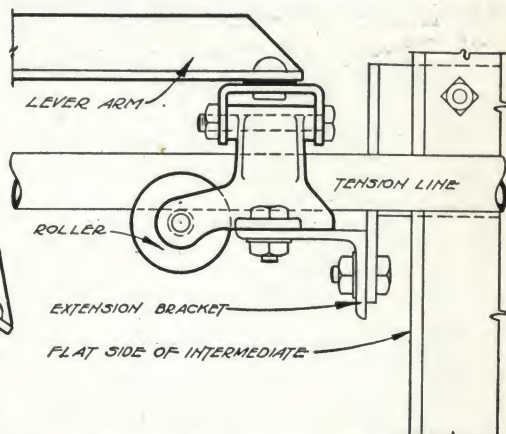
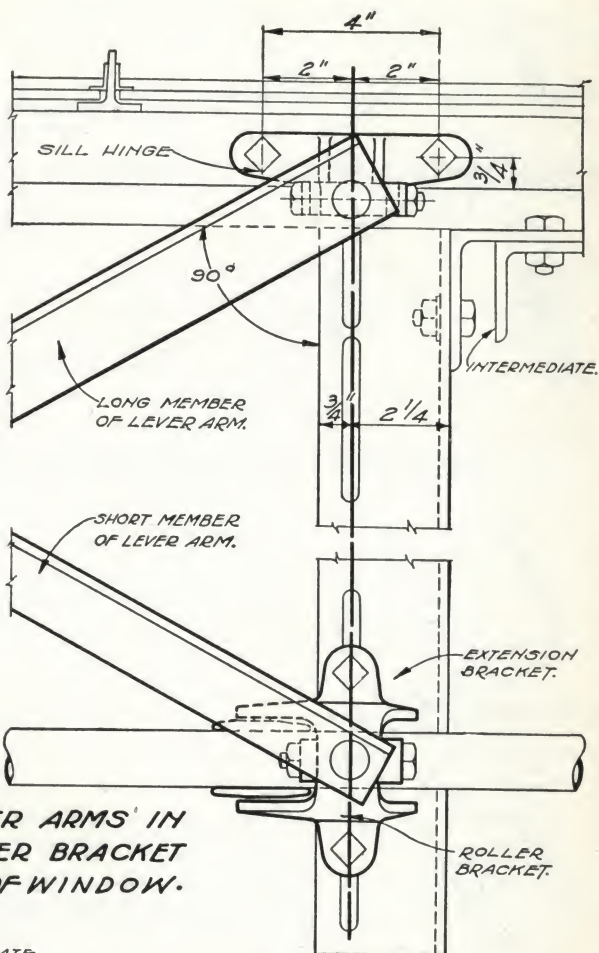
DETAIL OF LEVER ARMS IN OPEN POSITION.



DETAIL SHOWING LEVER ARMS IN RELATION TO ROLLER BRACKET AND SILL HINGE OF WINDOW.



DETAIL SHOWING STANDARD DISTANCES FROM FACE OF SILL TO TENSION LINE



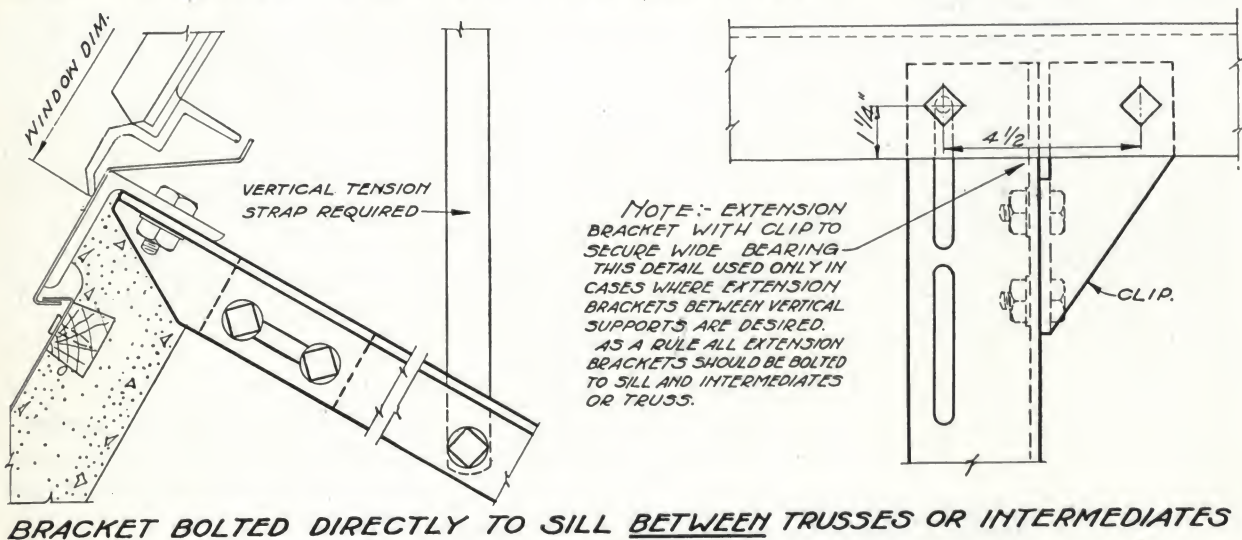
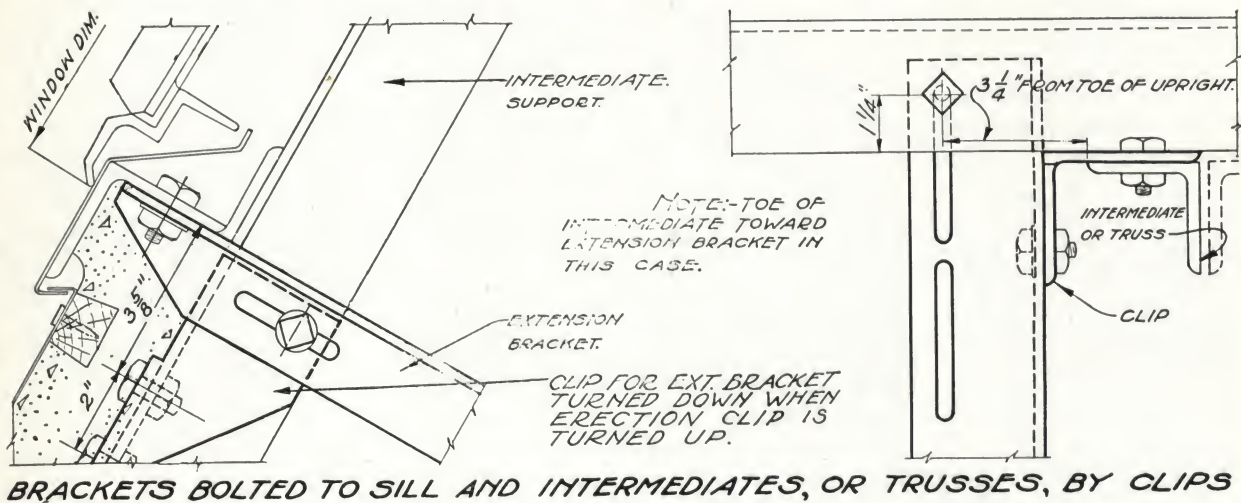
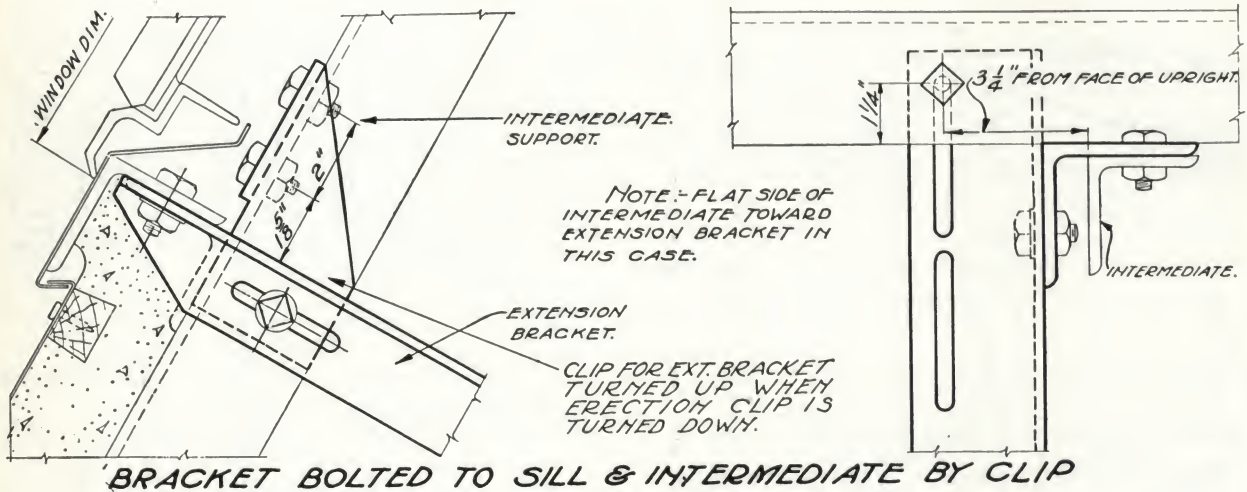
END VIEW SHOWING SWIVEL HINGE OF LEVER ARM AND ALSO ROLLER SUPPORT FOR TENSION LINE.

•SCALE: HALF-FULL-SIZE•

Fenestra
August 1927

Continuous Type Operator
Lever Arm Assembly

Plate No
S-502

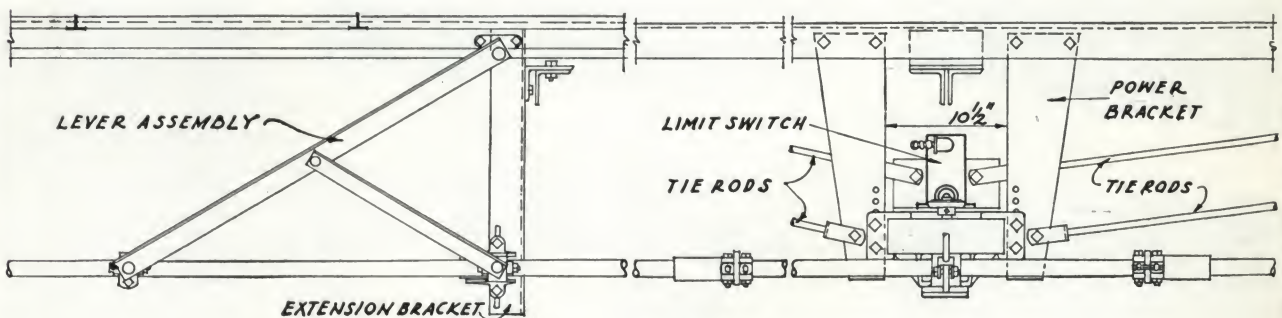
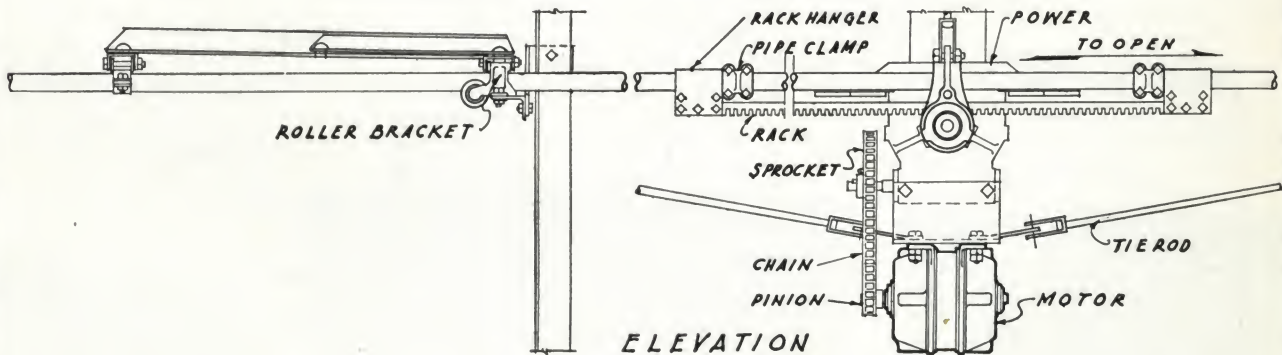
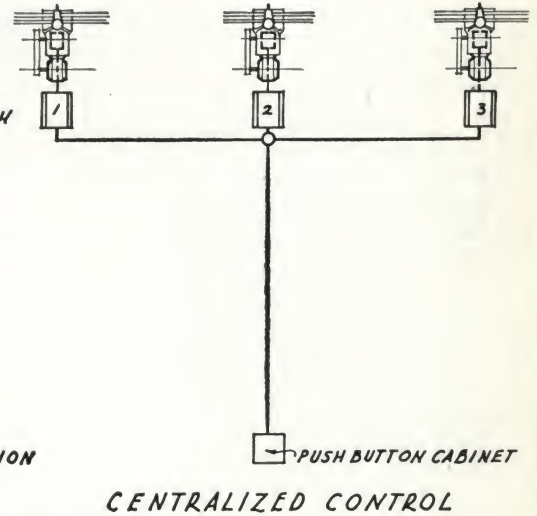
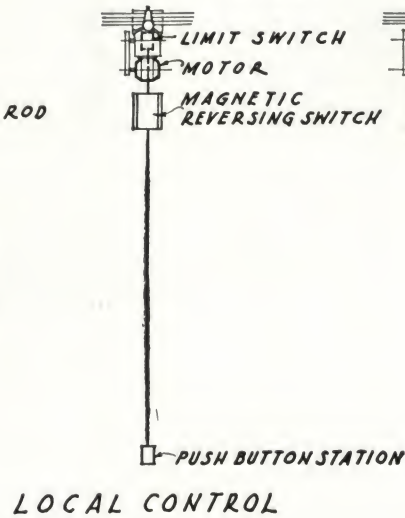
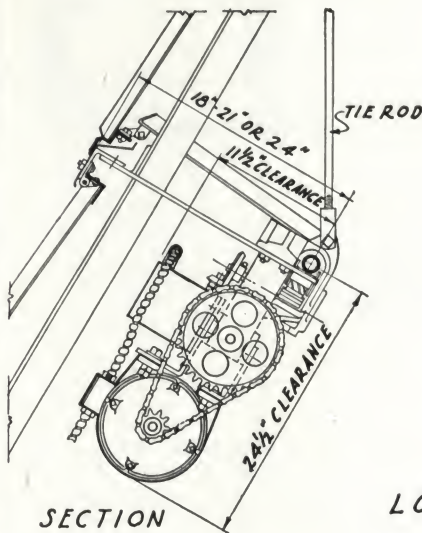
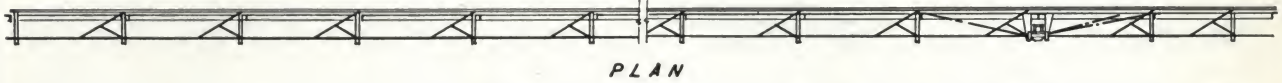


• SCALE: HALF • FULL • SIZE •

Fenestra
August 1927

Continuous Type Operator
Extension Bracket Details

Plate No
S-503

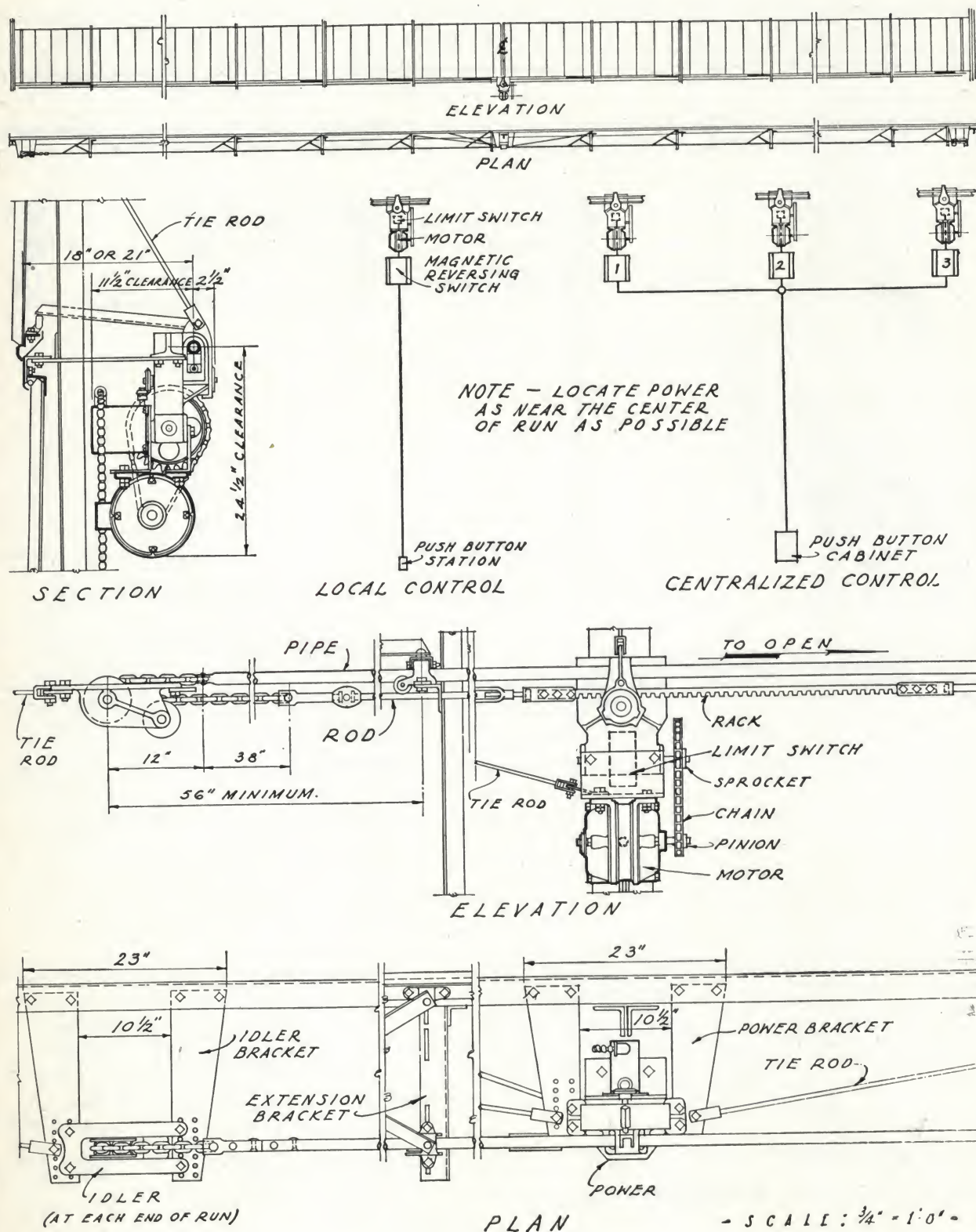


• SCALE: 3/4" = 1'-0" •

Fenestra
August 1927

Continuous Type Operator
Electrically Controlled

Plate No
S-504



Fenestra
August 1927

Continuous Cable Type Operator
Electrically Controlled

Plate No
S-505

(V) SWINGING AND SLIDING STEEL DOORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Both Channel and Tubular doors are made to swing or slide in single and double units. Specify as required.

(V-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

Note: In lists or schedules, indicate whether swing doors open "In" or "Out" and which jamb carries the hinges.

(V-2) General

All doors shall be *Fenestra* (Channel) (Tubular) Steel Doors as manufactured by DETROIT STEEL PRODUCTS COMPANY.

Note: Specify whether Channel, Tubular or both.

(V-3) Materials

(V-3a) Door Frames, etc.—

Note: We strongly recommend that all door frames be included with the Miscellaneous Structural Steel or Ornamental Iron and that they be included under these or similar other specification divisions, for the reason that the frames in all cases should be installed when the building is erected to assure rigid anchorage. Steel doors, on the contrary, should be installed only after the building is erected.

Note: Provide, therefore, that all frames shall be made to the exact dimensions furnished by the Door Manufacturer and that they shall be erected plumb, true and rigidly anchored. Include provisions for slotted, sliding door thresholds and supports for sliding door tracks where these are required.

Note: Where particularly desired, 4" channel frames for swing doors only, will be furnished with the doors at added cost. If required, so specify. (See Fenestra Page 75.)

(V-3b) Door Panels—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All panel frame members shall be (equal leg channel) (angle) sections.

Note: Channels are used for channel doors and angles for tubular doors. Include either or both as required.

Muntins shall be 1½" deep. Solid panels shall be of 13 gauge steel.

(V-3c) Door Stiles and Rails—

(1) Door stiles and rails shall be of heavy rolled steel channels.

(2) Door stiles and rails shall be of heavy square steel tubing.

Note: Specify either or both as required.

(V-3d) Sliding Door Closure and Guide Plates and Meeting Stile Astragals—Closures and guides (and meeting stile astragals) shall be of heavy steel plates.

(V-4) Construction

(V-4a) Door Panels—All panel frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon air hammer riveted. Solid panels shall be secured by angles riveted to the panel frame and muntin members.

(V-4b) Channel Doors—Channel stiles and rails shall be butted together over solid corner castings, through riveted with countersunk rivets. Stiles and rails shall be riveted to frame of panel. Door stiles shall be reinforced with a steel plate at butts.

(V-4c) Tubular Doors—Tubular stiles and rails shall be mitered and butt welded at corners. Panel frames shall be attached to stiles and rails with countersunk machine screws.

(V-4d) Closures—Closure plates at top and back edges of sliding doors shall be attached with countersunk machine screws.

(V-4e) Guides and Astragals—Guide (and astragal) plates on the face of sliding doors shall be attached with countersunk through rivets.

(V-4f) Glazing Angles—All glass shall be secured with glazing angles, neatly mitered at angles. Angles shall be secured to frames with brass machine screws and to muntins with machine screws and nuts.

(V-4g) Hardware Provisions—Stiles, where required, shall be tapped to receive hardware attached at the time of erection.

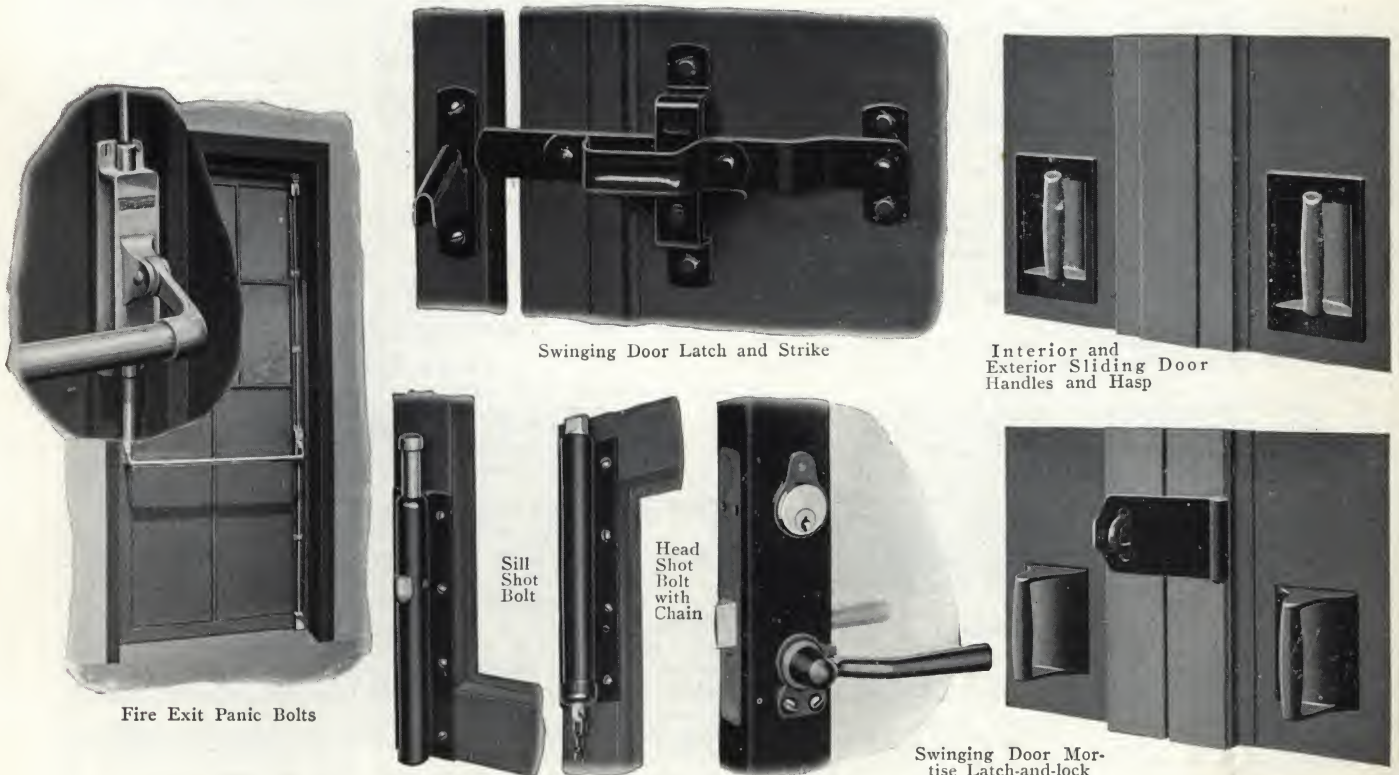
(V-5) Attached Hardware

Note: Attached at factory.

(V-5a) Butts—All swinging doors shall be equipped with standard (4½"x4½") (6"x4½") steel butts with non-risable loose pins. The number of butts to each door shall be such as to adequately carry the weight.

Note: 4½"x4½" butts are used on channel doors, 6"x4½" on tubular doors. Include either or both as required.

(V-5b) Latch-and-Locks—All swinging single doors shall be equipped with standard, bronze face, mortise latch-and-locks.



Swinging and Sliding Door Hardware

FENESTRA PAGE 73 (SEE PLATES ON PAGES 75, 76, 77)

Note: Cylinders are installed after erection.

Note: Omit if surface Japanned iron latch and strike are selected. See (V-6b).

(V-5c) Sliding Door Handles—All sliding doors shall be equipped with combination flush and projecting iron handles, one to each door, solidly riveted to the steel panels.

(V-6) Detached Hardware

Note: See Fenestra Page 73.

Note: All detached hardware shall be shipped carefully packed to prevent damage till applied for use.

(V-6a) Swing Door Cylinders and Handles—All swing doors shall be equipped with malleable iron handles, and bronze faced cylinders and escutcheons.

Note: Use when latch-and-locks are included, see (V-5b). Where master keying is necessary, we prefer to key to our own system. If cylinder master keying is required, so specify here.

(V-6b) Swing Door Latches—All swinging doors shall be equipped with surface, Japanned iron door latches and strikes.

Note: Omit if mortised latch-and-locks are selected. See (V-5b) and (V-6a).

(V-6c) Shot Bolts—All fixed leaves of double swing doors shall be equipped with standard surface, spring shot bolts (Japanned iron case and steel bolts). Top bolt shall be chain operated. Bottom bolt shall be foot operated.

(V-6d) Sliding Door Hasps—All sliding doors shall be equipped with hinged hasps and staples.

(V-6e) Sliding Door Tracks—All sliding doors shall be equipped with standard steel tracks and adjustable roller bearing trucks, complete with track brackets.

(V-6f) Special Hardware—

Note: Special hardware, such as standard fire exit panic bolts, standard door checks, etc., will be furnished where desired. If required, so specify.

(Y) INTERCHANGEABLE INDUSTRIAL PARTITIONS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: These partitions are adapted for use in warehouses, factories, mills, garages and the office portions of industrial buildings.

Note: To avoid repetition, where these specifications are identical to those for channel and tubular steel doors, this is so noted.

(Y-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 1.)

(Y-2) General

All steel Industrial Partitions shall be Fenestra as manufactured by the DETROIT STEEL PRODUCTS COMPANY.

(Y-3) Material

(Y-3a) Window Units—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All frame members shall be equal leg channel sections. Muntins shall be 1½" deep.

(Y-3b) Mullions and Door Frames—Each mullion shall be made of two 16 gauge formed steel plates, interlocked and punched for connections. Furnish malleable iron shoes for floor, ceiling and door head jamb connections. Door mullion shall be provided with butt reinforcing plates. Door head jambs shall be similar to mullions.

(Y-3c) Partition Ties—Partition Ties at top of window units shall be of 16 gauge formed steel plates, punched for mullion connections.

(Y-3d) Base Plates—Base plates shall be of 14 gauge steel.

(Y-3e) Filler Plates—Filler plates shall be of 24 gauge steel.

(Y-3f) Doors—Doors shall be formed with panels of window unit sections with special heavy rolled steel U channel stiles and rails. Glass shall be secured by glazing angles.

(Y-3g) Miscellaneous—Furnish all bolts, tap screws, etc., for connecting mullions and windows and door units together. Furnish angles or other means of attaching filler plates to building construction. Furnish expansion bolts where required.

(Y-4) Construction

(Y-4a) Window Units—All frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from head to sill and from jamb to jamb, so interlocked at intersections as to increase the rigidity and strength. Joints at frames shall be mortise and tenon air hammer riveted. Base plates shall be secured by angles riveted to the plate, frame and muntin members.

(V-7) Erection

(V-7a) All Steel Doors shall be erected by the FENESTRA CONSTRUCTION COMPANY under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(V-7b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(V-7c) Apply all hardware in accordance with the manufacturer's directions.

(V-8) Painting

All Fenestra Steel Doors shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(V-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications. See Paragraph 10, Fenestra Page 2.

(V-9a) Glass—Glass shall be ¼" thick, rough wire.

(V-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(V-9c) Glazing—All glass shall be bedded in putty and secured with glazing angles.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (V-8).

(Y-4b) Doors—Door panels shall be constructed like window units.

Note: Same as (V-4b).

(Y-5) Door Hardware

Note: Same as (V-5a), (V-5b), (V-6a), (V-6f) as applied to channel doors.

(Y-6) Erection

All steel Industrial Partitions shall be erected plumb and true, properly aligned and securely attached to the building construction. (Complete with all filler plates required.)

Note: If metal lath and plaster is substituted for filler plates, include this provision in the Lathing and Plastering Specifications.

Note: By loosening two mullions, any window unit may be removed or inserted without disturbing the rest of the partition. Units containing doors may be substituted for window units, or vice versa.

Apply door hardware in accordance with manufacturer's directions.

Note: Units which contain doors are shipped "knocked down." In erecting door units, doors must always be hung from the mullion, which is reinforced to receive the butt screws.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will erect steel Industrial Partitions. If required, so specify here.

(Y-7) Painting

Note: Same as (V-8).

(Y-8) Glass and Glazing

Note: The following should be included in the Glazing Specifications. (See Paragraph 10, Fenestra Page 2.)

Glass—Glass shall be ¼" thick plate (double strength).

Note: Single strength glass is not recommended.

Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

Glazing—All glass in window units shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Partition Manufacturer. (4 clips for each light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

Glass in doors shall be bedded in putty and secured with glazing angles.

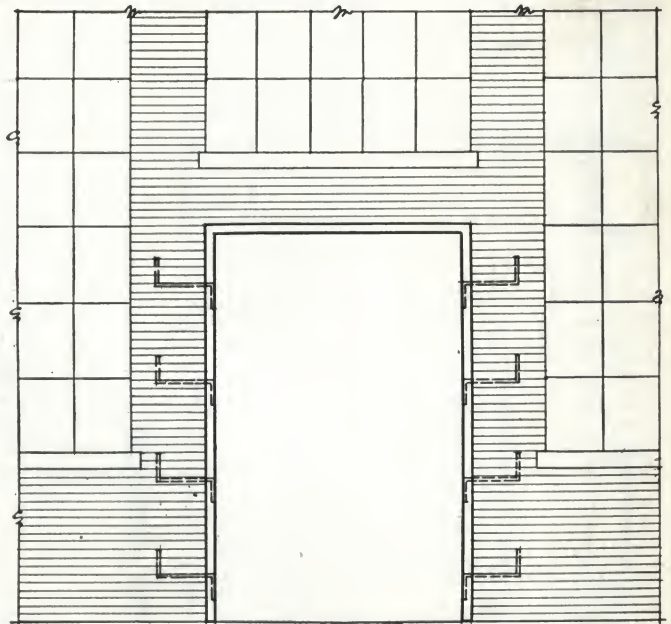
Note: Do not paint until putty has thoroughly hardened. See note Paragraph (V-8).



• STANDARD • AND • STOCK • TYPES •
TYPES SHOWN SHADED ARE CARRIED IN STOCK

NOTE - THE ABOVE UNITS WILL BE MADE WITH CHANNEL TRIM AND CAN BE USED FOR EITHER SWING OR SLIDING DOORS.

DIMENSIONS SHOWN ARE OVERALL DOOR SIZES WITH OPENING CLEARANCES DEDUCTED. FOR CLEARANCES SEE PLATE NO. V-102.

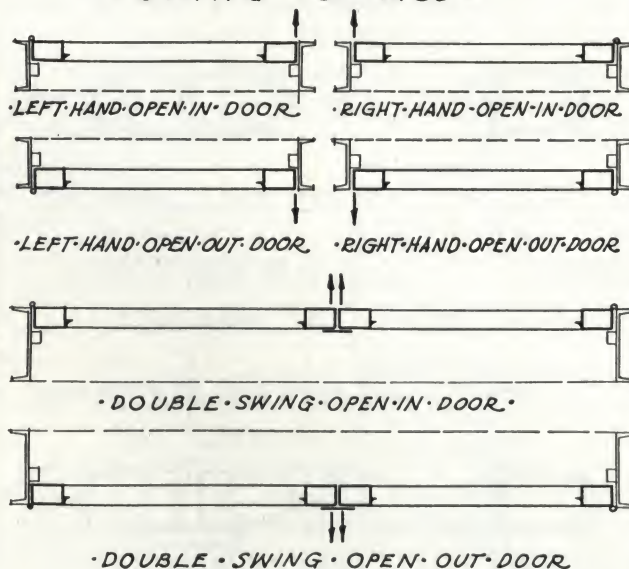


• ELEVATION • OF • TYPICAL • DOOR • FRAME •

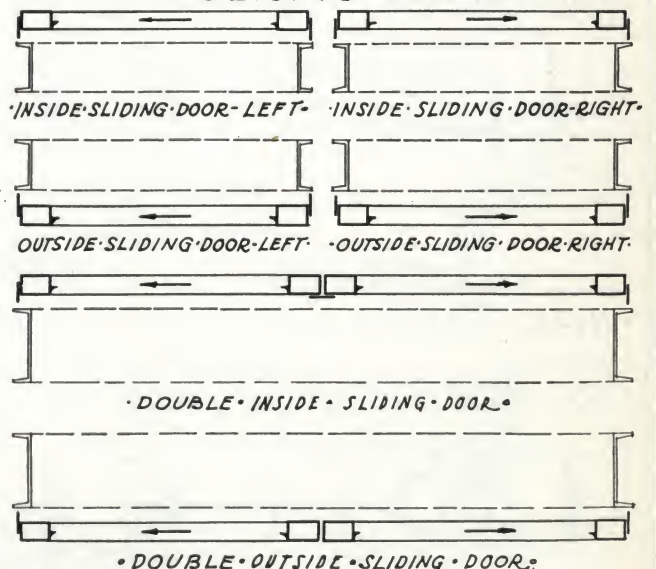
NOTE - STANDARD DOOR FRAMES FOR SWING DOORS ONLY ARE MADE OF 4" STRUCTURAL STEEL CHANNEL AND ARE EQUIPPED WITH HEAVY ZEE ANCHORS ON EACH SIDE SPACED ABOUT 2'-0" ON CENTERS TO ANCHOR FRAME INTO THE MASONRY. HOLES IN FRAME FOR HINGES ARE DRILLED AND TAPPED IN SHOP TO MATCH DOORS.

FRAMES FOR SINGLE DOORS ARE SHIPPED ASSEMBLED, USING AN ANGLE TIE ACROSS THE BOTTOM. FRAMES FOR DOUBLE DOORS ARE SHIPPED KNOCKED DOWN AND MUST BE BOLTED TOGETHER IN FIELD.

• SWING • DOORS •



• SLIDING • DOORS •

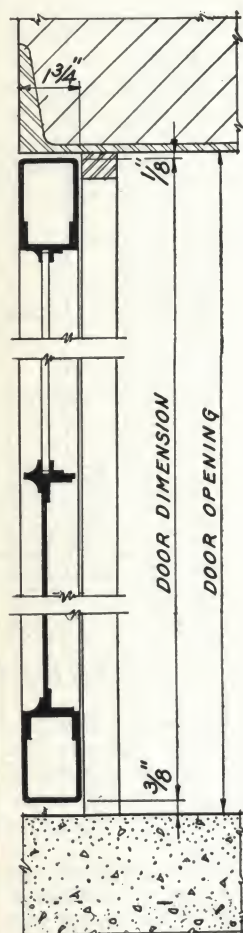


• DESIGNATION • OF • DOORS •

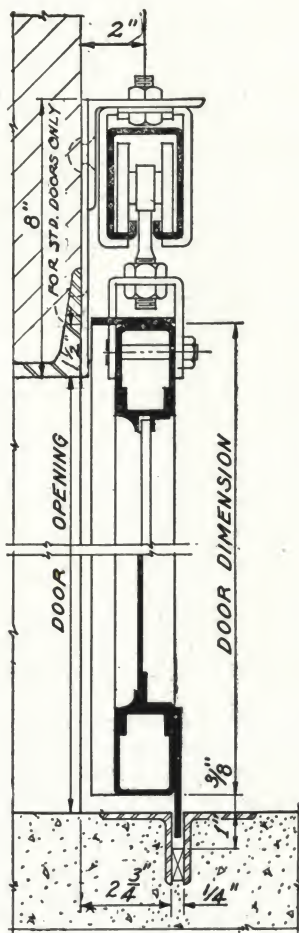
Fenestra
August 1927

Swinging and Sliding Doors
Types, Sizes and Handing

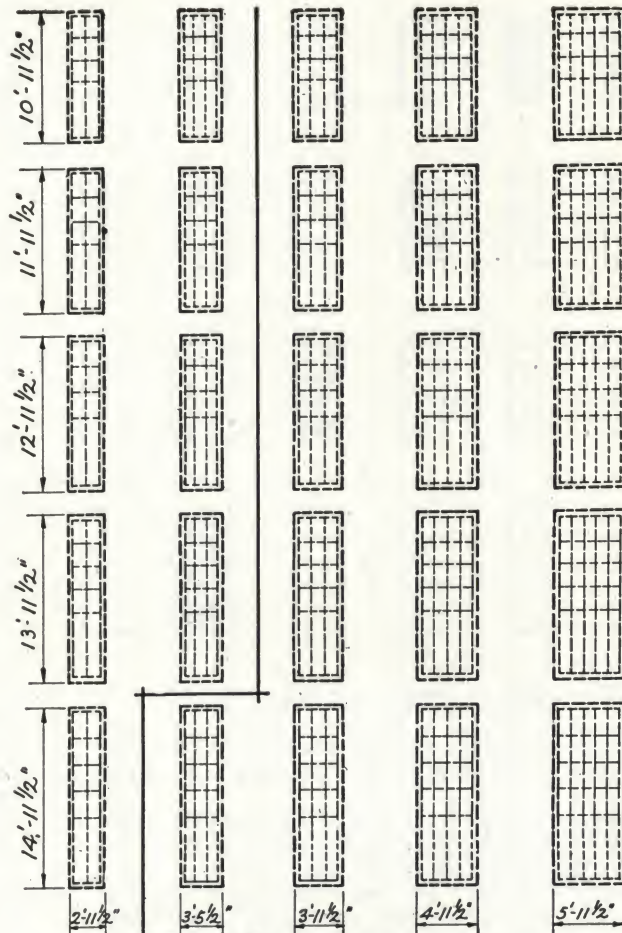
Plate No
V-101



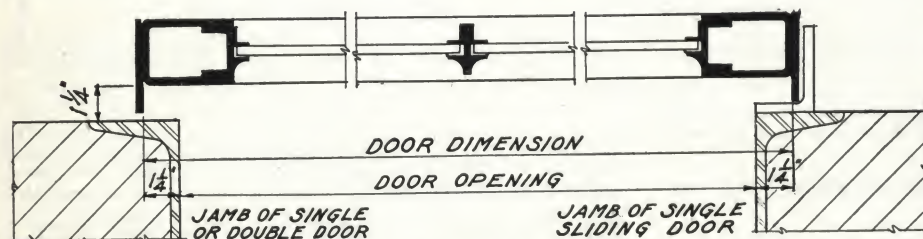
• VERTICAL • SEC. •
• SWING • DOOR •



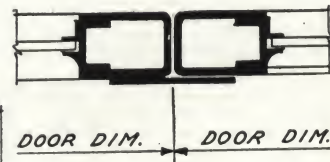
• VERTICAL • SEC. •
• SLIDING • DOOR •



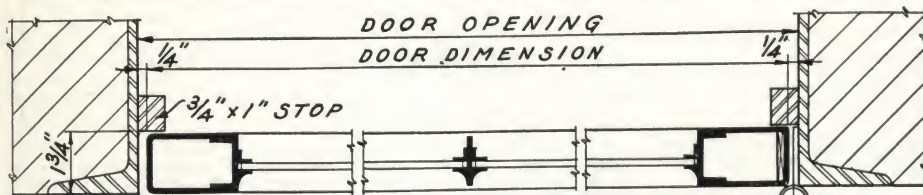
• SWING OR SLIDE • SLIDE ONLY •
• LISTED • SPECIAL • TYPES •



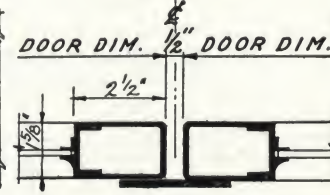
• HORIZONTAL • SECTION • SLIDE • DOORS •



• MEETING •
• RAIL •



• HORIZONTAL • SECTION • SWING • DOOR •

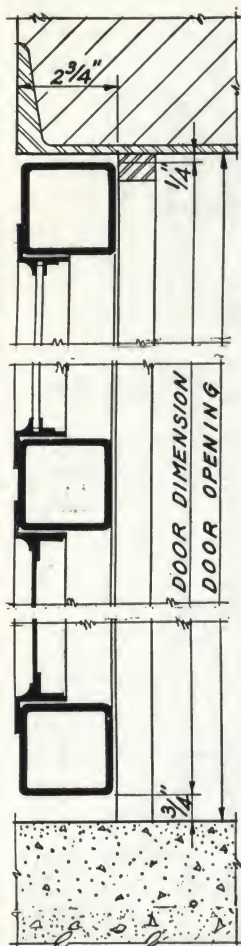


• MEETING • RAIL •

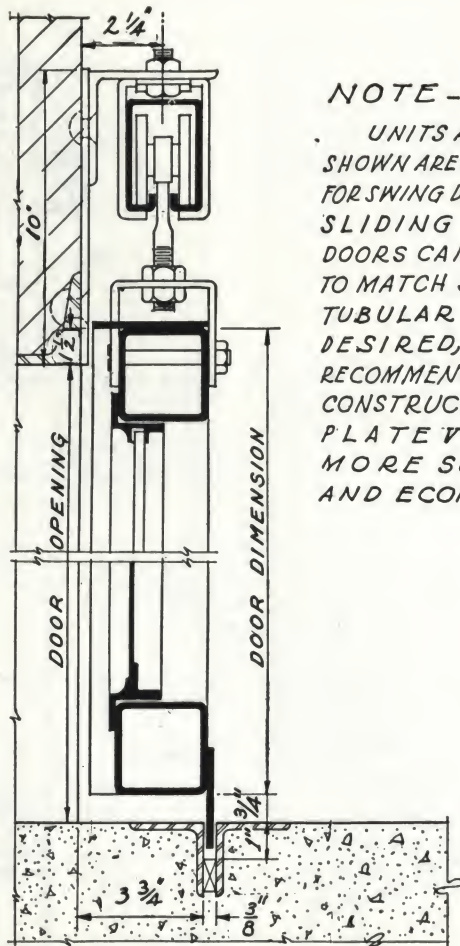
Fenestra
August 1927

Swinging and Sliding Doors
Typical Channel Doors

Plate No
V-102



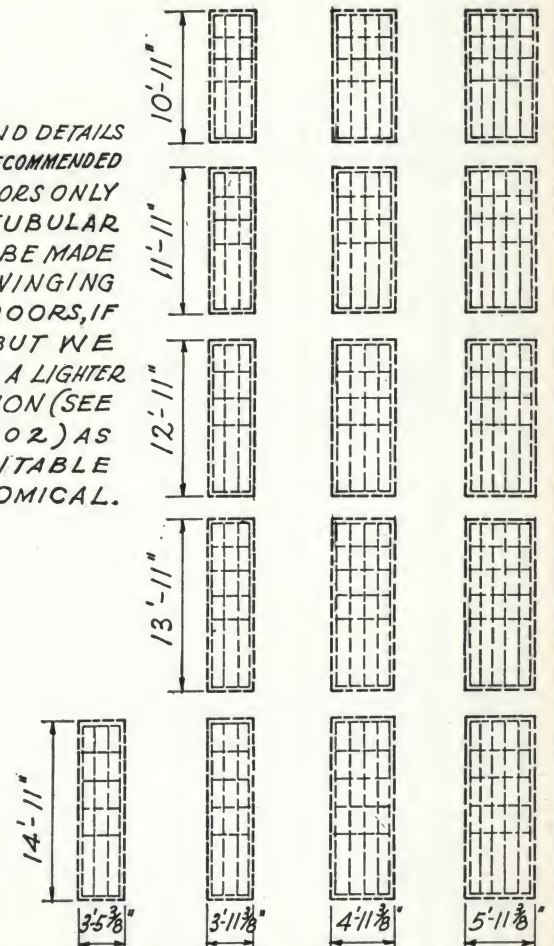
• VERTICAL • SEC.
• SWING • DOOR •



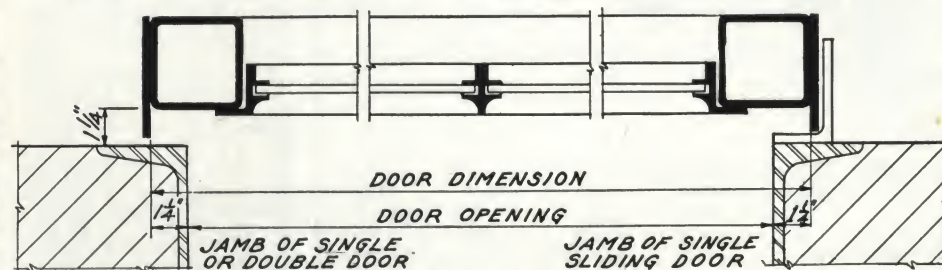
• VERTICAL • SECTION •
• SLIDING • DOOR •

NOTE -:

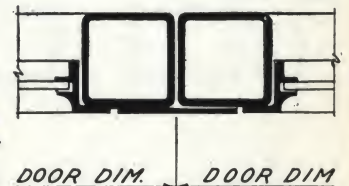
UNITS AND DETAILS SHOWN ARE RECOMMENDED FOR SWING DOORS ONLY. SLIDING TUBULAR DOORS CAN BE MADE TO MATCH SWINGING TUBULAR DOORS, IF DESIRED, BUT WE RECOMMEND A LIGHTER CONSTRUCTION (SEE PLATE V-102) AS MORE SUITABLE AND ECONOMICAL.



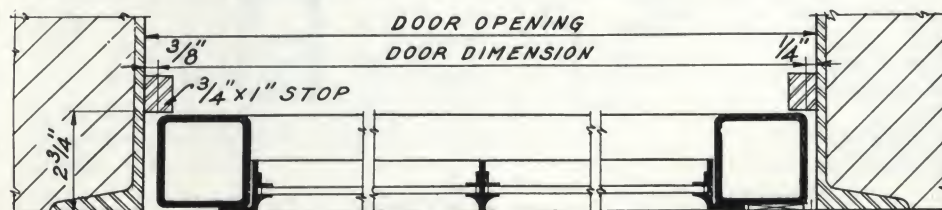
• LISTED • SPECIAL • TYPES •



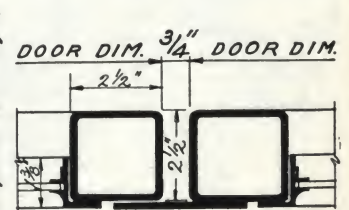
• HORIZONTAL • SECTION • SLIDING • DOOR •



• MEETING •
• RAIL •



• HORIZONTAL • SECTION • SWING • DOOR •

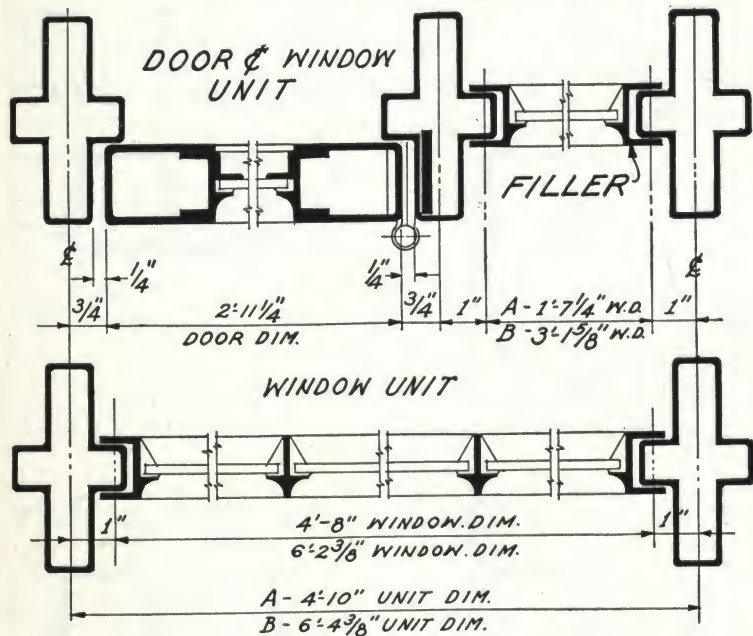
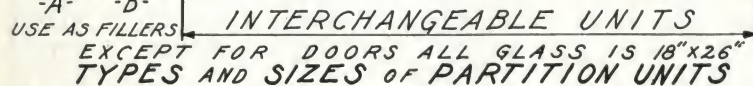


• MEETING • RAIL •

Fenestra
August 1927

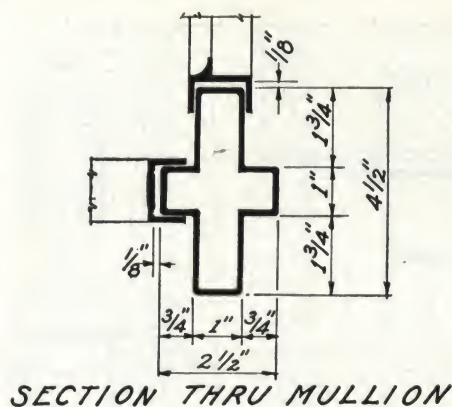
Swinging and Sliding Doors
Typical Tubular Doors

Plate No
V-103

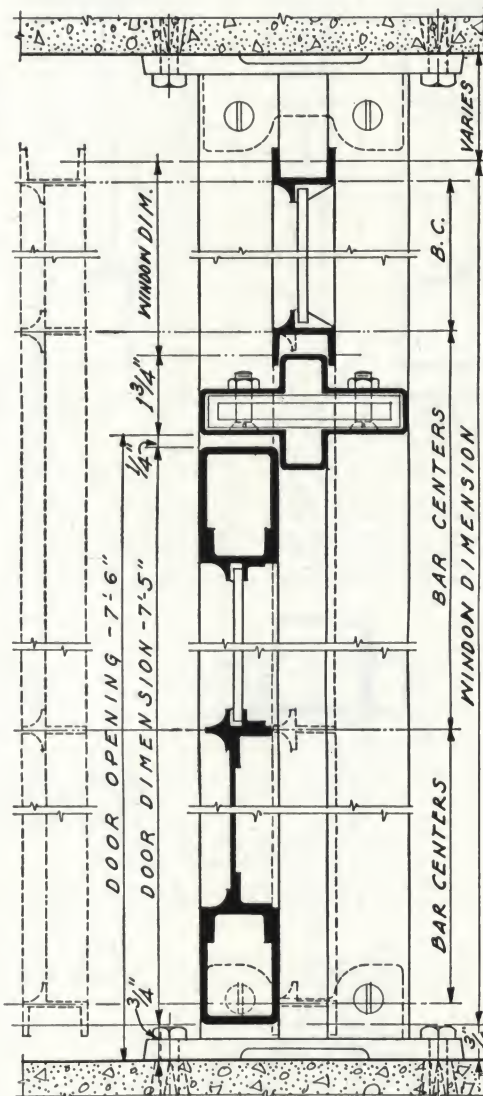


PLAN OF INTERCHANGEABLE UNITS

• SCALE : 3" = 1'-0"



SECTION THRU MULLION



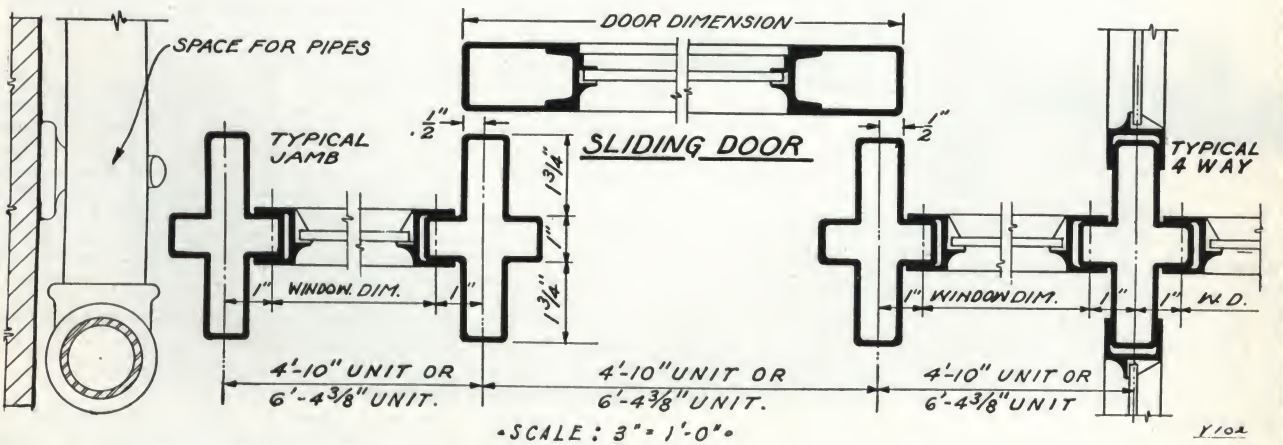
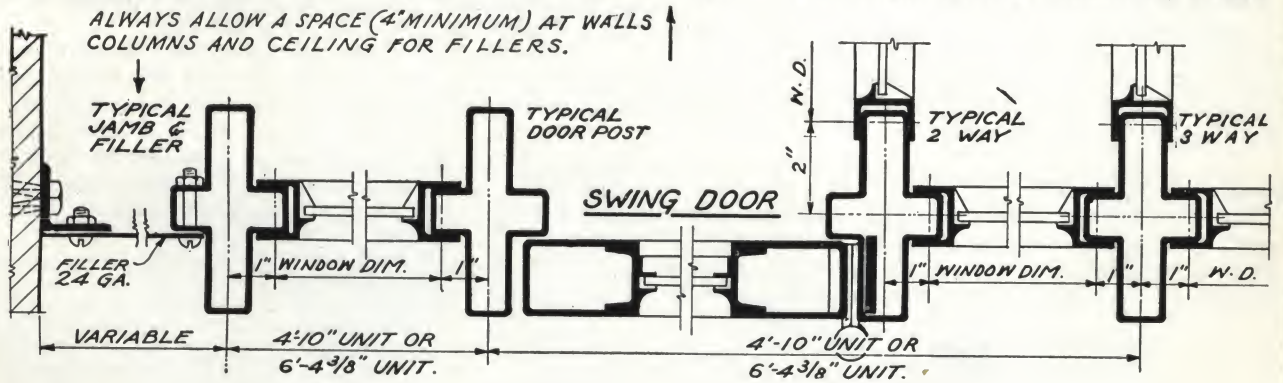
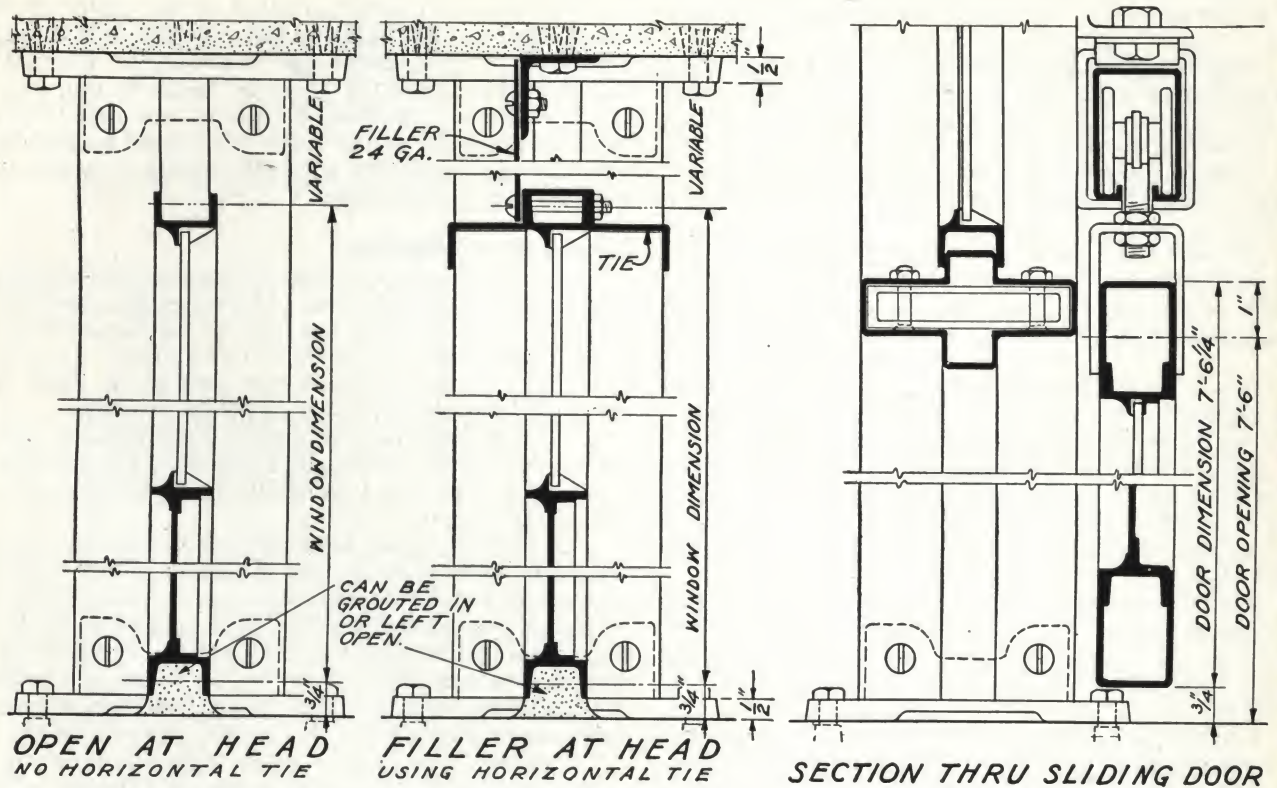
VERTICAL SECTION AT DOOR
SHOWING RELATION OF BAR CENTERS.

Fenestra
August 1927

Interchangeable Partitions

Types, Sizes and Details

Plate No
Y-101



Fenestra
August 1927

Interchangeable Partitions
Typical Cross Sections

Plate No
Y-102

Airplane Hangar Doors

Fenestra Airplane Hangar Doors offer a quick, easy and simple method of opening or closing large door openings.

Stiles and rails are made from hot-drawn 4x2½ in. seamless, steel tubing, and are mitered, butt welded and heavily reinforced at every corner. Special Fenestra, hot rolled, solid steel sections are used to frame the glass panels, glass being held by bed putty and glazing angles. Solid panels are of 11-gauge steel, and are double—one on each side.

All doors rest on double flanged, cast steel wheels designed to roll on steel tracks which carry the entire weight of the doors. Each wheel is mounted in a cast steel housing equipped with a roller swivel and ball bearings.

Bronze bushed steel rollers, attached to the head rail of each door, serve as guides, reduce friction and minimize the transverse load on structural steel members.

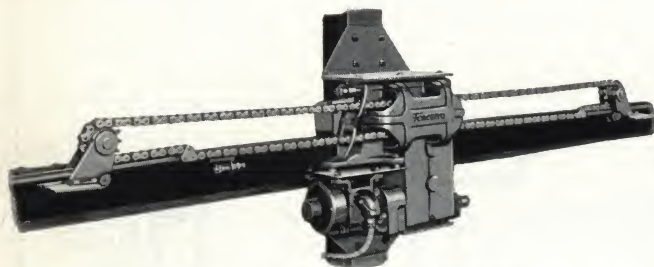
Suitable locking hardware, such as cane bolts, etc., is supplied and, to make manual operation easy, a hand hole is recessed into each door panel. Weathering is accomplished by means of ½x4½ in. rubber strips between doors.

Due to shipping limitations, the usual dimensions of these doors are 8x20 ft. but other sizes can be made as specified. Any number of doors can be used on parallel tracks approximately 6 in. apart to fill any width of opening.

Hinged pilot doors can be supplied when specified. As with other Fenestra products, erection and field painting will be handled by FENESTRA CONSTRUCTION COMPANY under separate contract, at reasonable added cost. Sixty-four of these doors, installed in 1926 at the Ford Airport, Fordson, Michigan, have been the subject of admiring comment on the part of aviators on account of their unusually easy operation.

Super-Power Operator

For exceptionally large industrial buildings where unusual operating service is desired on long runs of continuous top hung windows, we are prepared to supply the Fenestra Super-power which, in connection with con-



The Fenestra Super-Power Operator

tinuous operator transmission line and lever arms, will handle conveniently top hung continuous windows in runs up to 600 ft.

The utmost care has been used both in workmanship and materials to produce a device that combines smooth, even, efficient action with superlative strength and durability.

The power consists of a heavy, double, spur gear reduction of especially heat treated alloy steel and a case hardened steel worm engaging a heavy, special alloy, non-ferrous bronze, worm gear. Shafts for all spur gears are of heat treated alloy steel with generously proportioned bearings. The worm shaft has, in addition, combination radial and thrust bearings of ball bearing

type. The entire mechanism is enclosed in an accurately machined oil-tight case.

The power is usually located in the center of the run, operating a transmission line on either side through a heavy, continuous, roller type, chain drive. The motor is direct connected to the power by means of spur gears.

Conditions demanding the use of this super equipment are unusual. We strongly recommend consultation with Fenestra engineers who will be glad to make suggestions without obligation.

Underwriters' Windows

In most buildings, standard Fenestra steel windows afford ample fire protection. Under certain conditions, however, types carrying the label of the Underwriters' Laboratories, Inc., are desirable or required.

Underwriters' windows are limited to 7x12 ft., either dimension being taken as height or width.

Multiple units may be used to any width of opening by the use of the standard Fenestra T-bar mullion between units, provided the width between mullions does not exceed 7 ft.

¼ in. wire glass must be used, each light being limited in width to 14 in. and in height to 48 ft. and an exposed area of 350 sq. in. Glass to be held by ⅝x⅞ in. 16-gauge, pressed steel angles tapped to outside ventilator bars and bolted through interior muntins. Exposed glass area is measured from toe to toe of the glazing angles.

At added cost, the following types of Fenestra windows can be furnished with the Underwriters' label:

Standard and listed special types of horizontally pivoted windows (see Fenestra page 38) pivoted either 2 in. above center or 4 in. from the top.

Standard and listed special types of commercial projected windows (see Fenestra page 28) except those types which contain one or more open-in ventilators.

Standard and listed special types of architectural projected windows (see Fenestra page 20) by insertion of muntin bars in ventilators as necessary to meet glass limitations—except those types which include one or more open-in ventilators.

Counterbalanced windows, by the insertion of vertical and horizontal muntins in ventilators as necessary to meet glass limitations. All ventilators are limited in area to 30 sq. ft.

Each horizontally pivoted ventilator must be operated separately, either with standard cam handle and stay or cam handle and chain except those pivoted 4 in. from the top where cam and stay must be used. Standard Fenestra iron hardware on projected and counterbalanced types will be satisfactory.

Power and Auxiliary Power

The Fenestra Power and Auxiliary Power are designed for use on any tension operator where it is desired to operate several banks or runs of sash, one above another, from the same power station. Naturally it is used chiefly with continuous operator and is equally applicable to either manual or electrical control.

The device consists of a steel pinion which moves with the main power and which is connected through a steel shaft with universal joints, to a similar pinion in mesh with a rack on each of the other runs of windows. Thus the several pinions move in unison causing the tension lines on the various runs to act simultaneously.

The width of opening and the number and length of runs naturally vary with the requirements of the job.

Special Door Designs

Occasionally we are asked to solve some special door problem which arises in connection with buildings of unusual or peculiar design and our engineers are always glad to co-operate on such requests.

A typical example of this service was the design and manufacture of 20 Fenestra vertically sliding doors for the Detroit Seamless Steel Tube Company. These doors were operated by a worm and gear device connected by means of a steel shaft to pulleys over which the doors were counterbalanced against counter-weights.

HENRY HOPE & SONS

MAKERS OF

Metal Casements, Steel Windows, Leaded Glazing and Leadwork

B.C.M.
HOPE'S101 PARK AVENUE
NEW YORK, N.Y.B.C.M.
HOPE'S

Telephone: ASHLAND 8047 & 8048

STEEL & BRONZE WINDOWS

suitable for Residences, Universities, Colleges, Public Buildings, Schools, etc.

SECTIONS as illustrated full size, based upon over 100 years' experience, provide two points of contact, with ample interior cavity to prevent capillary attraction. This system has proved weathertight in the most exposed situations throughout the world. These three sections are of universal application, and can be made to open outwards, inwards, or to pivot horizontally or vertically. We recommend as a general rule that casements should open outwards.

GLAZING & SETTING

We keep a staff of fully qualified workmen, and undertake contracts including setting and glazing complete.

HARDWARE. Our hardware is of the highest class, made from BRONZE to U.S.A. Naval Specification, all working parts machined with ample bearing surfaces for everlasting wear. All hinges are of solid bronze, and horizontally and vertically pivoted casements are hung on our patent solid bronze cup pivots, which afford perfect security, easy working and exclusion of the weather.

QUALITY. We make three qualities: No. 1 fitted with Hope's bronze hardware; No. 2 with iron hardware (the steel for both these qualities is finished with two coats of anti-corrosive paint); Quality No. 1A is finished with a stoved coat of enamel in addition.

HOPE'S WINDOWS

VINCENT ASTOR RESIDENCE
PORT WASHINGTON, L.I.

DELANO & ALDRICH, Architects

The finest buildings throughout the world are fitted with HOPE'S Casements

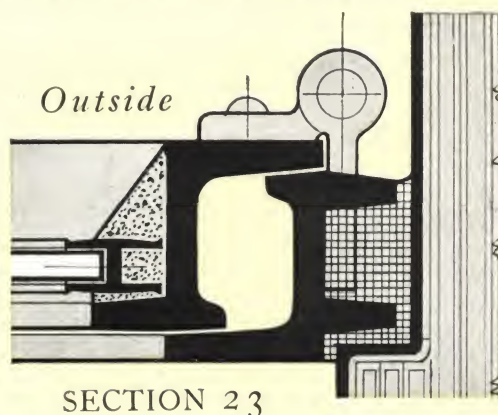
HOPE'S STEEL & BRONZE WINDOWS

FULL SIZE DETAILS AT JAMBS *of* SECTIONS No. 21, 22, 23

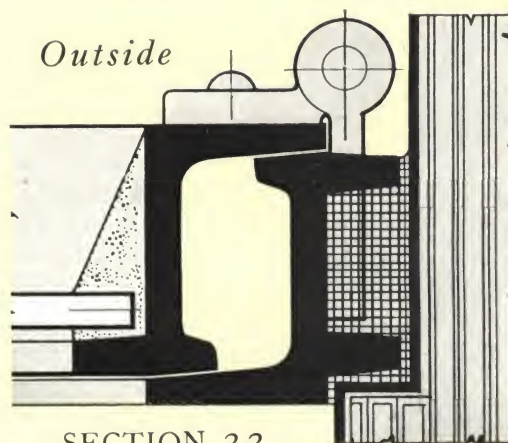


PHOTOGRAPH OF HOPE'S SIDE HUNG & TOP HUNG CASEMENT IN SECTION 23, QUALITY 1, HANDLE No. 1393, SLIDING STAY 223. THE TOP HUNG CASEMENT IS HUNG ON HOPE'S BRASS CUP PIVOTS, AND FITTED WITH HOPE'S PATENT CAM OPENER.

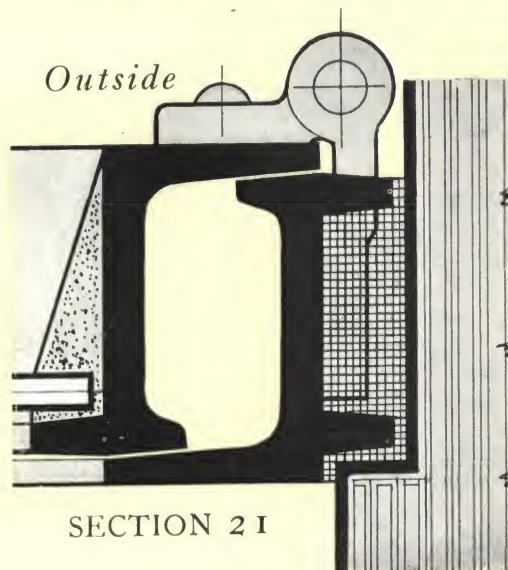
FOR THE HIGHEST CLASS OF WORK WE RECOMMEND THE USE OF SOLID BRONZE. IT IS EVERLASTING IN WEAR, HAS A BEAUTIFUL SURFACE, AND IMPROVES IN COLOUR WITH AGE. WE MAKE ALL OUR SECTIONS IN THIS METAL, AND WILL FURNISH SAMPLES AND ESTIMATE OF THE COST WHEN DESIRED.



SECTION 23



SECTION 22



SECTION 21

HOPE'S FRENCH WINDOWS



HOPE'S STANDARD FRENCH WINDOWS ARE 6' 10" HIGH \times 3' 4 $\frac{1}{4}$ " WIDE, AND ARE NOW FITTED WITH A SOLID BRONZE CREMORNE BOLT TO OPERATE FROM BOTH SIDES AND TO LOCK FROM THE INSIDE. THE PANES ARE THE SAME SIZE AS IN OUR STANDARD WINDOWS, SO THAT WITH A PROPER ADJUSTMENT OF CILL LEVELS HORIZONTAL BARS WILL RANGE WITH EACH OTHER. THESE WINDOWS ARE COMPLETE IN EVERY RESPECT AND ARE STOCKED IN NEW YORK.

HOPE'S STANDARD STEEL WINDOWS

When ordering state which hand the casements are to be hinged. A right hand casement has the hinges on the right looking from inside.

All casements are side hung to open out except the "T" type ventilators, which are hung at top to push out. All these windows can be coupled with vertical 1 mullions.

Diagram labels include: T.1, T.1 [WITHOUT PANES], T.4, T.4 [WITHOUT PANES], T.2, T.44, T.5, T.3, T.444, V.1, V.1 [WITHOUT PANES], V.9, V.9 [WITHOUT PANES], V.2, V.22, V.4, N.9, N.1, V.5, V.5 [WITHOUT PANES], V.10, V.10 [WITHOUT PANES], V.6, V.66, V.8, N.10, N.5, V.15, V.11, V.12, V.13, V.14, V.1T.1, V.1T.4, V.9T.1, V.9T.4, V.2T.2, V.2T.4, V.4T.3, V.4T.4, V.2T.4, V.5T.1, V.5T.4, V.10T.1, V.10T.4, V.6T.2, V.6T.4, V.8T.3, V.8T.4, V.66T.4, and two 'APARTMENT HOUSE WINDOW' diagrams.

HOPE'S "L" TYPE STANDARD WINDOWS WITH LEADED GLASS

Diagram labels include: L.1, L.1.F, L.1, L.2, L.1.F, L.2.F, L.3, L.3.F, L.4, L.4.T, L.4.F, L.5, L.5.T, L.5.F, L.6, L.6.F.

Types L.T., L.1., L.4.T., and L.5.T. are hung at top to push out, the remainder are side hung. Diagrams show each casement with its corresponding fixed light.

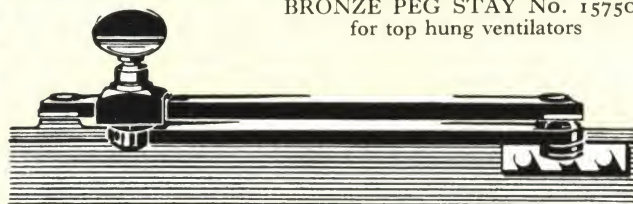


HOPE'S CLEANING HINGE
Inside view with window fully open

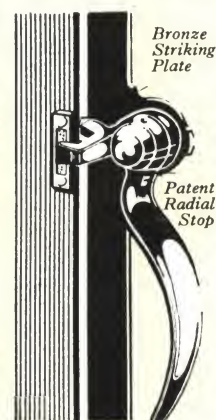
HOPE'S STANDARD FITTINGS



BRONZE PEG STAY No. 1575C
for top hung ventilators



HOPE'S NON-PROJECTING SLIDING STAY No. 223C
with bronze rail, box and screw, for side hung casements



HOPE'S 2-POINT
BRONZE HANDLE

HOPE'S STANDARD STEEL WINDOWS



Send for illustrated catalogue of Hope's standard windows

HOPE'S STANDARD WINDOWS *with* LEADED GLASS



Send for "L" Type booklet of standard casements with leaded glass

HOPE'S HAND-WROUGHT LEADWORK



NO. 36



NO. 34



LEAD RAIN
WATER PIPE
NO. 689. 4" x 3"



LEAD RAIN
WATER PIPE
NO. 690. 4" x 3"

LEAD HEAD NO. 666. Width over ears, 29"



NO. 38. 10" x 10"

LEAD
FRETS



NO. 35. 10" x 10"

LEAD GUTTER NO. 814. 6 3/4" x 5"



ESTIMATES AND DRAWINGS, WITH SPECIAL DESIGNS TO HARMONISE WITH ANY ARCHITECTURAL STYLE, WILL BE SUPPLIED ON APPLICATION. PLEASE SEND FOR OUR NEW CATALOGUE.

KEWANEE MANUFACTURING COMPANY

Basement Coal Chutes, Basement Windows and Building Specialties

85 North Tremont Street, KEWANEE, ILL.

Nationally distributed through Dealers in Building Material, Hardware and Structural Steel

Product

Kewanee Copper Steel Basement Windows.
For Kewanee Coal Chutes, see pages A614-615.

Kewanee Copper Steel Basement Windows

Old or new basements may be materially improved by the use of Kewanee Copper Steel Basement Windows, which will transform the basement into a big, light, airy room, readily utilized for laundry, workshop, playroom and many other purposes.

In remodeling a great opportunity is offered to modernize with Kewanee Windows. They are suitable not only for use in basements, but also for garages and a variety of other small buildings. Architects, builders and contractors recommend these improved Kewanee Copper Steel Windows because of their marked advantages.

Durable and Attractive—The strong, compact and efficient steel sections employed in Kewanee Windows admit 50% to 75% more light and air (depending upon the size of the wall opening) than the bulky wood frame and sash. Their trim, clean-cut lines add greatly to the appearance of the basement.

The Kewanee one-piece frame insures absolute rigidity with no possibility of distortion. Constructed of rust resisting Copper Steel, Kewanee Windows are rotproof, fireproof, windproof, dustproof and verminproof, and in every way more durable than wood windows. Experts recommend steel basement windows instead of wood because of the protection they provide against the ravages of termites, or white ants.

Efficient and Convenient—Kewanee Windows open easily and lock securely. They never warp, bind or rattle. When closed, the hanger-hinge at the top and the cam-action lock at the bottom draw the sash and frame tightly together, all around, in a broad flat contact. This construction, in connection with the drip bar projecting over the bottom edge of the frame, makes Kewanee Windows exceptionally weatherproof. When closed, the sash is firmly held in place by the hanger-hinge, but when swung open into the horizontal position it is readily lifted out for cleaning.

Furnished Complete—

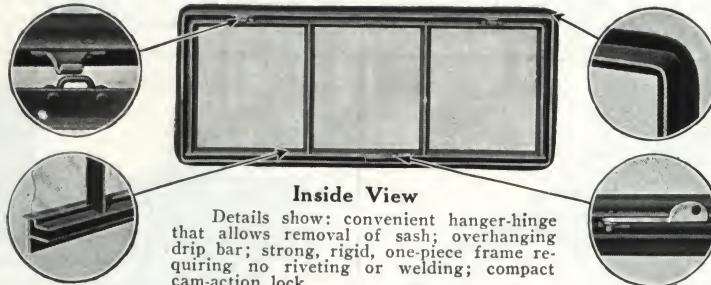
Kewanee Windows are shipped from the factory with sash in frame, hardware attached, all coated with best metallic paint, and completely assembled in every detail (except glazing), ready to set in the openings without further preparation or fitting. The clips needed for glazing are included with each window. Screw holes in frame permit

screens to be readily attached.

Easily Installed—Kewance Windows are readily installed in any kind of construction. (Details of typical installations are shown below.) The sash, hinges and lock are contained entirely within the horizontal flange of the frame, which affords the workman a clean, definite masonry guide on all sides, that he can build up to without obstructions of any kind. He is not called upon to exercise any judgment as to the amount of clearance he should

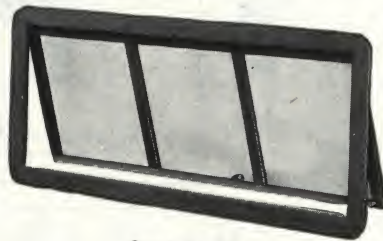
allow in order to insure a sightly job and free operation of the sash.

Low Cost—Standardization and quantity production have greatly reduced the cost of manufacture, so that you may now obtain Kewanee Copper Steel Windows at the same cost—installed—as wood windows.

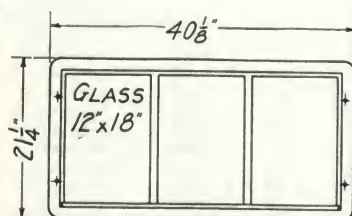
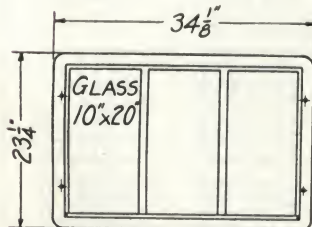
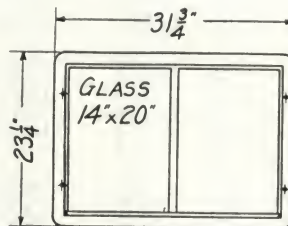
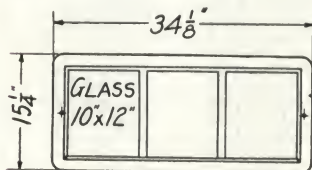


Inside View

Details show: convenient hanger-hinge that allows removal of sash; overhanging drip bar; strong, rigid, one-piece frame requiring no riveting or welding; compact cam-action lock

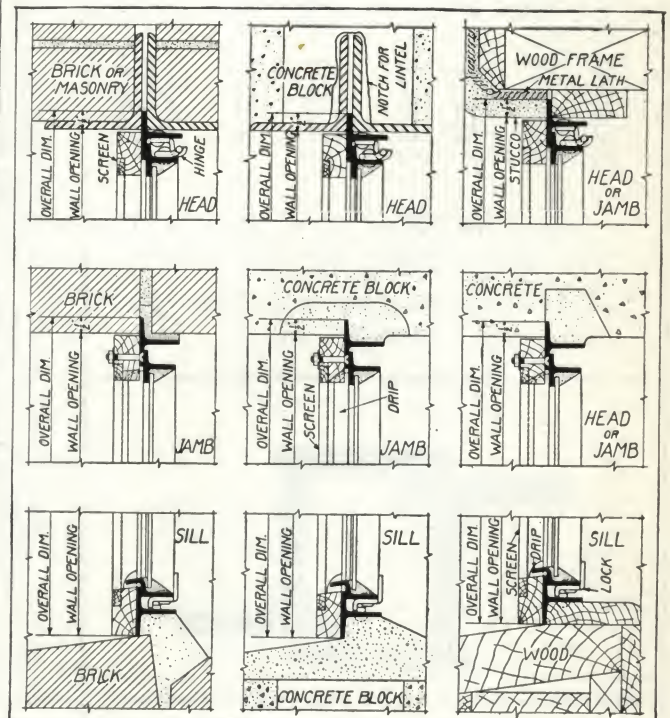


Outside View



STANDARD SIZES OF KEWANEE BASEMENT WINDOWS

Number of lights	Size of lights, in.	Over-all dimensions, in.		Wall opening required, in.		Net and shipping weight, lb.
		Width	Height	Width	Height	
3	10x12	34 $\frac{1}{2}$	15 $\frac{1}{2}$	32 $\frac{3}{4}$	14 $\frac{3}{4}$	18
2	14x20	31 $\frac{3}{4}$	23 $\frac{1}{4}$	30 $\frac{3}{4}$	22 $\frac{3}{4}$	20
1	10x20	34 $\frac{1}{2}$	23 $\frac{1}{4}$	32 $\frac{3}{4}$	22 $\frac{3}{4}$	22
3	12x18	40 $\frac{1}{2}$	21 $\frac{1}{4}$	38 $\frac{3}{4}$	20 $\frac{3}{4}$	23



LUNDELL-ECKBERG MANUFACTURING CO., INC.

"Lemco" Steel Casements and Hardware for Wood and Steel Casements
JAMESTOWN, N. Y.

"Lemco" Standard Casements

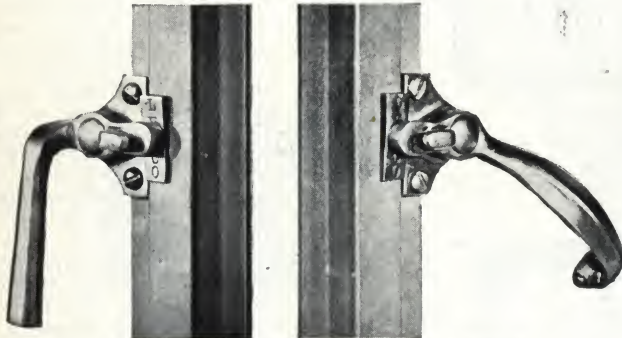
Materials and Construction—All Lemco casements are made from hot rolled steel sections and bars are carefully straightened.

All corners are accurately mitered and electrically welded together, making a strong and neatly finished casement.

All surfaces are thoroughly cleaned from rust and scale and given one coat of gray enamel which is baked on; this prepares the casement for the final coat to be applied after glazing.

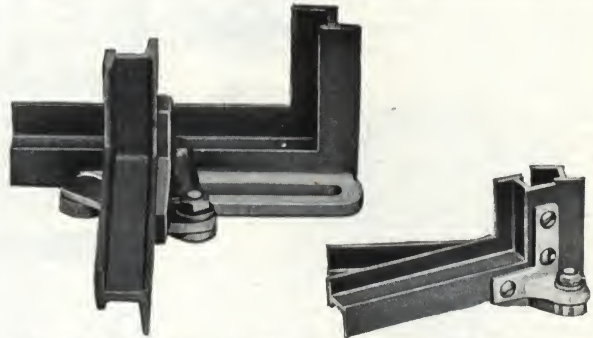
Weatherproof Construction—Lemco construction provides two-point weathering contact throughout, and casements, if properly erected, are guaranteed to be absolutely weatherproof.

Hardware—All standard casements are equipped throughout with solid bronze or brass hardware. Single casements are hung on Lemco Patented Safety Cleaning Hinges which permit the cleaning of the exterior of the glass from inside the room. These hinges also have a friction pivot feature which holds the sash in any desired position and eliminates the use of adjusters.



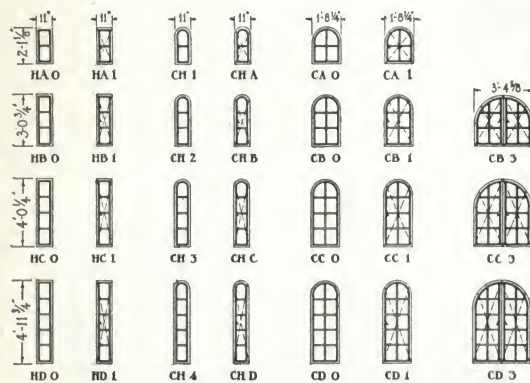
No. 20 Fastener
With double lip feature

No. 18 Fastener
With double lip feature



No. 10 Safety Cleaning Hinge
For single or double casements

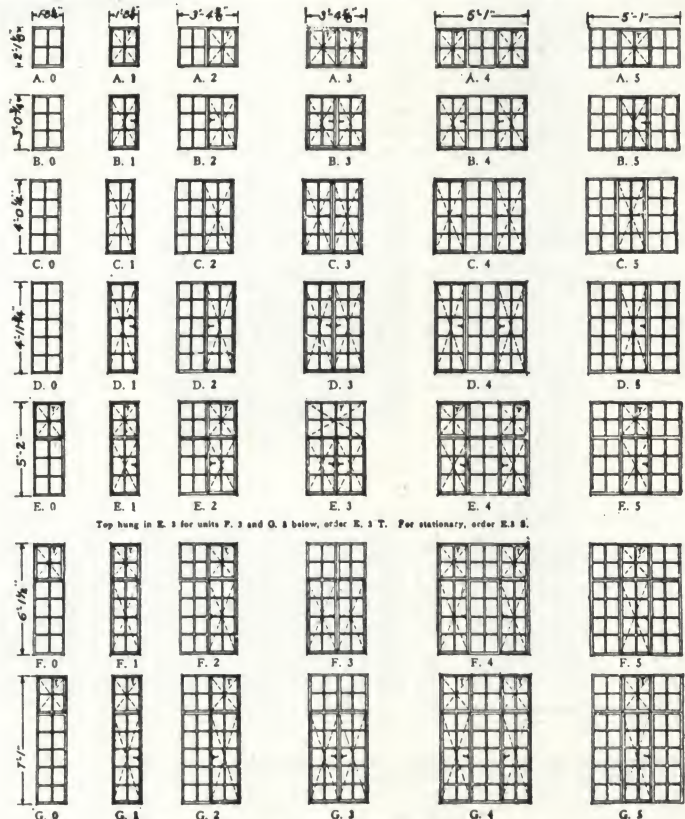
No. 10 Friction Pivot
For narrow casements



Sizes of Lemco Standard Shaped and Narrow Steel Casements



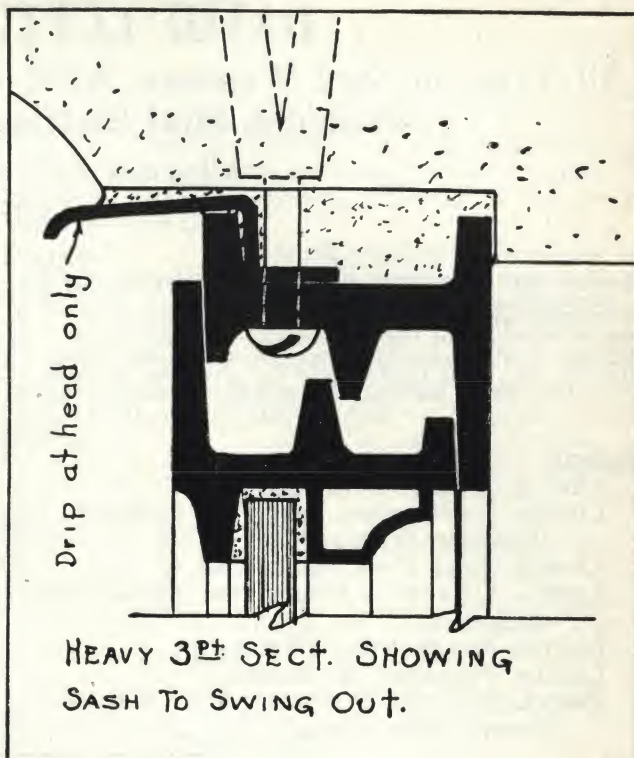
Full Size Standard Section Lemco Steel Casement



Top hung in E. 3 for units F. 3 and G. 3 below, order E. 3 T. For stationary, order E. 3 S.

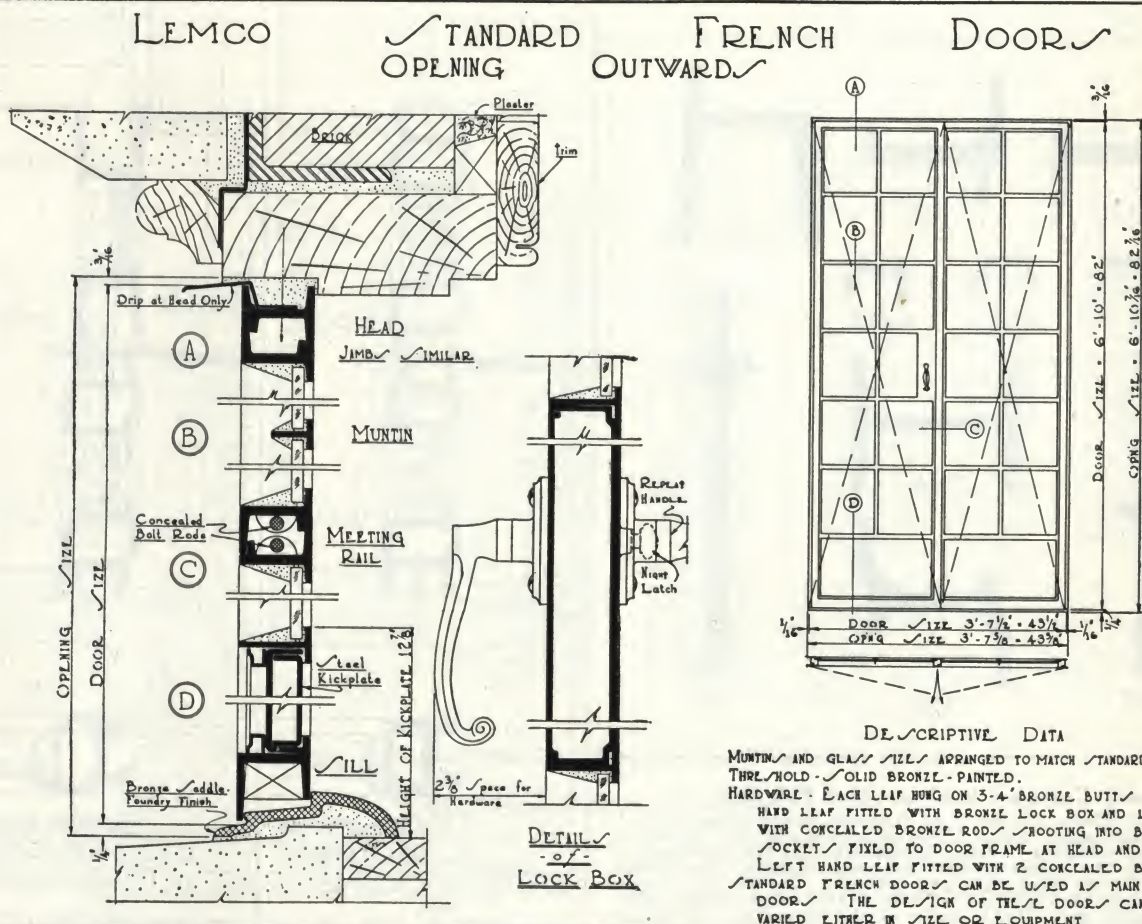
Sizes of Lemco Standard Steel Casements

Casements are side hung to open out, except Type A which are top hung, to push out. These are made side hung to order. Above units can be changed into different combinations; for example: A. 5 can be placed over B. 4, C. 4 or D. 4; also the top hung in E. 3 may be had fixed instead of as A. 3.



Full Size Detail of Heavy Three-point Sections

Lemco Window Details



DAVID LUPTON'S SONS CO.

All Types of Steel Windows, Window Operating Devices, Steel Doors and Partitions, Steel Shelving and Factory Equipment

Allegheny Avenue and Tulip Street
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SONS CONSTRUCTION Co., 639 Pacific Building

Products

LUPTON CASEMENTS (Heavy Type).
LUPTON COPPER-STEEL RESIDENCE CASEMENT and BASEMENT WINDOWS.
LUPTON STEEL PIVOTED WINDOWS.
LUPTON OPERATING DEVICE: for normal runs of windows.
LUPTON ROLLED STEEL SKYLIGHT.
LUPTON PROJECTED WINDOWS.
POND CONTINUOUS WINDOWS: Roof, Sidewall and Power House Types.

POND OPERATING DEVICE: for long lines of windows.

LUPTON DOUBLE HUNG STEEL WINDOWS.
LUPTON STEEL DOORS and PARTITIONS.
BURVETT VERTICAL LIFT DOOR.
Also Steel Shelving and Factory Equipment.

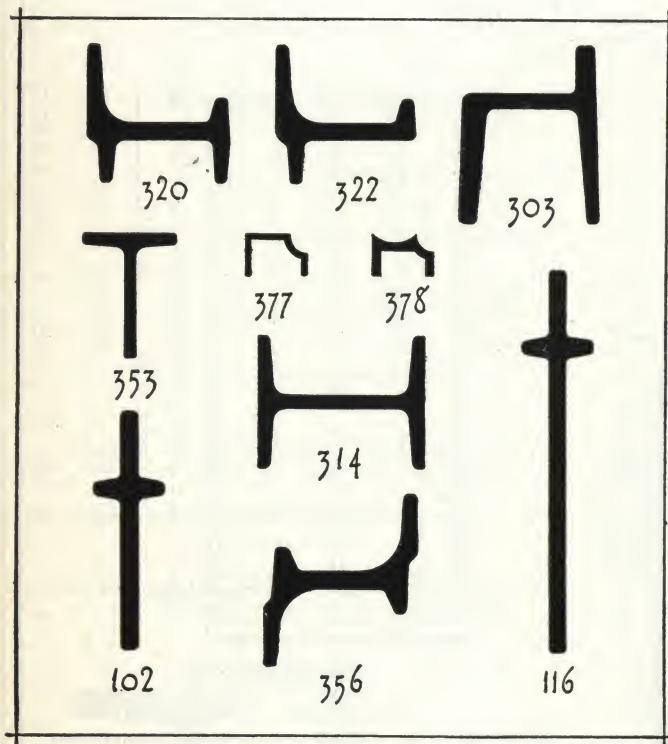
Literature

Catalogues and literature on all products sent on request. Mention product or products on which information is wanted.

Lupton Heavy Casements

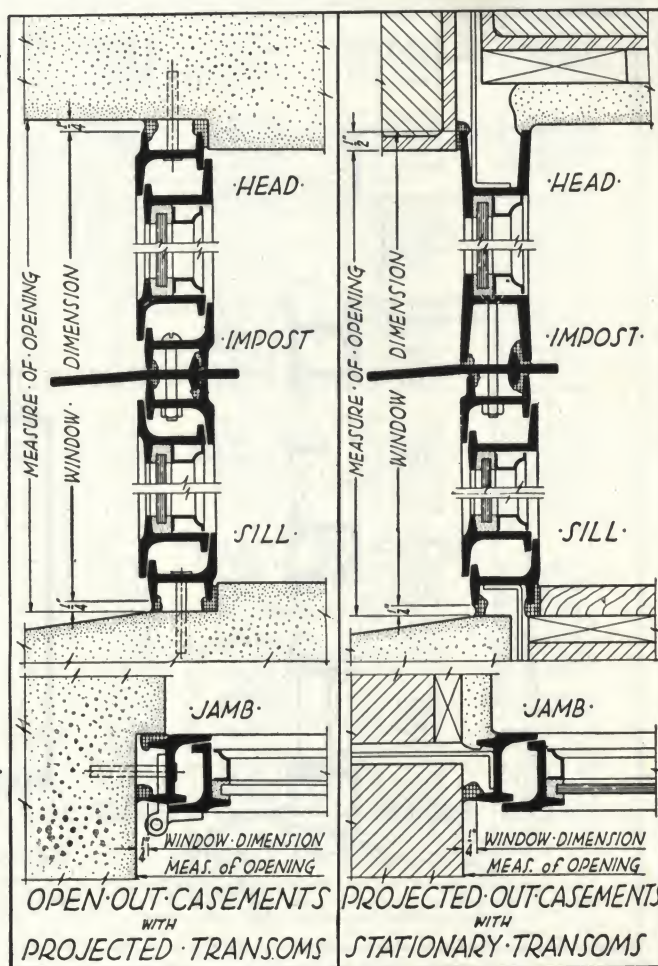
Made side hinged, double or single, opening out and opening in; top hung, opening out; vertically pivoted; horizontal-pivoted; projected.

All hardware is of bronze and combines refinement of design with abundant strength. Half-size sections are shown at lower left and details below.



Heavy Casement Sections—Half Full Size

Section 320—Frame member of all casements having hinged, pivoted or projected ventilator. Section 322—Top, bottom and side rail of all outward opening casements. Section 353—Muntin. Section 102—Mullion and transom bar for smaller multiple casements. Section 116—Mullion and transom bar for larger multiple casements. Section 303—Frame member of all stationary windows. Section 314—Vertical mullion. Section 356—Meeting Rail. Inside frame member where two ventilating sections occur. Sections 377 and 378—Glazing beads. No. 378 is extruded bronze, furnished on specification only



Lupton Residence Casement Windows

Members are specially rolled from high carbon copper-bearing steel, with the corner joints of all frames and ventilators solidly welded. Muntins are riveted into

frame members and have locked joints at intersections.

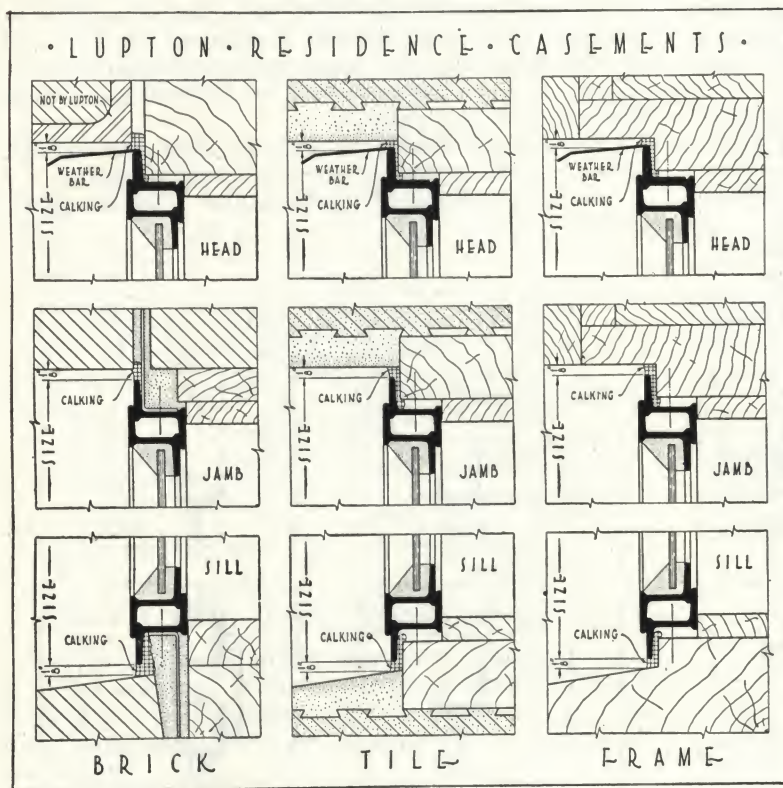
Side hinged casements have malleable iron window cleaning (extended) hinges; top hinged transoms and standard one-light wide side hinged windows have close-up hinge of similar design. Hinges are riveted to frames and ventilators.

The side hinged type are equipped with malleable iron locking handle, bronze keeper and steel stay bar adjuster with tapered brass peg to prevent rattling. Bronze hardware of attractive design furnished when specified. All hardware is shipped attached.

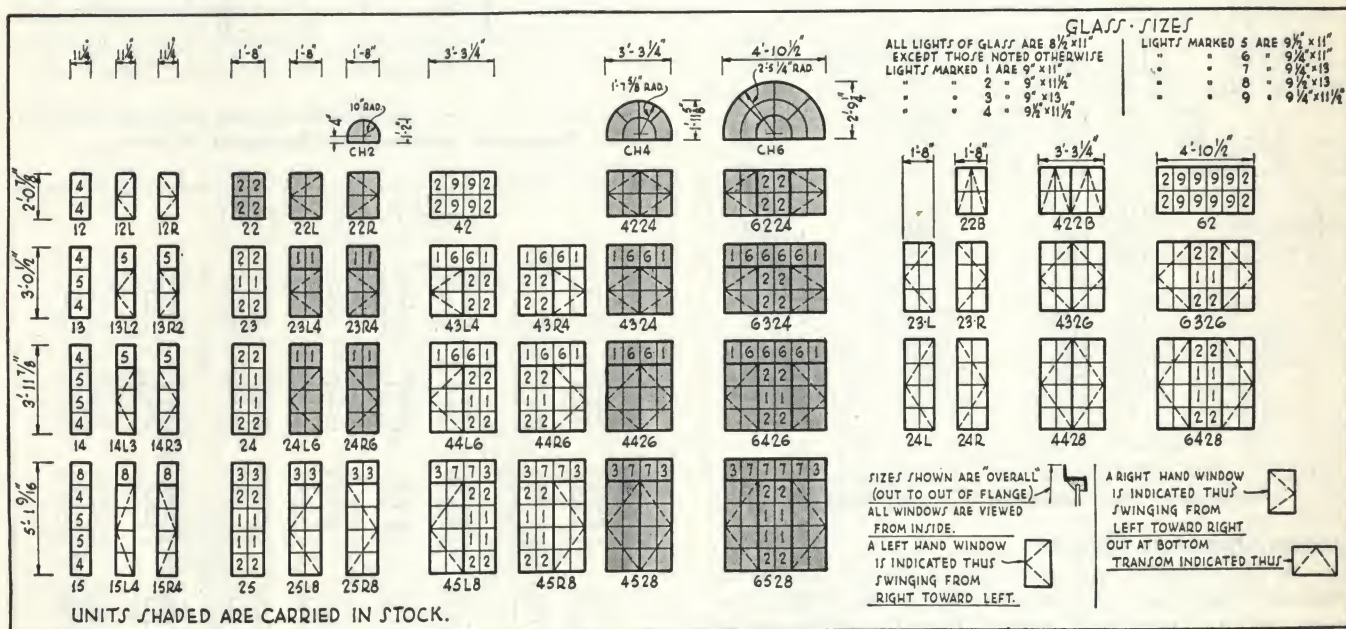
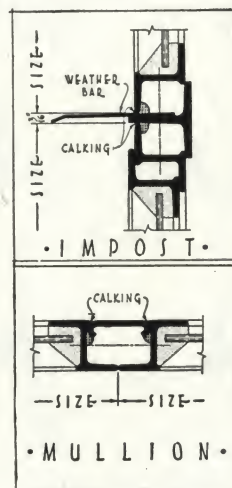
Diagram below shows standard and warehouse stock sizes. Stock sizes are shaded.

General details are shown at left.

Calking—Space between casements and opening should be calked with Lupton Elastic Pointing Cement furnished with all windows. Where horizontal imposts and vertical mullions occur, the frame members and impost bar should be buttered with Lupton Elastic Pointing Cement (detail at left).



Typical Wall Details



Warehouse Stock and Standard Sizes Residence Casement Windows

Lupton Basement Windows

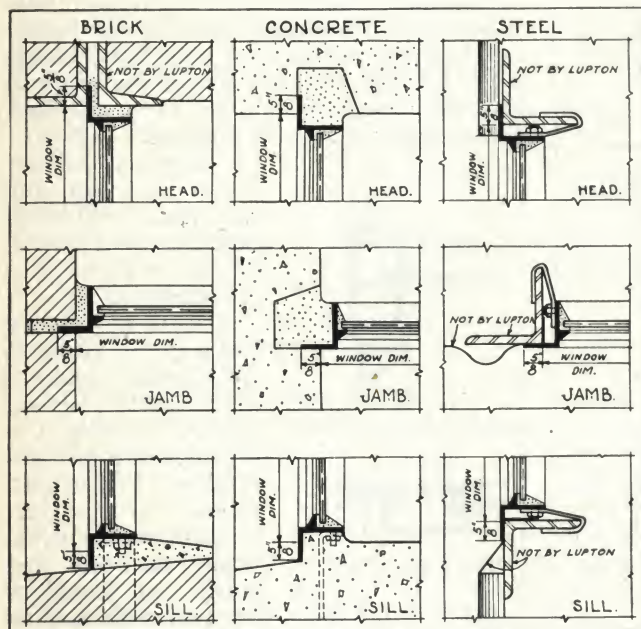
Sections are copper-bearing steel, with the corners stoutly welded, not bent. A solid steel drip at the bottom adds to the weathertightness of the windows. Five standard sizes, all 100% ventilated and hinged at top, available for immediate deliveries.

Three lights wide, 10x12-in. glass (2'9 3/4" x 1'3"); three lights wide, 10x20-in. glass (2'9 3/4" x 1'11"); three lights wide, 12x18-in. glass (3'3 3/4" x 1'9"); two lights wide, 14x20-in. glass (2'7 3/8" x 1'11"); and a Security Type, 8 small glass lights (2'7 3/8" x 1'11"). Dimensions are overall.

Lupton Pivoted Windows

For sidewalls of all types of industrial buildings. Members are low carbon steel, designed for necessary strength without needless weight.

Diagram below shows Lupton warehouse stock sizes, most used sizes of stationary and pivoted windows, in 14x20-in. and 12x18-in. glass sizes. They are strictly standard in construction and are carried in stock completely assembled.



Wall Details of Pivoted Windows

		• WIDTHS •			
		2 LIGHTS 12"x18" GLASS 14"x20" GLASS	3 LIGHTS 3'-2" 3'-8"	4 LIGHTS 4'-2 1/2" 4'-10 3/8"	5 LIGHTS 5'-2 3/4" 6'-0 1/4"
• HEIGHTS •	1 LIGHT 3'-1 1/2" 3'-5 1/2"				
	2 LIGHTS 4'-6" 5'-2"				
	3 LIGHTS 6'-2 1/2" 6'-10 3/8"				
	4 LIGHTS 7'-0 1/4" 8'-6 1/4"				
	5 LIGHTS 8'-0 1/4" 9'-6 1/4"				

© CARRIED ONLY IN 14"x20" GLASS SIZE

Warehouse Stock Sizes of Pivoted Windows

Lupton Operating Device

A high grade torsion device designed to operate medium length runs of center pivoted sidewall steel windows and top hung and bottom hinged wood windows. Two sizes are carried in stock. Details furnished on request.

Lupton Rolled Steel Skylight

Especially adapted to conditions of unusual severity, such as vibration, wide range of temperature and inaccessibility for frequent painting. Details and literature on request.

Lupton Projected Windows

In this type of window, the ventilators project in or out rather than pivot.

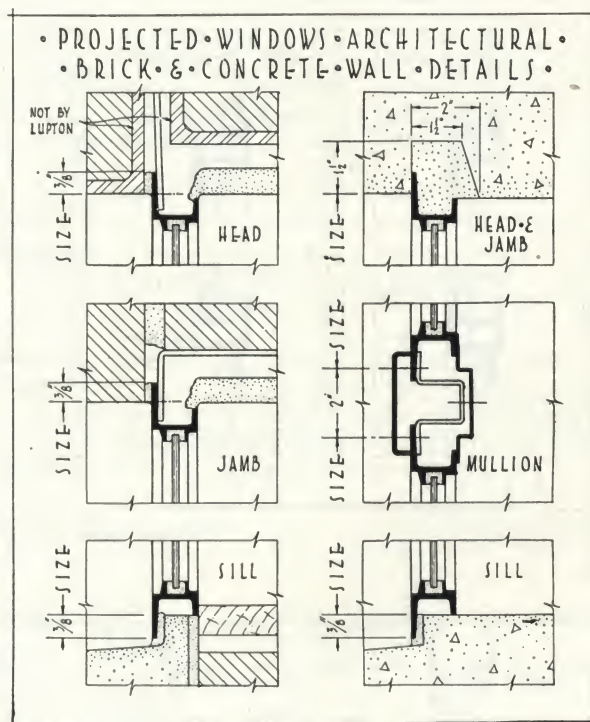
The Architectural Type calls for larger glass lights and is furnished with glazing angles.

In the Commercial Type, glass sizes conform to those used in Lupton Pivoted Windows.

Ventilators remain open in any position without locking, the movement of the friction shoe insuring an adjustment for this purpose.

Screens and shades are easy to apply; we furnish neither but will be glad to offer our suggestions.

Sizes and details of Architectural Type are given below.



Details of Architectural Projected Windows

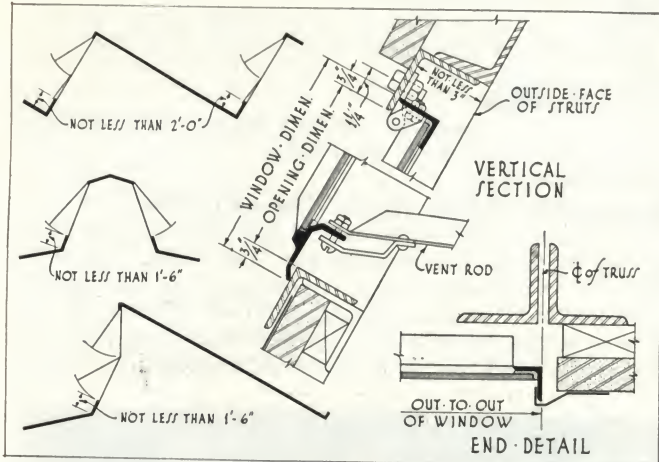
		• STANDARD UNITS •			
		• WIDTHS •			
		3'-2 1/4"	3'-11"	4'-7"	5'-3"
• HEIGHTS •	5'-7"				
	6'-3 3/8"				
	6'-11 3/8"				
	7'-7 1/8"				
	8'-3 3/8"				
	8'-11 3/8"				
	9'-7 1/8"				
	10'-3 3/8"				

Sizes of Architectural Projected Windows

Pond Continuous Windows

Solidly welded top hung steel windows, which can be joined together to make runs of practically any length. Standard heights: 3, 4, 5 and 6 ft.; standard lengths, 20 ft.

They are used in Pond Roof Designs, permitting free elimination of gases and heavy air, and need not be closed for storms. They can also be used in lower side-walls, monitors and sawtooth roofs.



Details of Pond Continuous Windows Shown on Slope

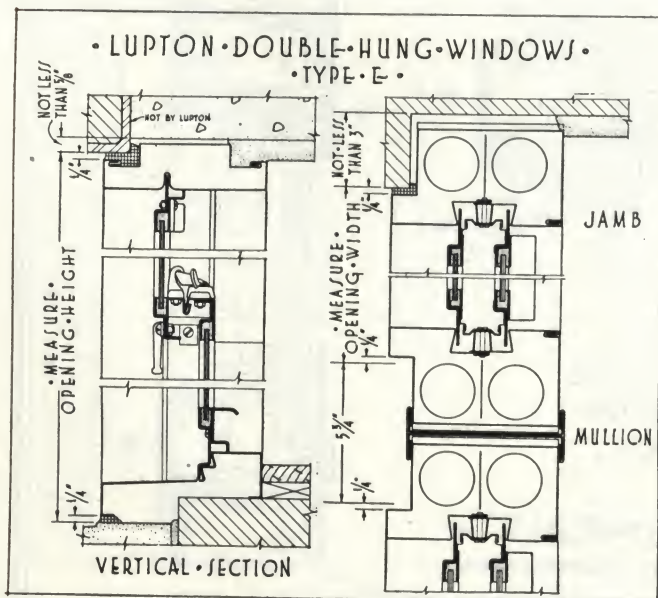
Through the abundant light and ventilation afforded by these windows, shop conditions are made ideal for large groups of workers. Costly turnover is consequently avoided, effecting considerable savings to the employers.

Pond Operating Device

Designed on the principle of tension transmission, this device will satisfactorily control long lines of top hung windows, either vertical or sloping. Windows will securely lock in any position. Operation is either by hand chains or motors. Details and literature on request.

Lupton Double Hung Windows

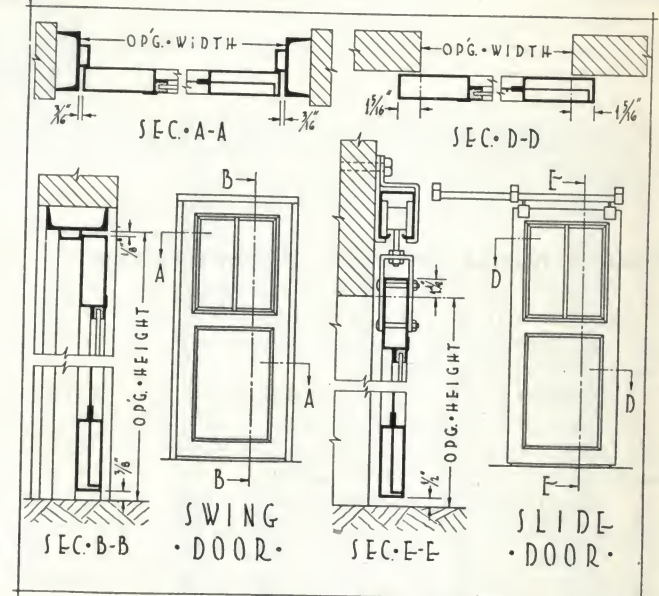
Made in forty standard sizes, in two types, E and F. Design of both is the same, the F Type being of heavier material than Type E. Details below.



Detail, Double Hung Window

Lupton Commercial Steel Doors

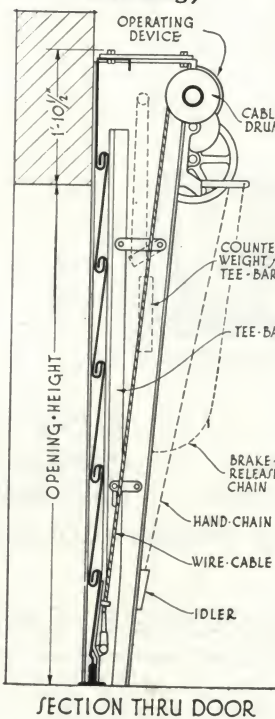
Lupton Commercial Steel Doors are made in hinged and sliding types. They are strongly built to stand hard wear and the accompanying hardware matches the doors in quality and service. Sizes as given are carried for immediate delivery. We also manufacture seamless tube doors used for inside and outside doors of factories, power houses, warehouses etc.



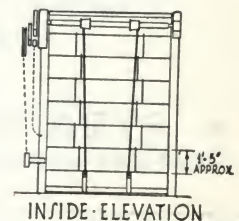
Details and Standard Sizes Steel Doors

Opening, swing		Opening, sliding		Glass Sizes
Width	Height	Width	Height	
Single Doors				
2'6"	7'0"	2'3"	6'10½"	19⅞"x30½"
3'0"	7'0"	2'9"	6'10½"	12⅝"x30½"
3'6"	7'6"	3'3"	7' 4½"	15⅝"x36½"
4'0"	8'0"	3'9"	7'10½"	18⅝"x42½"
5'0"	10'0"	4'9"	9'10½"	16¼"x30¾"
Double Doors				
5'0"	7'0"	4'9"	6'10½"	19⅞"x30½"
6'0"	7'0"	5'9"	6'10½"	12⅝"x30½"
7'0"	7'6"	6'9"	7'4½"	15⅝"x36½"
8'0"	8'0"	7'9"	7'10½"	18⅝"x42½"
10'2"	10'0"	9'9"	9'10½"	16¼"x30¾"

Burvett Vertical Lift Doors (Patented and Patents Pending)



A new design in door construction overcoming the limitations of rolling, sliding and hinged doors. Galvanized steel plates are raised and lowered in telescopic fashion. Heavy wire rope, which is attached to each side of the bottom leaf, runs over steel drums located on a horizontal shaft at the top. Doors are closed by gravity by simply releasing the brake. Operation is by hand chain or motor, each door being controlled independently. Standard design. Full details upon request.



THE McCOY BRONZE COMPANY, INC.

Architectural and Ornamental Bronze Work and Casements

Forsythe and Holden Streets, DETROIT, MICH.

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MONUMENTAL, ECCLESIASTICAL, ARCHITECTURAL and COMMERCIAL BRONZE WORK in all the branches.

Pyramid Bronze Casements.

Also Signs, Tablets and Letters; Castings furnished in bronze, brass, aluminum and alloy.

For Pyramid Bronze Doors, see pages A834-835.



Service

Estimates furnished from architects' plans and specifications.

Suggestions, designs or models will be furnished when desired. We solicit your inquiries.

Facilities

A complete modern plant manned with experienced and capable workmen.

Pyramid Bronze Casements (Patents Pending)

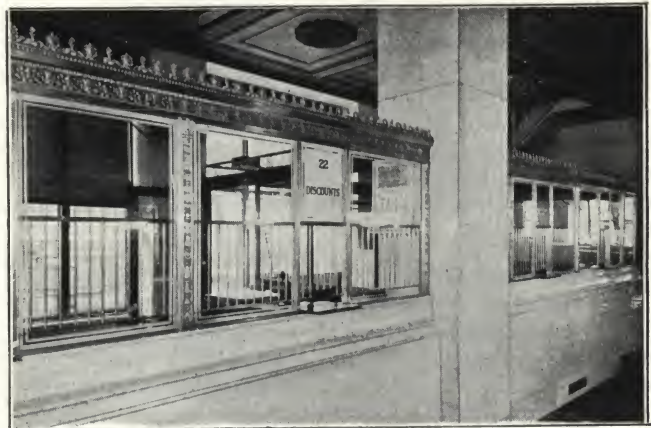
Suitable for all types of buildings, the Pyramid bronze casement is superior in durability, weathertightness and appearance. Sections shown will illustrate the many points of excellence.

Construction—Pyramid sash has six different standard extruded bronze members (extruded from our own dies) with a combination of which we are able to make up any form of bronze sash.

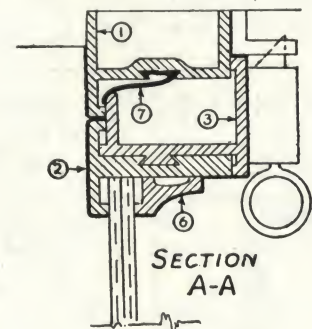
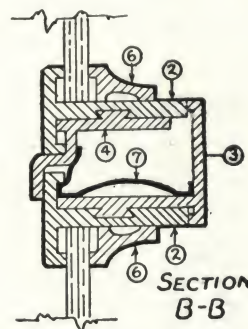
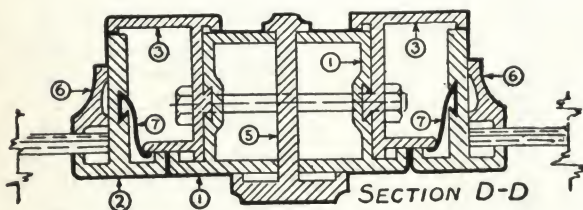
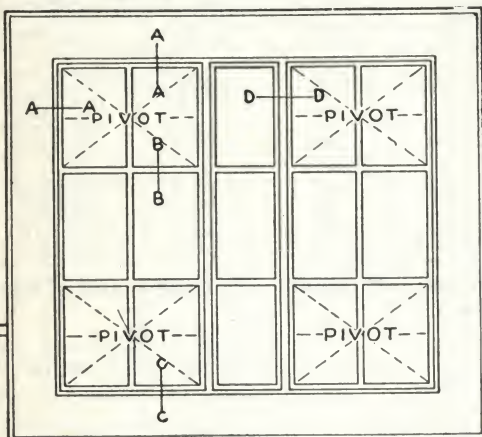
This construction, making for economy and uniformity, creates unbroken architectural lines both inside and outside. The glass mould and frame mould are applied in a novel manner, concealing and permanently retaining all putty.

Ornamental Bronze Work—Standard Units

Architects will be pleased to learn of the standardization of bronze counterscreens and store fronts for bank work, etc. We have a large collection of die shapes and special ornamentation. Many desired effects can be secured without cost of special tools and patterns. We will gladly send details of different standardized units.



Detroit Savings Bank, Detroit, Mich.



- | | |
|-----------------------------|---------------|
| ① FRAME | ④ DRIP BAR |
| ② MUNTIN BAR | ⑤ MULLION BAR |
| ③ WEATHER BAR | ⑥ GLASS STOP |
| ⑦ BRASS SPRING - CONTINUOUS | |

• PYRAMID BRONZE CASEMENT •

TYPICAL SECTIONS SHOWING SUPERIOR POINTS OF CONSTRUCTION
SCALE - 1/2 FULL SIZE

STANDARD STEEL WINDOW CO., INC.

Solid Rolled Steel Casement Windows

WASHINGTON, D. C.

REPRESENTATIVES IN PRINCIPAL CITIES

Steel Casements and Leaded Glass in Standard Units and Sizes

STANWIN casements properly set are absolutely weathertight. They are of two-point flat contact solid rolled sections and are considerably heavier than the ordinary cottage casement.

STANWIN units can be assembled with one another into an almost limitless arrangement and thus provide windows in complete harmony with a wide variation of designs, and at the same time suitable in every respect to meet the most exacting weather conditions.

The hardware used on STANWIN casements is of substantial design and quality with all moving parts of solid bronze. The design of the hardware permits the installation and operation of insect screens and the full use of draperies and curtains for practical as well as decorative purposes.

The finish of STANWIN casements is two coats of oven baked gray enamel.

STANWIN casements, doors and leaded lights carried in stock for immediate delivery.

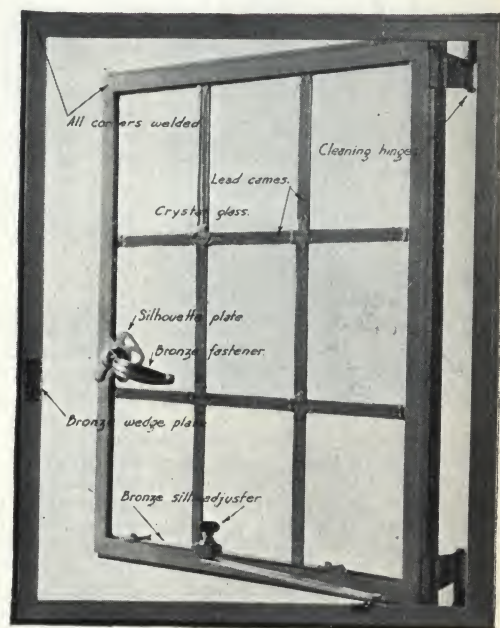
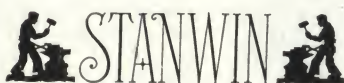
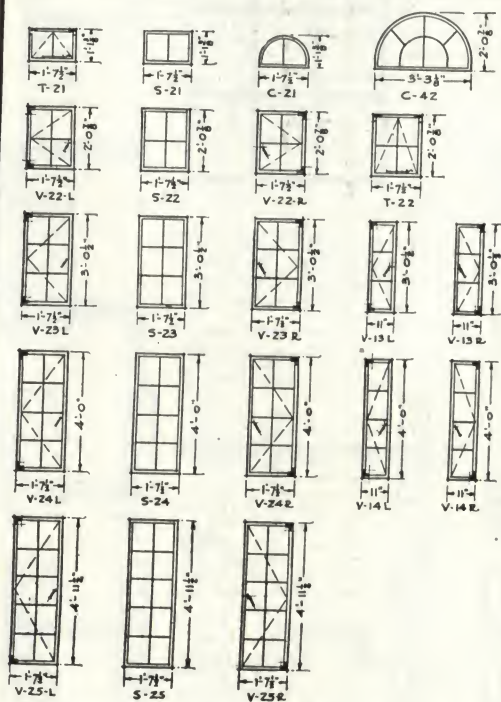


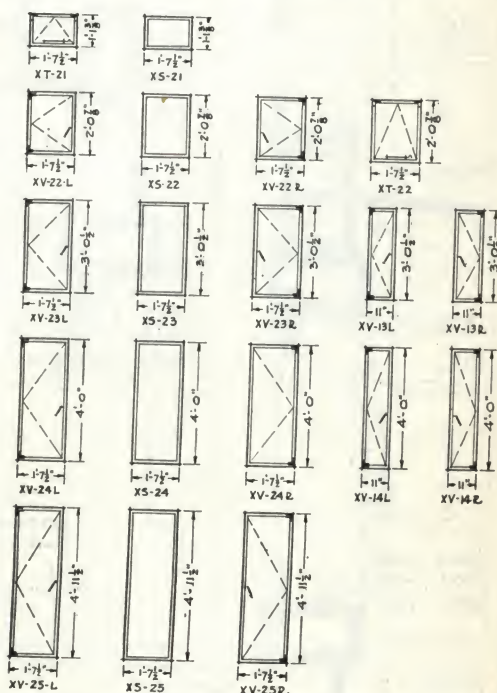
Illustration of Type XV-22L

Glazed with leaded glass
Construction, finish and hardware is typical for all units



All standard units both with and without steel muntins are carried in stock ready for assembly into the composite window. The windows are completely assembled and delivered to the job ready for installation.

Through the use of vertical T-mullions and horizontal transom bars, any of the STANWIN units either with or without muntins, may be combined to create windows of practically limitless combinations.



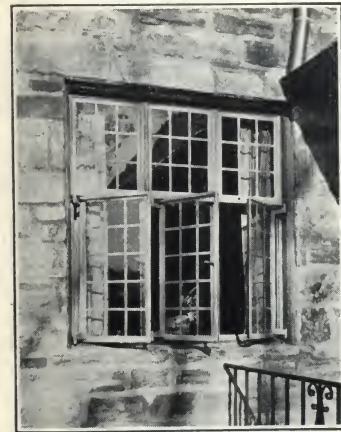
STEEL CASEMENTS IN STANDARD UNITS AND SIZES

Composite Windows of Stanwin Stock Units

The window illustrated below is one of the many possible combinations of STANWIN stock units.

This window is composed of the following: transom, 3 units type XS-22; sash, 2 units type XV-23L and 1 unit type XV-23R; 2 vertical mullions 5 lights high, and 1 transom bar 6 lights wide.

Any STANWIN units may be bolted together to make a composite window, through the use of the vertical mullions and transom bars, thus affording the architect practically an unlimited arrangement in the selection of a window best suited for any particular purpose.



One-half size mullion and transom bar details are shown adjoining. Regardless of the total height or width of a composite window the mullions and transom bars are both continuous from jamb to jamb, or head to sill.

Assembling is completed in our warehouse, hardware is attached and the entire window is shipped as one piece, ready for installation.

It is often desirable to hinge all vents on the same side, or provide more or less ventilation and special requirements as to the location of the ventilating sections are all easily met

through the use of STANWIN stock units.

The dimensions of the composite windows are determined by adding $\frac{1}{8}$ in. for each vertical mullion to the total width of the units, and similarly the height is determined by adding the height of the units plus $\frac{1}{8}$ in. for each transom bar. For example, the window illustrated above is figured as follows:

Width: 3 units at $1'7\frac{1}{2}"$ — $4'10\frac{1}{2}"$	Height: 1 Transom at $2'0\frac{7}{8}"$ — $2'0\frac{7}{8}"$
2 mullions at $\frac{1}{8}"$ — $\frac{1}{8}"$	1 Sash at $3'0\frac{1}{2}"$ — $3'0\frac{1}{2}"$
	1 Transom bar at $\frac{1}{8}"$ — $\frac{1}{8}"$
Total width $4'10\frac{1}{4}"$	Total height $5'1\frac{1}{2}"$

Stanwin French Casement Doors

These doors include four standard units, being doors and sidelights for same.

D-21 and SL-11 are arranged for single lights or leaded glass while D-46 and SL-26 have steel muntins which harmonize with

and provide glass sizes similar to STANWIN stock casement units.

Not only is it possible to combine the doors with STANWIN sidelights, but through the same ingenious arrangement of mullions and transom bars, STANWIN stock window units can be used for transoms and sidelights in almost endless combinations.

This enables the architect to obtain the utility of the door in openings of various sizes to meet his requirements and still avoid costly special construction.

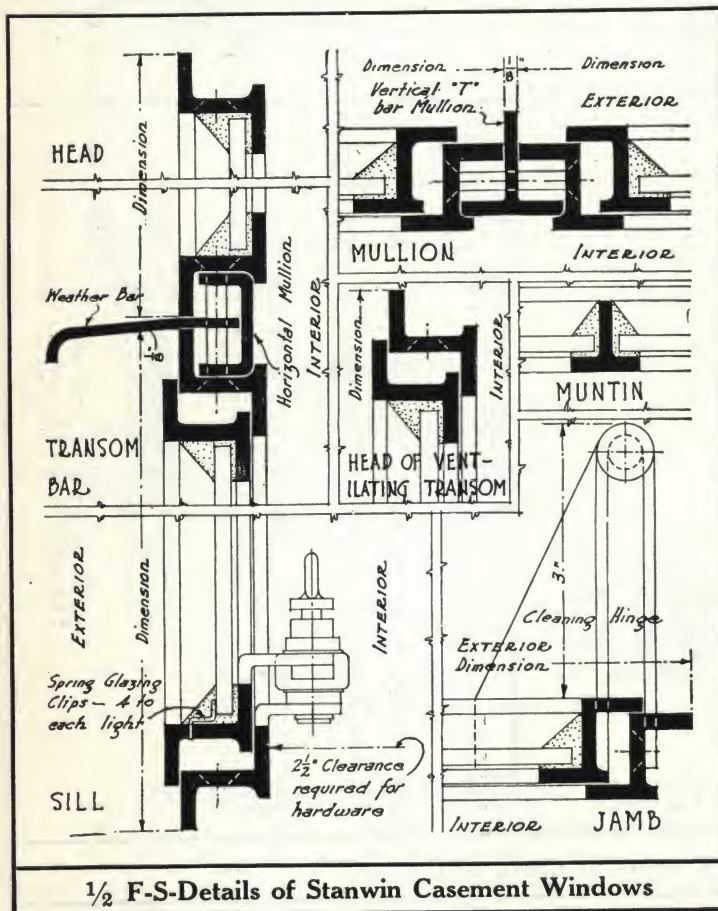
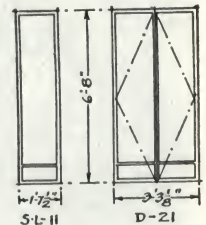
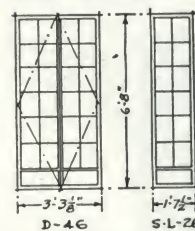
These doors are very well adapted for use as terrace or balcony openings, and are



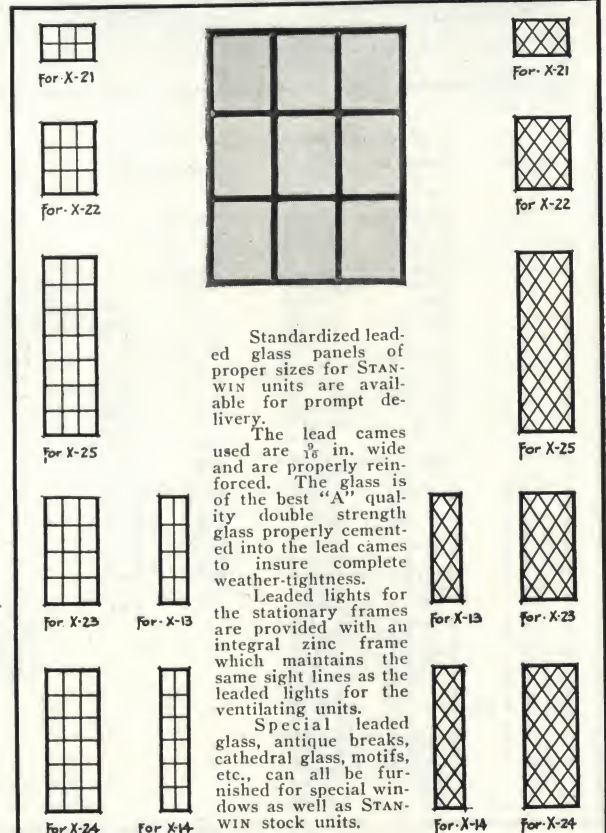
Stanwin French Casement Doors

Equipped with five knuckle bronze hinges, bronze slide bar adjusters at head, bronze cremone bolt, bronze threshold and bronze weatherstrip at sill

often used with good artistic results for interior openings. The locking is accomplished from inside only, and the doors cannot be used for entrance purposes.



1/2 F-S-Details of Stanwin Casement Windows



Leaded Glass in Standard Types and Sizes

Steel Casements in Special Sizes and Designs

Uses—For banks, office buildings, public buildings, churches, clubs, schools, universities, hospitals, etc.

Construction—Constructed of special rolled steel flat two-point contact sections of either heavy series 400 sections, or medium series 350 sections, process straightened, corners mitered and welded. Hardware attachment plates welded direct to casement sections. Sash fitted with solid rolled steel glazing beads on interior of sash (or arranged for exterior putty glazing).

Painting—All steel parts to receive one coat of rust resisting paint, and one coat of gray enamel, each coat separately baked on.

Hardware—Hardware of heavy design solid bronze of Government specification mixture, with dark coinage color.

Ventilators—Ventilated units arranged to open in or out; side, top or bottom hinged; vertically or horizontally pivoted; or projected. Doors fitted with double steel kick plates and bronze thresholds.

Subframes—Subframes of No. 12 gauge pressed steel designed to be built into the masonry, and allowing the installation of the casements after the rough work is completed in the building.

Operators—Mechanical sash operators controlling individual ventilators or in groups furnished for sash to operate from floor.

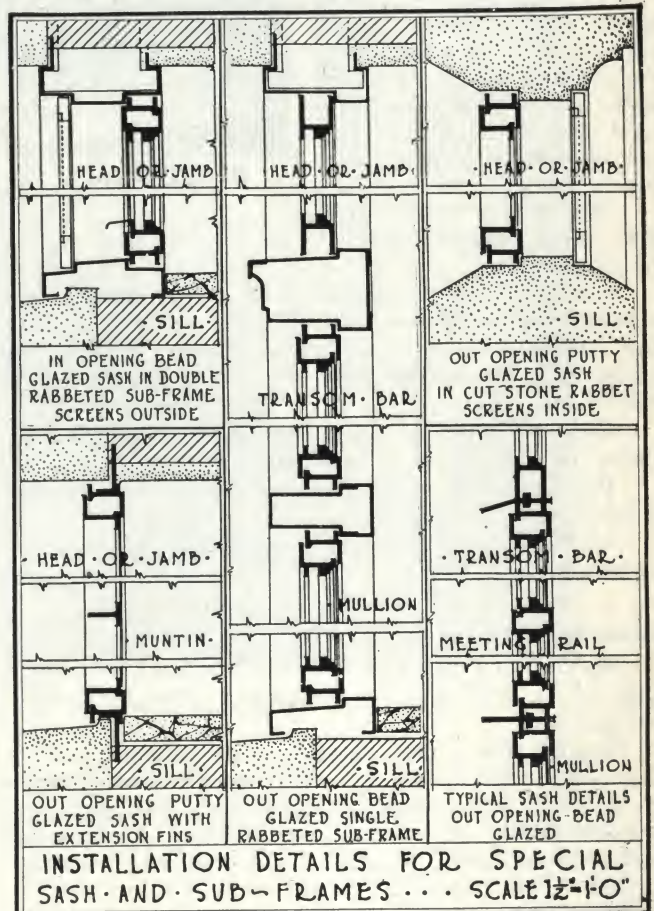
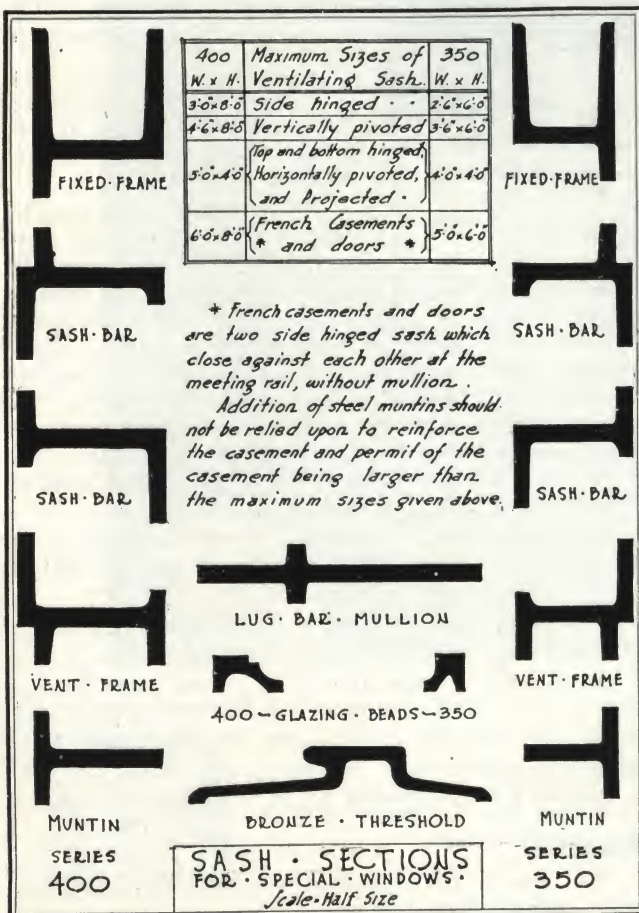


Erection—Erection is included in our contracts. We maintain a staff of experienced mechanics to do this work.



**East River Savings Bank,
New York, N. Y.**

WALKER & GILLETTE, Architects
HEGEMAN-HARRIS Co., Contractors
No. 12 gauge steel subframes.
Heavy weight steel casements (series 400). Mechanical sash operators



RICHEY, BROWNE & DONALD, INC.

2101 Flushing Avenue
MASPETH, CITY OF NEW YORK

AGENTS IN PRINCIPAL CITIES

Products

BROWNE FIREPROOF, WEATHERPROOF and DUST-PROOF WINDOWS.

Browne Windows

Browne windows are of solid steel, built on principles that produce positive results in operation and in overcoming air leakage. The windows may be in groups of one or more pair of sash as desired.

Also made in bronze.

Browne Fire Windows

—Same in general appearance, and bearing labels of Underwriters' Laboratories, Inc.

General Description

Frames and sash are of solid rolled steel. Sash are firmly hinged together to open (outwardly) and shut under symmetrical control of hinged arms attached to a stationary vertical bar. Arms are forged steel and afford absolutely rigid support. A simple catch lock fastens sash when window is closed.

Heavy felt weatherstripping is an integral part of the construction.

Every window is assembled at factory, tested for accuracy and shipped a complete unit including hardware and weatherstrips. Browne windows require no special skill for setting and are readily glazed after installation.

Glass—Should be furnished and set by glazing contractor and may be of grade or type desired.

Painting—All metal parts receive one shop coat of paint before shipment.

All finishing coats should be applied by the painting contractor.

Advantages

Maximum Light and Vision—Sash are continuous from sill to head with no obstruction from horizontal meeting rails.

Ventilation—Ideal changing of air without drafts. The sash control forms flue that draws out all impure air, which is automatically replaced with fresh air. A pleasant quality of ventilation is obtained by bowing sash open to extent of catch hook attached to center upright. This gives fresh air intake at bottom, exhaust at top, with no opening at sides.



**National Board of Fire Underwriters Building,
New York, N. Y.**

CLINTON & RUSSELL, WELLS, HOLTON & GEORGE, Architects
JAMES STEWART & Co., Builders

Weather Protection—The airtight and dustproof qualities of the windows have been established under laboratory test of 140-mile wind velocity.

Noiseproof—Thick felt contact cushions practically shut out street noises when window is closed.

Safety—All parts of the sash are accessible from the inside. The expense and danger of outside window cleaning and painting are eliminated.

Simplicity—No track mechanism for the accumulation of dirt and water. No weight boxes to invite drafts and annoyance from noise; no chains, weights or pulleys to get out of order; no rattling of parts when open or closed.

Contact—No metal to metal weathering contact. The contact in all cases is metal to felt.

Service—Continuous and lasting, with no danger of sagging, warping, racking, or wearing off paint.

Operation—Smooth, easy, noiseless; without physical effort the sash may be

opened to any desired angle. Releasing catch handle, pushing sash partly open and a slight pull at the edges of sash towards center opens window full extent. Pushing edges of sash away from center brings handle within easy reach for closing and locking. The handle is a most convenient latch attachment and is intended for this use only. Where windows can not be reached from the floor, our standard operator may be applied, locking the window in any position.

Strength—All parts are sturdy and substantial; the greatest care is taken in the construction and assembling to insure rigidity and permanence.

Curtains, etc.—Curtains, shades, Venetian blinds, and inside screens may be applied as for ordinary sash.

Economy—Minimum cleaning and maintenance costs; assurance of maximum results from heating arrangements; and fuel saving due to dependably tight openings are prominent features.

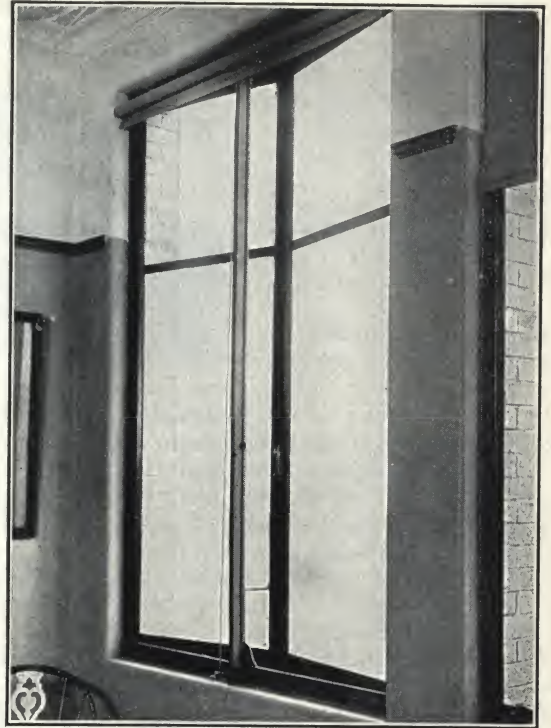
Hardware—Furnished by us with the window.

Information

Full size details, specifications and complete information furnished on request.



APARTMENT



OFFICE BUILDING



SOLARIUM



Browne Windows of Various Types

Appropriate in Design for Homes, Office Buildings, Apartments, Schools, Public Buildings, Hospitals, University Buildings, Hotels, Industrial Buildings, Department Stores



F. W. STEVENS & SON, INC.

Manufacturers of Unit Casement Windows

70 Needham Street
NEWTON HIGHLANDS, MASS.

Products

STEVENS UNIT CASEMENT WINDOWS and SCREENS.
CASEMENT WINDOW HARDWARE.
Patented in United States of America and Canada.

Unit Casement Windows

Advantages—A completely assembled product including frames, sash, glass, screens, weatherstrips. Suitable for all kinds of construction, and architect's details. Guaranteed to be weathertight. Complete control of ventilation without direct drafts. Our ventilated transom window is especially suited for schoolhouses and hospitals. Transoms operated without disturbing screens or shades, or may be fixed.

Ease with which windows can be cleaned on the outside from within—thus eliminating danger in cleaning.
Simplicity of construction.

May be installed in old frames without disturbing interior or exterior finish.

Materials—Frames—Either for brick or wood construction from good seasoned white pine made to our standard or architect's details.

Sash— $1\frac{3}{4}$ in. thick from best white pine.

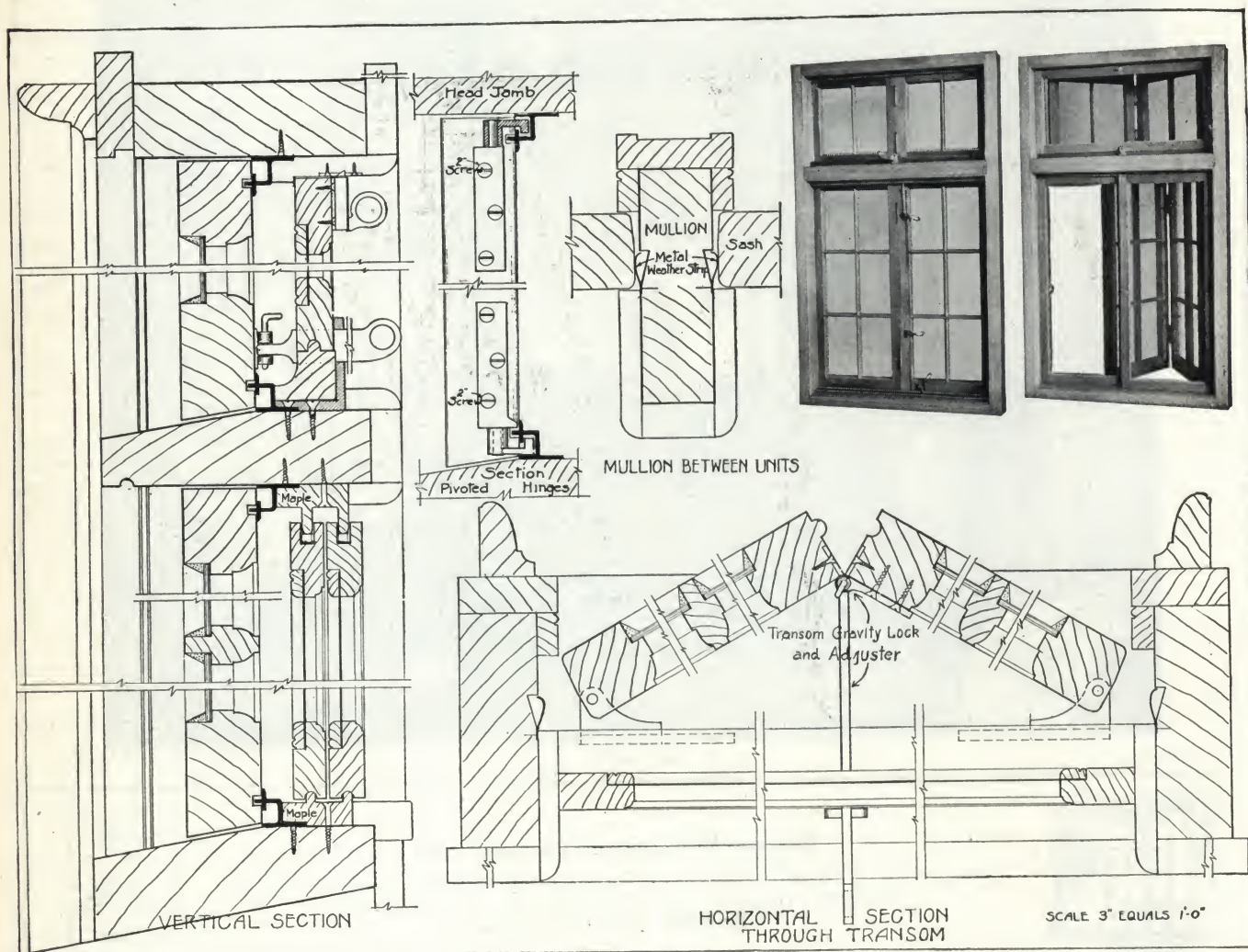
Glass—Selected quality in the varying thicknesses. Glazed with the best glazing compound.

Screens—Made from best of rift sawed white pine, wired with 16-mesh dark copper screen cloth.

Hardware—All solid brass to our special detail, and completely fitted to sash. Special finishes of hardware may be furnished.

Installation—Windows are delivered at the building assembled, and carpenter has only to set units in openings designated on the plans. This completes the job in-so-far as the operation of sash and screens is concerned. We do not furnish interior trim. For frame construction make rough openings 5 in. wider and higher than size of sash to be used.

Operation of Sash—A slight outward push in the center of each pair of sash will make the units fold together; they can then be slid to either side, or they may be placed in any position so as to give as little ventilation as desired. The windows are held firmly in any position, and irrespective of the wind velocity will not rattle. For single sash or groups of three,



Details of Stevens Unit Casement Windows with Transom

the odd single sash opens similar to the units, except that one of the pivoted corner hinges is replaced by an arm, one end of which is secured to sash, other being fastened to jamb, allowing sash to remain rigid in outswung position.



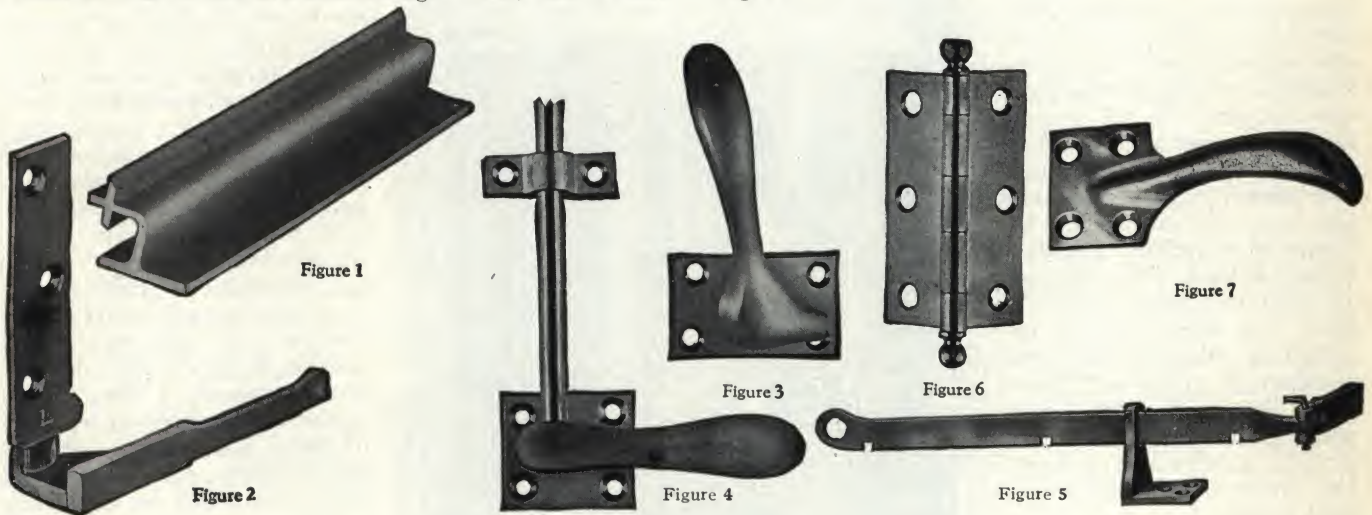
Note: Sashes may be glazed with "Vitaglass," the health-giving window glass, which transmits the curative ultra-violet rays of daylight.

Further information and full sized details for either brick or wood construction furnished upon request.

Hardware for Stevens Unit Casement Windows

The extruded brass track (Fig. 1) is screwed to stool and head jamb the entire width of each opening; the horizontal projecting tongue of track acts as a weatherstrip, fitting into a groove in the sash. The pivoted hinges (Fig. 2) are of cast brass; each hinge slides in extruded track from which it is impossible to become disengaged. Commercial spring bronze weatherstrips are furnished full length for each pair of jambs. Butts are 3x2 in. and are solid wrought brass; two or more

being required for each pair of sash, depending on height of sash. The polished cast brass handle and lock (Fig. 3) is used as a lock, a slight turn securely fastening the sash. Polished cast brass top lock for use on high sash (Fig. 4); one lock required for each pair of sash. Transom gravity lock and adjuster for operating transom only (Fig. 5). Loose pin butt (Fig. 6). Handle to open and close the window (Fig. 7).



A Few Installations and Their Architects

Tampa Municipal Hospital, Tampa, Fla., Stevens & Lee, Boston, Mass., and M. Leo Elliott, Tampa, Fla.
Deaconess Hospital, Boston, Mass., E. W. Dearing
Quincy City Hospital, Quincy, Mass., Stevens & Lee
Norwood Hospital, Norwood, Mass., J. Williams Beal Sons
Lawrence Memorial Hospital, Medford, Mass., Chas. B. Dunham
Heywood Memorial Hospital, Gardner, Mass., Stevens & Lee
Home for Aged, Somerville, Mass., Charles M. Baker
Children's Hospital, Washington, D. C., Stevens & Lee
Palmer Memorial Hospital, Boston, Mass., E. W. Dearing
Mary Lane Hospital, Ware, Mass., Stevens & Lee

Freeman Hospital, Joplin, Mo., E. W. Dearing
Nurses Home, Fall River Hospital, Fall River, Mass., E. M. Corbett
St. Luke's Hospital, New Bedford, Mass., Stevens & Lee
Waltham Hospital, Waltham, Mass., J. R. Worcester, Engr.
First Church of Christ, Scientist, Wellesley Hills, Mass., E. W. Dearing
Nurses' Home, Lawrence Memorial Hospital, Medford, Mass., Charles B. Dunham
Wellesley Friendly Aid Society, Wellesley Hills, Mass., Stevens & Lee



Tampa Municipal Hospital, Tampa, Fla.

Architects: STEVENS & LEE, Boston, Mass. and M. LEO ELLIOTT, Tampa, Fla.

J. S. THORN COMPANY

Manufacturers of Solid Steel Casement Windows

20th and Allegheny Avenues, PHILADELPHIA, PA.

NEW YORK, N. Y., 21 East 40th Street

BOSTON, MASS.

Products

THORN STANDARD RESIDENCE and MANOR TYPE CASEMENTS for residences, apartments, dormitories, etc.

THORN MEDIUM and HEAVY TYPE CASEMENTS—Side Hung and Projected.

For other Sash Products, see pages A1080-1081.

Thorn Standard Residence Type Casements

Produced in standard sizes, made of specially rolled solid steel casement sections of substantial weight, and designed to produce a most rigid construction. At all corners the sections are mitered, electrically butt-welded and ground to a smooth finish. Steel muntins have a $\frac{5}{8}$ -in. face and all intersections are flush and electrically welded. All casements are accurately made, carefully fitted and when properly installed in the building are weathertight under all conditions. Casements are equipped with Thorn solid bronze straight handles and strikers, and Thorn cleaning hinges of solid bronze.

Thorn Cleaning Hinge

—A new type sliding hinge of solid bronze for Thorn solid steel casements, which, when closed has the appearance of an ordinary butt hinge and,

when open, permits cleaning of the glass from the inside. Not only is the unsightly extension or offset hinge eliminated, but also the sill adjusters, as the Thorn sliding hinge, with friction adjustment, holds the casement securely, top and bottom, in any position.



Thorn Casements Readily Cleaned from Within

Advantages—Thorn metal casements provide a distinctive quality and an architectural appearance which can not be obtained by the use of wood windows. They have all the advantages of double hung windows and, in addition, they provide 100% ventilation. They control ventilation by conducting breezes into the building and to a certain extent will exclude rain while the windows are open. They are economical, costing no more than a good quality wood casement and are more reasonable in price than double hung windows. They need not be weatherstripped because of their watertight construction. They can not warp, shrink, or swell as do wood windows.

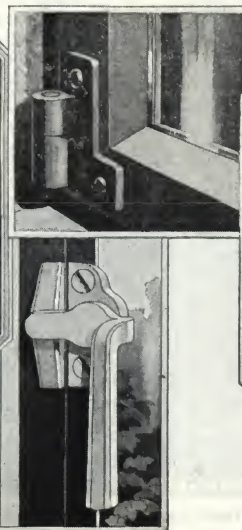
Catalogues

Thorn Casements for Residences and Apartments—R.C-3 and M.C-1.

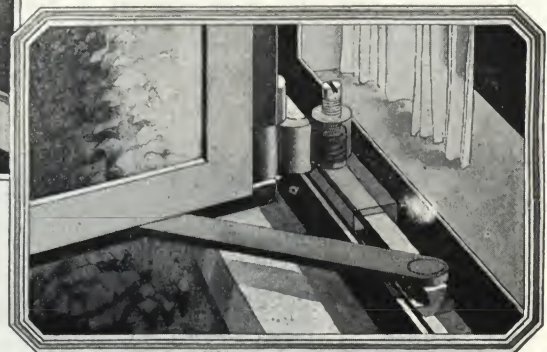
Thorn Medium and Heavy Type Casements—M.H-1.



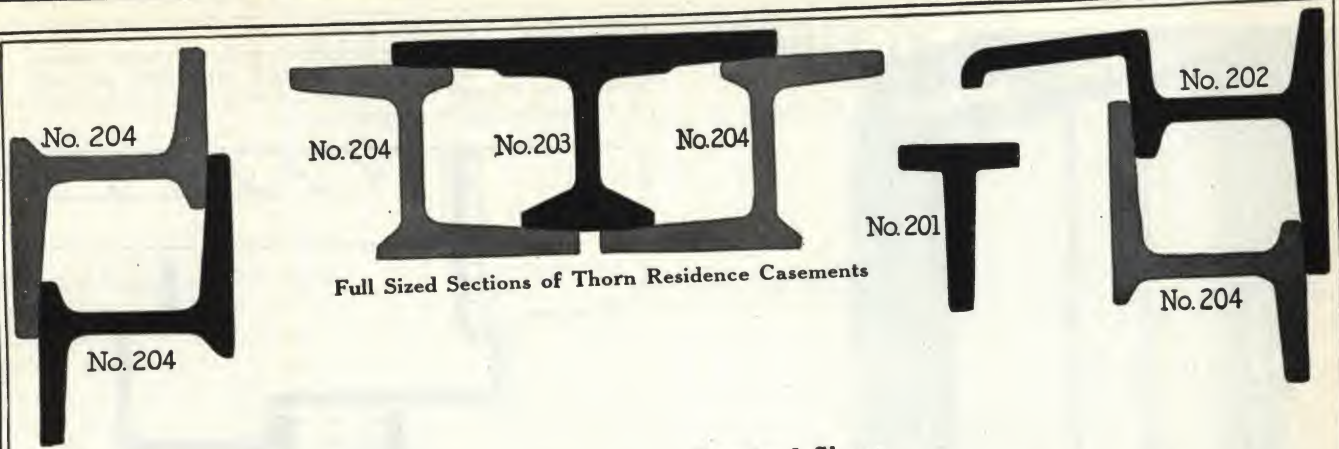
Thorn Cleaning Hinge Open



Thorn
Fastener
No.
201



Thorn Cleaning Hinge, Showing Slide and Friction Adjusting Screw

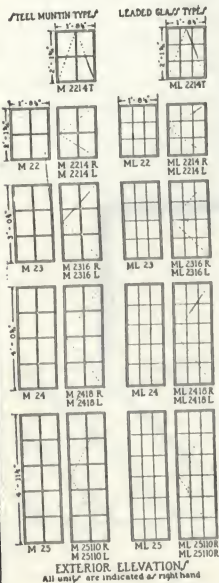
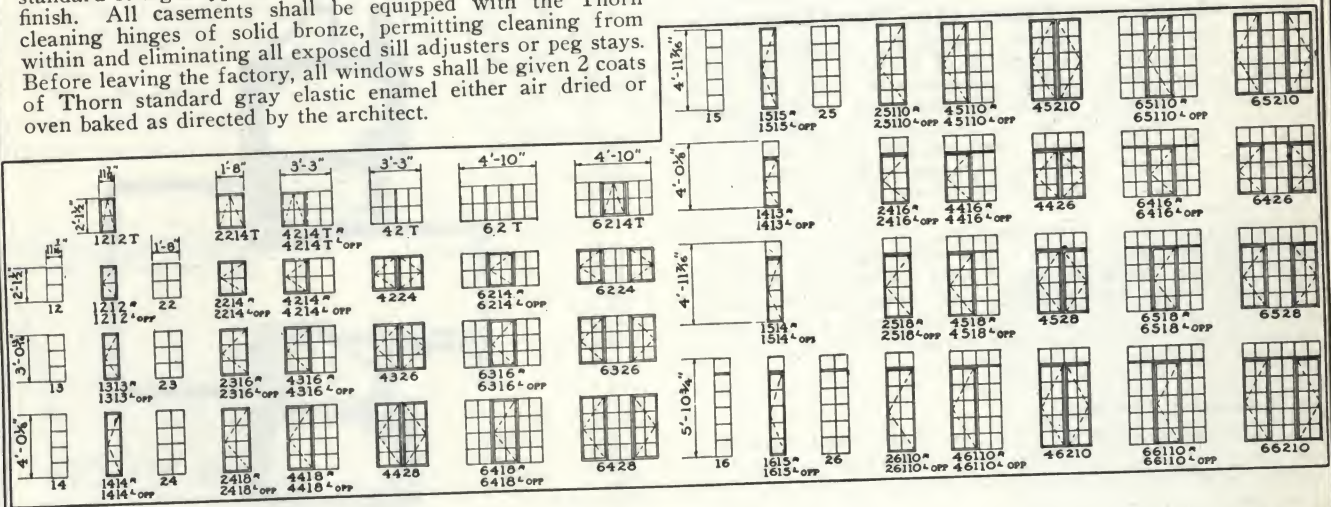


Standard Specifications

All openings shall be fitted with Thorn standard residence casements as manufactured by the J. S. THORN COMPANY, Philadelphia, Pa. All corners shall be mitered, electrically welded and ground to a smooth finish. Muntin bars shall have a $\frac{1}{8}$ -in. face, and all intersections of muntins shall be flush and electrically welded. Fasteners shall be Thorn's standard straight type No. 201 of solid bronze, light statuary finish. All casements shall be equipped with the Thorn cleaning hinges of solid bronze, permitting cleaning from within and eliminating all exposed sill adjusters or peg stays. Before leaving the factory, all windows shall be given 2 coats of Thorn standard gray elastic enamel either air dried or oven baked as directed by the architect.

Standard Sizes

In order to keep the price of Thorn residence type casements as low as possible they are produced in large quantities of standard sizes. Below are shown the standard units carried in stock and their over-all dimensions. Openings of two or more units, both in height and width, can be obtained by the use of steel mullions. For each steel mullion $\frac{1}{8}$ in. must be added to over-all dimensions of the units.



Thorn Manor Casements

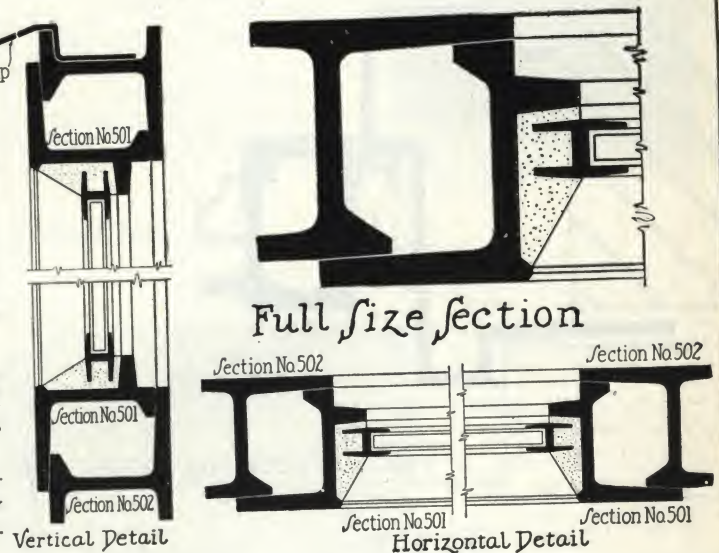
A standardized casement of the finest quality combining the very best of materials and workmanship.

The design of the sections incorporates refinements of the most minute nature to gratify architectural desire for a sturdy, well made casement, particularly adapted to leaded glass with neat, narrow sight lines and short putty levels.

The famous Thorn Hinge, strong, pleasing to the eye and unequalled in performance, is standard equipment.

The "Manor" is an accomplishment in steel window craft befitting the finest architecture.

CONSTRUCTION DETAILS



THORN
CASEMENTS

DETAILS OF RESIDENCE AND MANOR TYPE
CASEMENTS

THORN
CASEMENTS



will at all times be glad to co-operate with architects, owners and builders in the proper preparation of details and will forward on request our booklet covering usual installation conditions for Thorn standard units.

Thorn Medium and Heavy Type Metal Casements

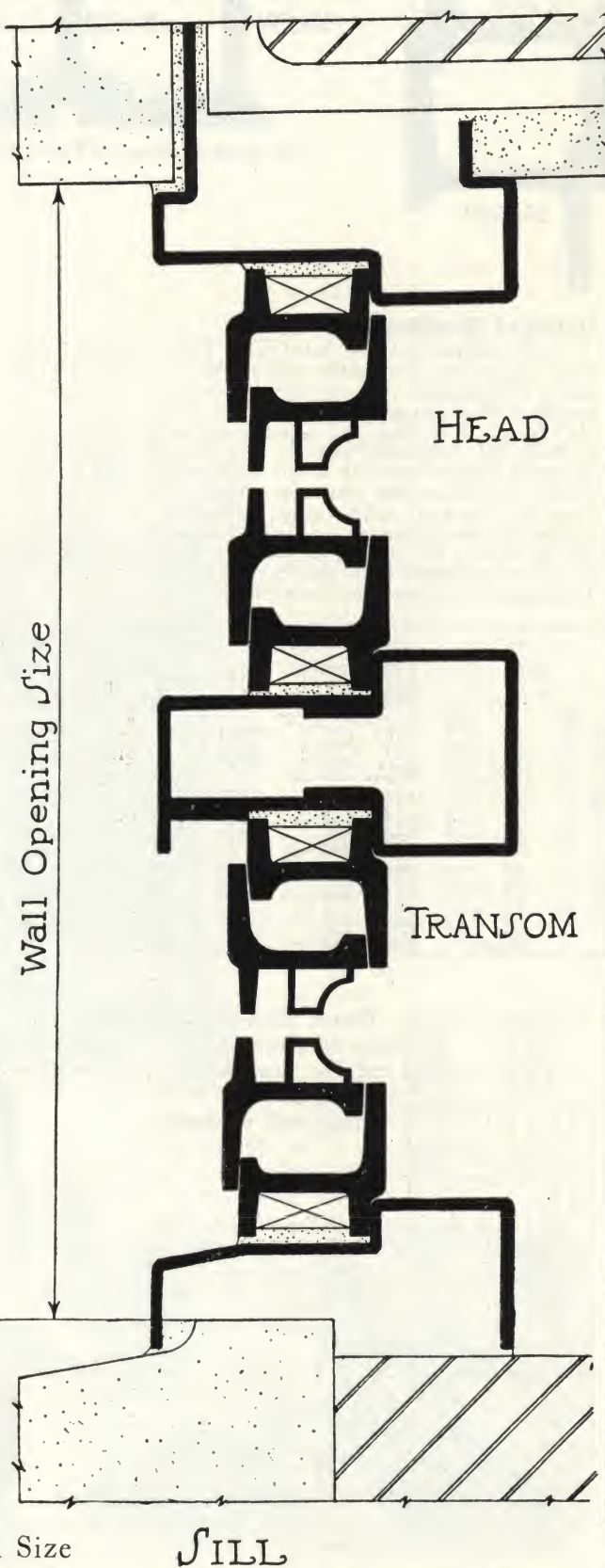
For use in more elaborate residences, churches, banks, office buildings, etc. Constructed of heavy 2-point specially rolled steel casement section. Constructed with the same care and accuracy as Thorn light casements. Glazing may be provided for by the use of putty only or glass may be held in place with drawn steel glazing beads which are accurately mitered at the corners and held in place with brass oval head screws. Solid bronze hardware is used throughout.

Where desired, Thorn medium and heavy type metal casements may be provided with a metal subframe which is built in and the casements placed after openings are prepared.

Made to open outward or inward. These larger sections lend themselves admirably to the construction of French casements or doors with bronze thresholds, steel kick panels and suitable locks and other hardware.

Architectural Service

In designing buildings in which Thorn metal casements are to be installed, it is always well to detail the openings to receive the windows after masonry work is completed. We



THORN
CASEMENTS

DETAILS OF HEAVY TYPE CASEMENTS

THORN
CASEMENTS

ALLISON STEEL PRODUCTS CO.

Steel Windows, Doors and Partitions

CHESTER, PA.

Pivoted Factory Steel Sash

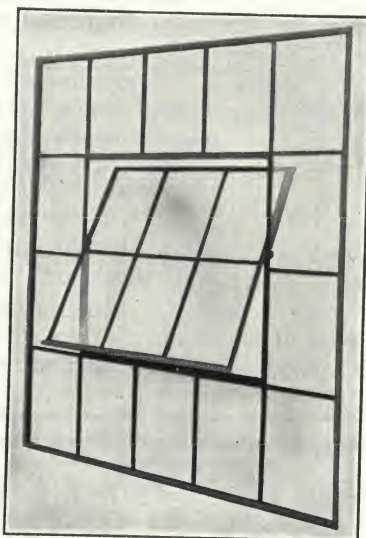
Allison sash are made of heavy cove shaped steel sections joined together at the intersections by neat flush miter joints electrically welded, combining strength and neatness.

The ventilators have double contact weathering on all sides, and are hung on substantial steel pivots.

The ventilator hardware furnished with the windows consists of push bar, spring catch and chain or cam latch and chain.

We recommend push bar for all vents within reach from floor, and spring catch and chain for all vents out of reach.

The sash can be set in any type of masonry, steel or wood, and we furnish complete hardware.

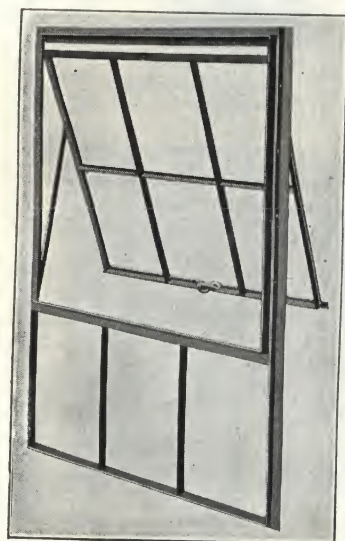


Standard sash are designed to receive 12x18 and 14x20-in. glass and the opening dimensions for single units are as follows:

Lights wide	12-in. glass		14-in. glass		Lights high	18-in. glass		20-in. glass	
	ft.	in.	ft.	in.		ft.	in.	ft.	in.
1	1	11 1/4	1	3 1/4	1	1	7 1/4	1	9 1/4
2	2	15 1/8	2	5 5/8	2	3	15 1/8	3	5 5/8
3	3	22 1/4	3	8 3/8	3	4	22 1/4	4	8 3/8
4	4	29 1/8	4	10 3/8	4	6	29 1/8	6	10 3/8
5	5	35 1/8	5	12 3/8	5	7	35 1/8	7	12 3/8
6	6	41 1/8	6	14 3/8	6	8	41 1/8	8	14 3/8

Combine any 12-in. width with 18-in. heights, and 14-in. width with 20-in. heights.

Two or more units may be combined in an opening, and the opening size determined by adding the sizes of the units together plus 2 in. for each mullion.



Projected Ventilator Windows

This type of window is for use in the better types of buildings, such as offices, schools, hospitals and hotels.

The vents can be arranged to open in or out, and project beyond the sash only on the side on which they open.

They are furnished with appropriate fittings in malleable iron or brass.

This window is made in various designs and the division of glass can be so arranged to present pleasing architectural effects.

Steel Tube Doors

Allison steel tube doors are made of rectangular steel tube stiles with sash and plate inserts, as desired.

They are for use in factories, warehouses and all types of industrial buildings where sturdy construction is necessary.

They are made hinged or sliding, are furnished with or without channel frames.

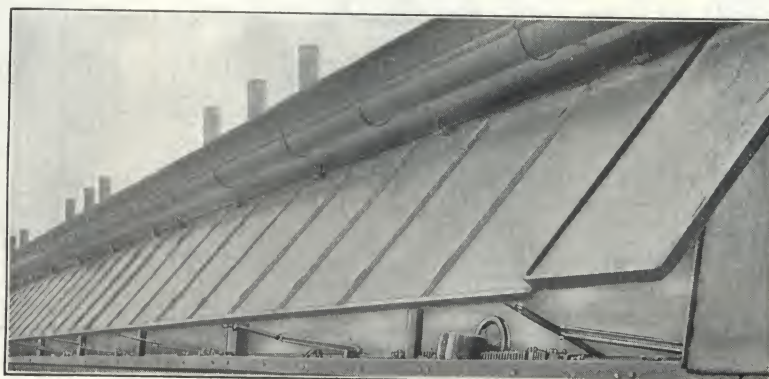
Suitable hardware, including latch or cylinder lock, is furnished with the door.



Continuous Steel Sash

This type of sash is used principally in monitor and sawtooth construction. It is very advantageous for natural lighting in wide buildings, and by means of its ventilating possibilities it is very useful in carrying off gases, impure air or smoke.

It can be kept open in storms which do not reach the driving stage, due to the awning-like effect of



sash together with the overlapping storm panels at the ends. This sash is made of heavy structural members solidly riveted together. Sill section is so constructed that condensation is carried off without use of metal gutters.

Made stationary and ventilated. Ventilating type is operated by Allison operator.

Complete catalogue will be mailed on request.

ESTABLISHED 1881

THE WILLIAM BAYLEY CO.

Manufacturers of Steel Windows and Doors

SPRINGFIELD, OHIO

NEW YORK, 67 W. 44th Street
Telephone, Vanderbilt 2858

BRANCH OFFICES
CHICAGO, 310 South Michigan Avenue
Telephone, Harrison 6194
SALES AGENTS IN 65 AMERICAN CITIES

BOSTON, 73 Tremont Street
Telephone, Haymarket 3285

Products

PIVOTED VENTILATOR WINDOWS.
Continuous and other forms of MONITOR WINDOWS.
WINDOW OPERATORS.
STEEL AND GLASS SIDEWALLS and PARTITIONS.
RESIDENCE CASEMENTS.
STEEL DOORS and BASEMENT WINDOWS.
UTILITY WINDOWS.

Bayley-Springfield Windows

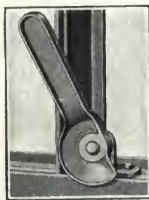
Bayley-Springfield Windows are backed by 46 years of continuous manufacturing experience and 18 years of solid bar window sash manufacturing experience. Made in a variety of kinds for a variety of purposes. Tell us what you want and permit us to submit the necessary detail matter. The following is only suggestive.

Bayley-Springfield Center Pivoted Windows

Standard Sizes—50 layouts in 14x20 glass size and 50 layouts in 12x18 glass size shown on following page. These units are produced in large quantities and when used singly or in combined unit openings, meet practically all building conditions where center pivoted windows are applicable. Designers should confine requirements to these sizes to get the benefit of low prices and quick deliveries.

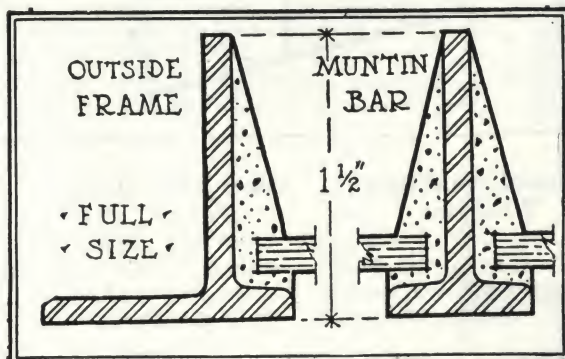
Frame and Muntin Bars—1½ in. deep provide strength and rigidity.

Ventilators—Center pivoted (CP). Have double weathering contact 1⅝ in. deep at sides and 1¾ in. deep at top and bottom. Exceptionally strong and deep at top and bottom. Exceptionally strong and tight.



H CAM

Two used with push bars.
Alternate for F lock bar at additional cost

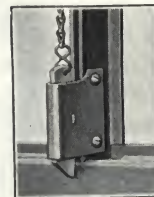


PRINCIPAL BARS
Full size sections



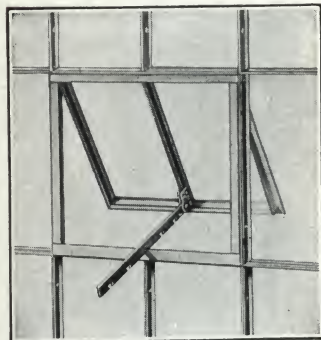
INTERSECTION

Simple, strong, pleasing appearance. Bars not bent or manipulated in assembling, therefore, steel can be and is of strong character. Surfaces get-at-able for easy and complete repainting

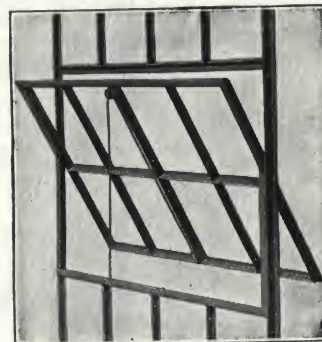


C CHAIN CATCH

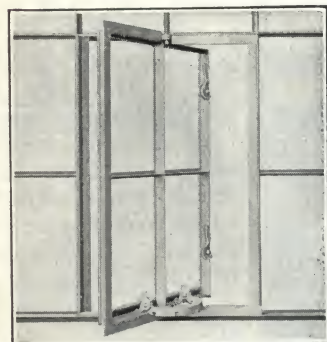
Made of steel, sherardized.
Used when ventilators are high up



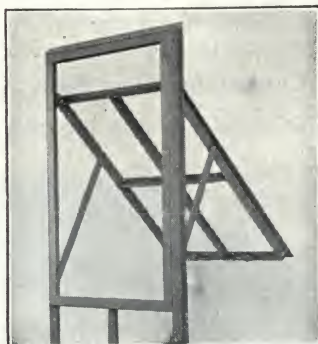
VENTILATOR TPO
F lock bar hardware—the most frequently used kind



VENTILATOR CP
Chain catch hardware—for use above reaching distance

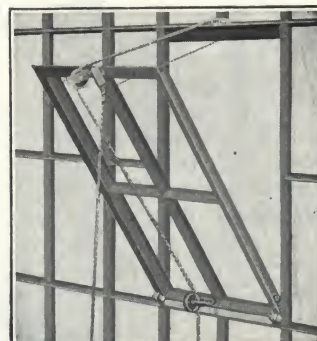


VERTICALLY PIVOTED (VP)
VENTILATOR
With usually furnished hardware



PROJECTED OUT (PO)
VENTILATOR

The kind here shown has many merits of other kinds and some individual ones. Users of steel windows may well give it careful consideration



BOTTOM PIVOTED INSWINGING
(BP) VENTILATOR
With usually furnished hardware

BAYLEY-SPRINGFIELD SIDE WALL WINDOWS

Paint—One shop coat of Bayley-Springfield stand-
ard red.

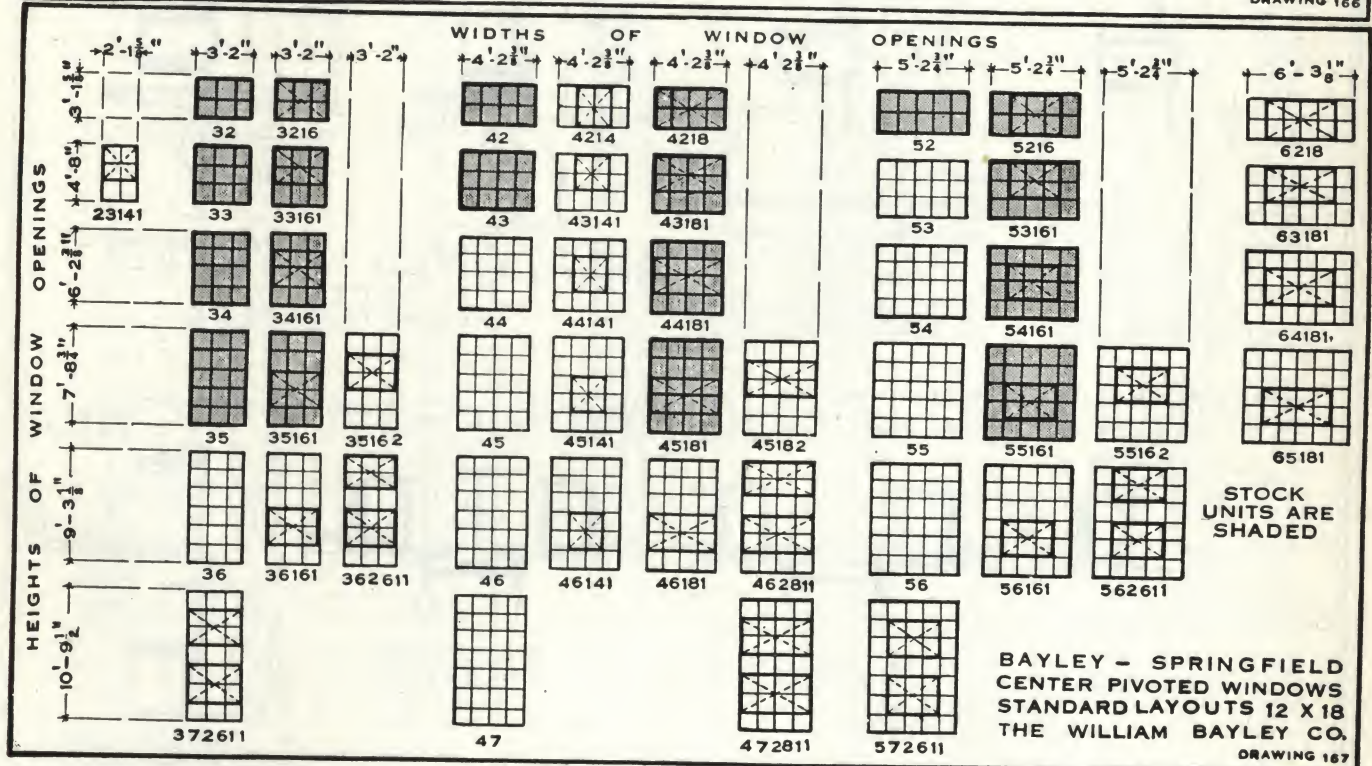
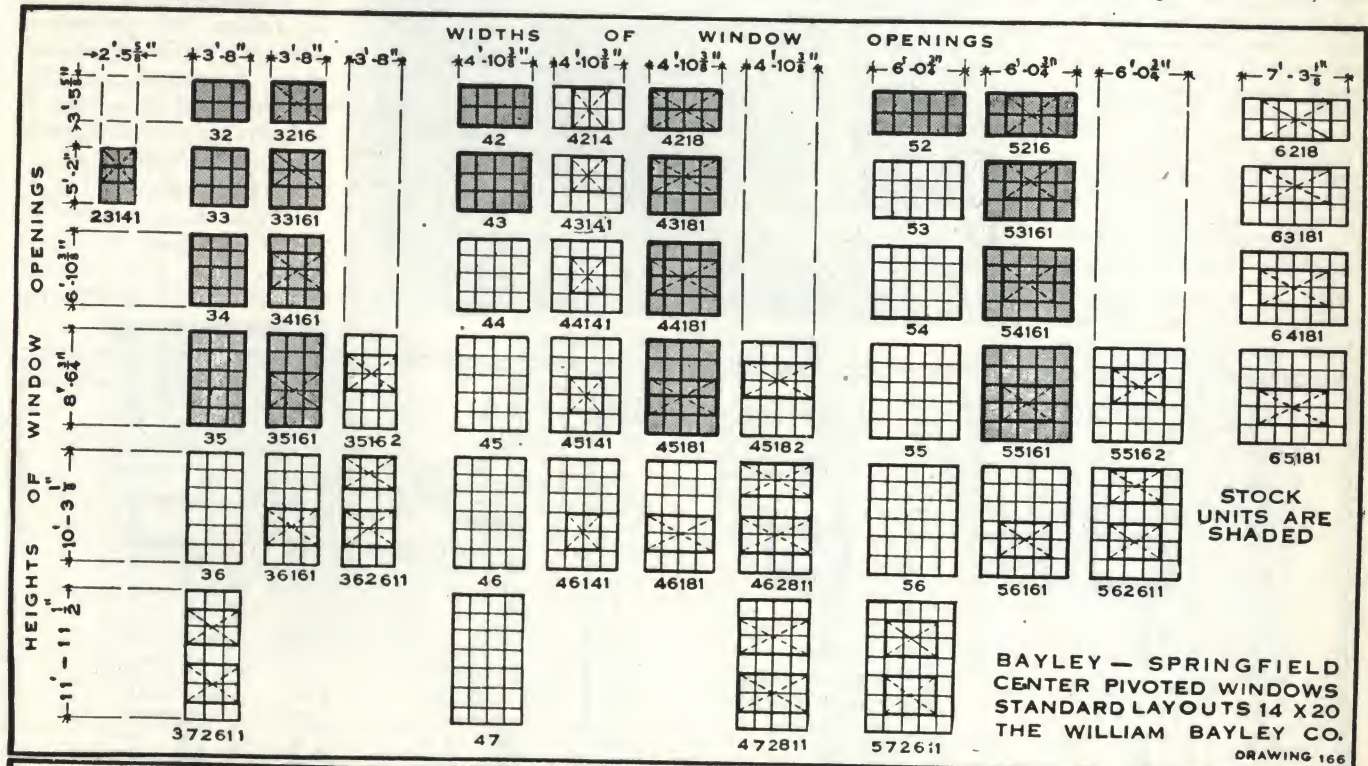
In Stock for Immediate Shipment—20 sizes in
14x20 glass and 19 sizes in 12x18 glass carried in stock.
These are a selection of most popular standard units and
are shown in heavy outline on drawings number 166 and
167 below. They are constructed the same as made-to-
order windows and are carried in warehouse and by
dealers.

Bayley-Springfield Utility Windows—In stock.

*Made in one size 3 ft. 4 in. wide by 3 ft. 7 $\frac{5}{8}$ in.
high. Standard Bayley-Springfield construction sections
1 $\frac{1}{2}$ in. and 1 $\frac{5}{8}$ in. deep, 3 lights wide and 2 lights high—
top 3 lights ventilated.*

Paint—Bayley-Springfield Utility Window gray.
Ideally adapted for small structures such as garages and
similar buildings.

F Horizontal Mullions—Usually not furnished
by this company. Made of structural materials and per-
mit using one unit above another for power houses, etc.



BAYLEY-SPRINGFIELD STEEL WINDOWS

Anchorage—Secured in masonry openings by embedding the outside frame member in cement fill, or by the use of Economy inserts. Windows may be clamped to structural steel by use of clips and bolts which are furnished when specified. Type of head, sill and jamb must be stated.

When Writing for Quotations—Avoid delay by giving complete information as follows:

Type of units; number of units; number and kind of mullions, if any; kind of hardware (lock bar, push bar and 2 cams, chain catch). If chain catch hardware is desired give distance from sill of window to floor. If to be installed in structural steel (anchors consequently required), state where anchors are needed. State when shipment is required.

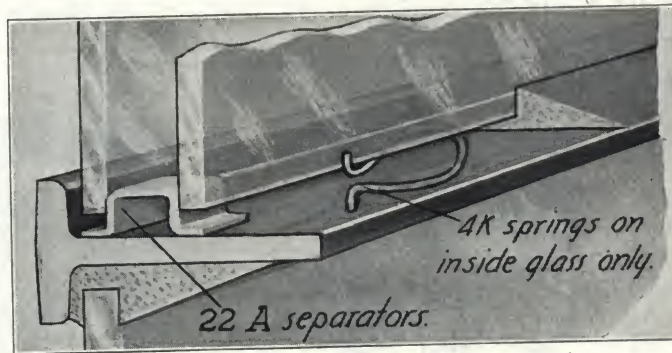
Quotations—Cover window units complete with or without ventilators as specified. M mullions as required, with

necessary clips and bolts, F lock bars (1 to each ventilator), 4K glazing springs (4 to each light), and (only when specified) 3A or 66A clips spaced about 2-ft. centers for attachment to structural steel.

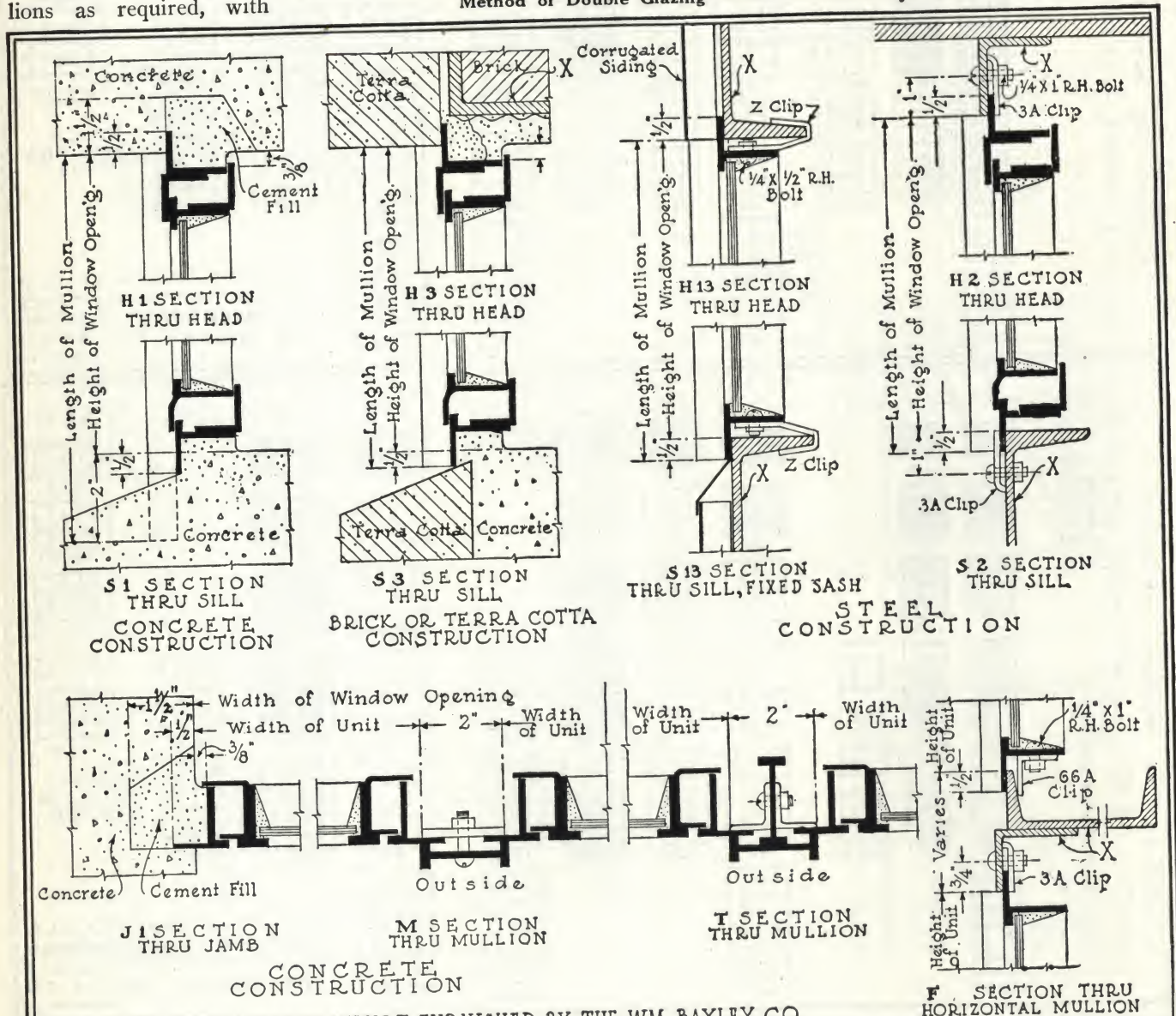
Quotations do not cover (unless specifically stated) structural materials and parts not established and standardized as parts of steel windows and recognized as such in the practices of the trade, glass, putty, erections, glazing or other labor, etc.

Double Glazing—As a means of promoting comfortable living conditions in summer and conserving heat in winter, is effectively provided for in Bayley-Springfield.

The excessive depth of the bars admits of sufficient dead air space between two panes of glass and entirely eliminates objectionable features.



Method of Double Glazing



NOTE:—MEMBERS MARKED "X" NOT FURNISHED BY THE WM. BAYLEY CO.

THE WILLIAM BAYLEY CO.
SPRINGFIELD, OHIO, U.S.A.

BAYLEY-SPRINGFIELD SIDE WALL WINDOWS

SCALE 3"=1'-0" DRAWING NO. 2

Bayley-Springfield Projected Ventilator Windows

Ventilators balance on pivoted arms and simultaneously move down and out, or up and in, sufficient friction being provided to hold them in any desired position. Sliding mechanism parts are of brass.

Bayley - Springfield CC Windows with Projected Ventilators—Are a highly standardized manufactured product, the merits of which have produced a demand sufficient to permit quantity production and, with it, high quality and low cost.

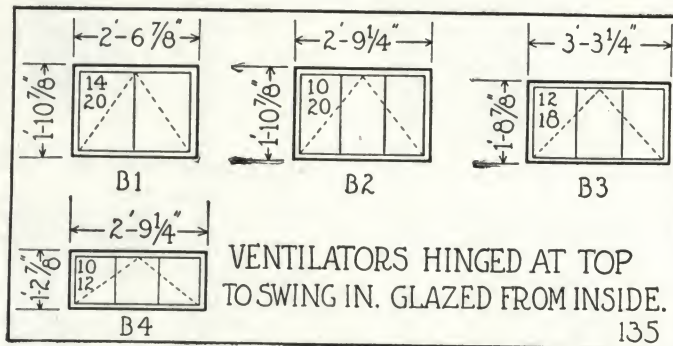
For standard layouts see Drawing 170 below.

For sizes use dimensions

of corresponding units on second preceding page.

Bayley-Springfield BB Windows—Are an extremely high grade product at a surprisingly moderate cost. They are of layouts shown in drawings 119 and 120 and incorporate such structural and quality features as welding of corners of both ventilators and ventilator openings, glazing stops, solid bronze hardware and preparation for attachment of shade brackets.

These windows lend themselves readily to screening and may be prepared for steel screens at but slight additional cost.

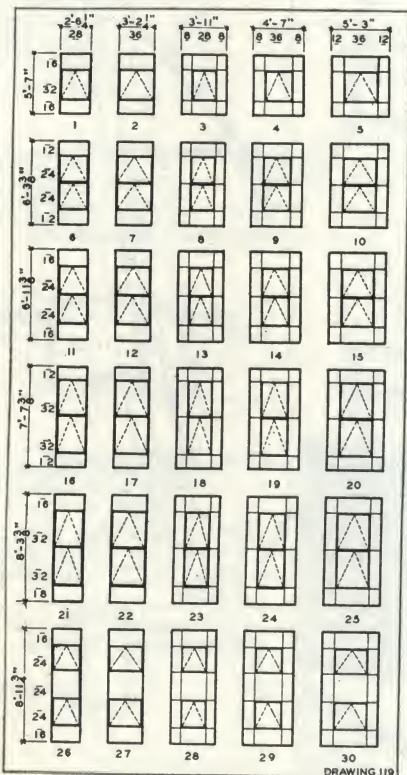


Bayley-Springfield Basement Windows—Ventilated 100%

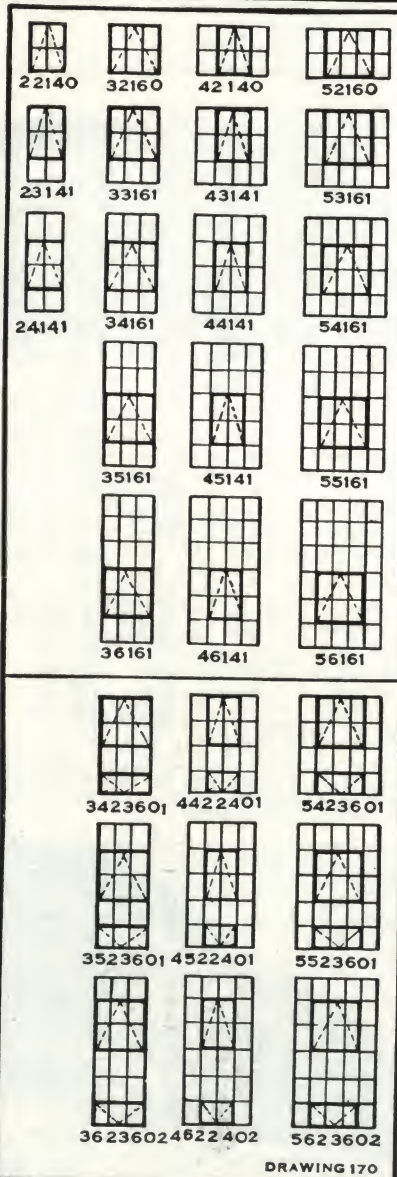
Immediate shipment. Masonry openings and glass sizes, see drawing No. 135. Have a heavy stiff frame. Have a strong ventilator with 1 1/2 in. deep muntins. Easily removable and replaceable. For use in wood, brick, concrete or tile. Inexpensive, cost no more than wood



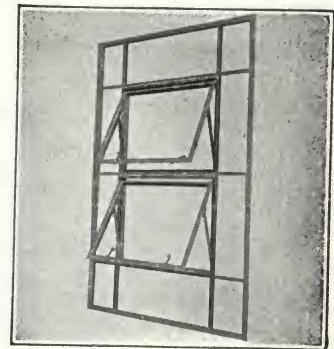
CC PROJECTED VENTILATORS



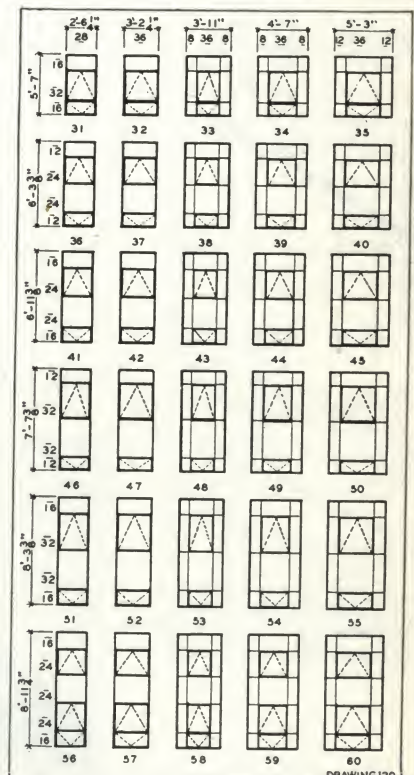
BB WINDOW LAYOUTS AND SIZES



CC WINDOW LAYOUTS



BB UNIT 3'10" x 6'2 3/8"



BB WINDOW LAYOUTS AND SIZES

BAYLEY-SPRINGFIELD PROJECTED WINDOWS

Continuous Windows

Continuous windows here pictured and described for use in roof construction, are suited to use in side walls and are frequently so used. They are particularly desirable in positions where utility or convenience may be served by mechanically opening a large glass area. Engineers thoroughly versed in the details of the product itself and its use, are at your service either from Springfield or from one of our branch offices. You incur no obligation in availing yourself of this service.

They differ from other Bayley-Springfield in the material of which made and in the details of construction. Their glass is inserted from the outside.

Their top and bottom horizontals are $2 \times 2 \times \frac{3}{16}$ -in. angles; vertically $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ -in. tees.

They have an extra horizontal $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ -in. angle for attachment of mechanical operators.

They are made in four standard lengths with provision for field splicing to meet practically any requirement.

They are made in four heights which may be combined one above another. The 3-ft. height should be

used for the hinged panels. Hinges, heavy steel butts with bronze pins properly spaced and securely riveted to top horizontals, are positioned not to interfere with flashing materials. See catalogue for more details.

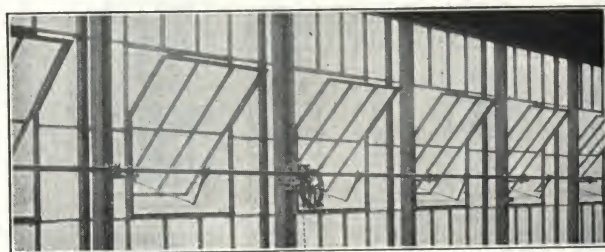
Weather-tightness is provided by lapping, shingle fashion, the tops under, the bottoms over, throughout their entire length, and by the use of underlying storm panels at the ends.

Bayley-Springfield for Monitor and Sawtooth Roofs

Sidewall windows thus used (see section at left) afford opportunity for simplicity and economy. They are means by which all windows of a building may be alike, at least, in glass light sizes and ventilators. They must be used in the vertical position.

Continuous windows as shown below and in section at right are better suited to many of the larger installations.

Architects' Specifications—Use wording which appears on the following page with proper insertion of words "Bayley-Springfield continuous windows," or "Bayley-Springfield sidewall windows for monitors."



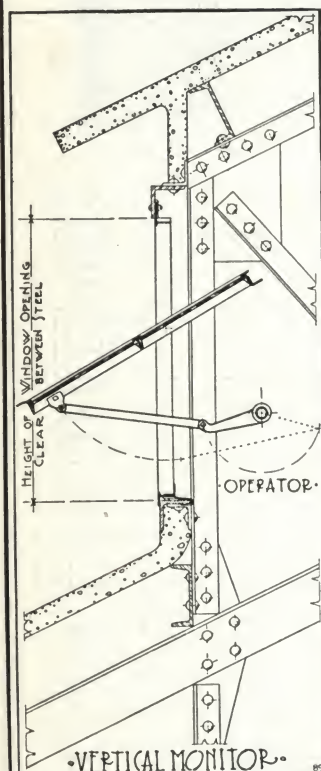
SIDEWALL WINDOWS IN MONITOR
Bayley-Springfield gear and worm operator

Illustrative and descriptive matter herewith which is intended only to be suggestive. A Bayley-Springfield catalogue should be in the hands of every architect. Ask for one

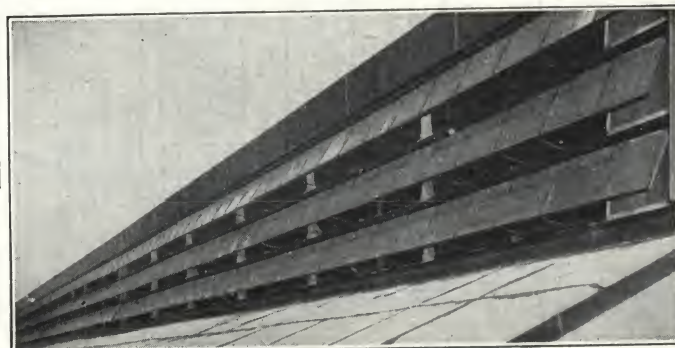
DIMENSIONS FOR CONTINUOUS WINDOWS

HEIGHT AND GLASS SIZE			PANEL LENGTH		
Window height	Clear opening	Glass height	Panel	Mark	Length
3' 0"	2' 10 1/2"	2' 10 1/2"	End	S6R	13' 3 3/8"
4' 0"	3' 10 1/2"	3' 10 1/2"	End	S6L	13' 3 3/8"
5' 0"	4' 10 1/2"	4' 10 1/2"	Line	C6	12' 3 3/8"
6' 0"	5' 10 1/2"	5' 10 1/2"	Line	C4	8' 2"
			Line	C2	4' 1"

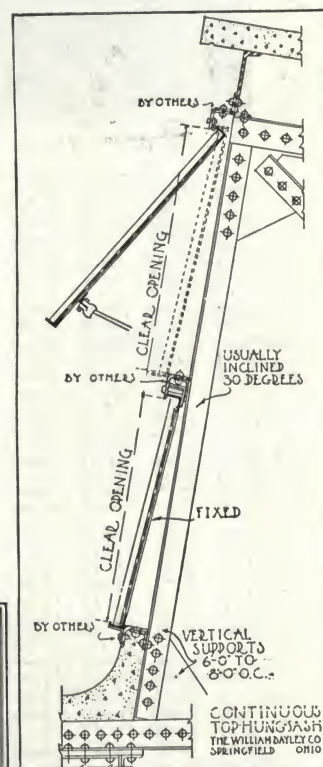
Any combination of panels with end panels S6R and S6L can be used. Clear opening width must be 4 in. to 1 ft. 4 in. greater than the combined length of panels used.



SECTION OF VERTICAL MONITOR AND SIDEWALL WINDOWS

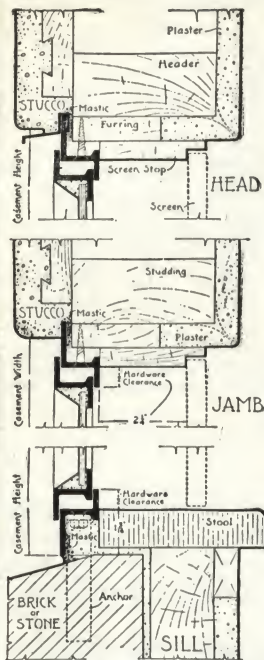


CONTINUOUS WINDOWS IN MONITOR, MOTOR OPERATED



INCLINED MONITOR AND CONTINUOUS WINDOW

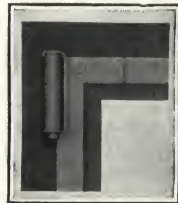
DETAILS AND INSTALLATIONS OF BAYLEY-SPRINGFIELD WINDOWS



STUCCO CONSTRUCTION DETAIL



HANDLE OF IRON



STANDARD HINGE



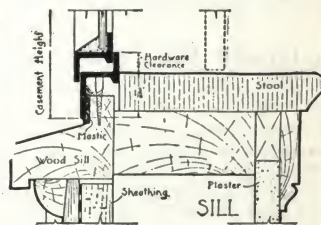
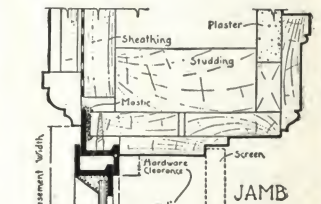
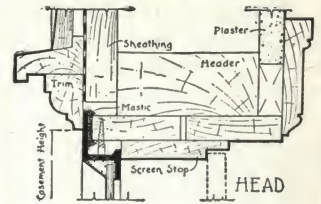
CASEMENT OPEN



HANDLE OF BRONZE



EXTENSION HINGE



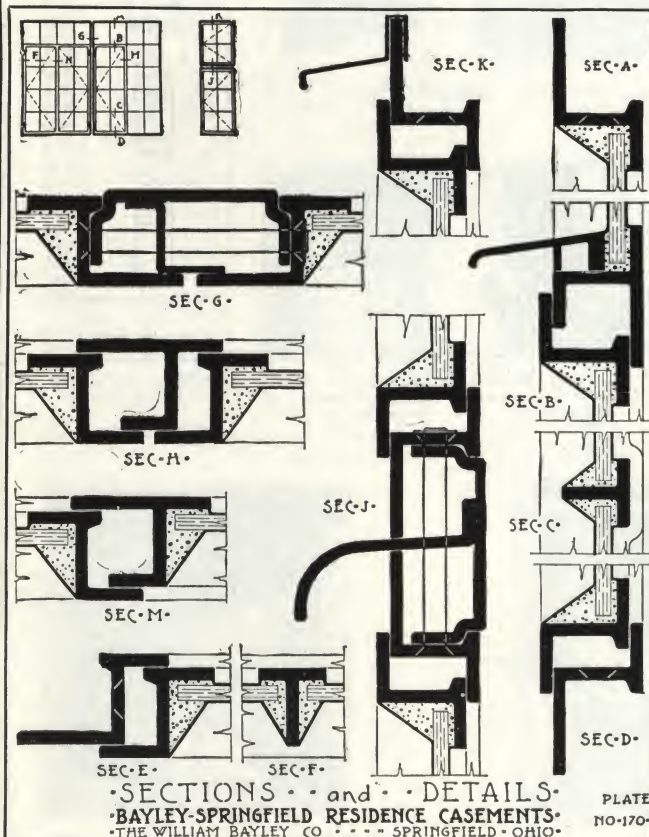
FRAME CONSTRUCTION DETAIL

Bayley-Springfield Residence Casements

Made in England. They open out and are glazed from the outside. One dip coat of standard gray paint is applied before shipment. Wide frames are used around all units. Measure one and three-sixteenths inches and provide additional space inside for plaster or other interior finish and also sufficient engagement into walls for weatherproofing. Leaded glass panels may be used. Mullion and transom bar dimensions must be

added to casement widths and heights given on plate 174. For vertical mullions add one inch and for horizontal transom bars add five-eighths inch. Hinges of standard type set close to the window, of heavy steel with heavy bronze pins, are furnished on all casements except on windows 2 and 6 lights wide, where hinges of extension or cleaning type are used. Handle of malleable iron is standard but may be of bronze at additional cost. It has bronze working parts, provides two slightly open positions and a tight contact when closed.

Peg and stay of rolled steel is standard but may have bronze arm and peg at additional cost. Finish of hardware, if of iron or steel is like the casement, and if of bronze is smooth nut brown. Prices include hardware, necessary fixing anchors, horizontal and vertical mullions with bolts, if any are required, 2 glazing springs per light and mastic for weatherproofing. Copper drip is furnished over casements that extend to the head of openings. For complete details send for catalogue R. C. 27.



SECTIONS and DETAILS
BAYLEY-SPRINGFIELD RESIDENCE CASEMENTS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO

PLATE
NO. 170

LAYOUTS and SIZES				GLASS SIZE SCHEDULE	
				PANES	MARK
1'-0"	1'-6"	1'-6"	3'-3"	2214TH	4214TH
2'-0"	2'-0"	2'-0"	2'-0"	2214R	4214R
2'-0"	2'-0"	2'-0"	2'-0"	2214L	4214L
3'-0"	3'-0"	3'-0"	3'-0"	2316R	4326
3'-0"	3'-0"	3'-0"	3'-0"	2316L	4326
4'-0"	4'-0"	4'-0"	4'-0"	2416R	4426
4'-0"	4'-0"	4'-0"	4'-0"	2416L	4426
4'-0"	4'-0"	4'-0"	4'-0"	2518R	4528
4'-0"	4'-0"	4'-0"	4'-0"	2518L	4528

Top Hinged Outswinging Ventilators have their unit marks ending in TH. When viewed from the outside, a unit with hinges on the right is marked R. When viewed from the outside, a unit with hinges on the left is marked L.

SCALE
NONE

LAYOUTS and SIZES
BAYLEY-SPRINGFIELD RESIDENCE CASEMENTS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO

PLATE
NO. 174

BAYLEY-SPRINGFIELD RESIDENCE CASEMENTS

Bayley-Springfield Steel Doors

Primarily for use in industrial buildings. Parts heavy enough and details strong enough to insure continued, satisfactory working under rough and abusive conditions of service. Outer members are thick walled steel tubing. Filling is made of steel window shapes. Usually glazed in the upper portion and provided with a steel plate in the lower. Some are made with steel plates in both portions. Tube corners are reinforced (see BEB below) for strength and along the miter lines to hold the metal heated to fluid condition during the welding process. Plate is flanged on four edges and stretched during riveting so that it is free from buckles and serves as a truss.

Frames for hinged doors are usually channels and contemplate the sills being of concrete. Send sketches of openings for recommendations. Frames for sliding doors usually not required.

Architects' Door Specifications

The standard of quality adopted for the steel doors is that established by THE WILLIAM BAYLEY CO., Springfield, Ohio, in the manufacture of Bayley-Springfield steel doors, and bidders are required to base their proposals upon the use of this Bayley product.

"Any bidder may submit an alternate on another make of steel doors, but in doing so must give the name and address of the manufacturer, together with evidence that the product is equal to the adopted standard in strength, permanency, design, finish and workmanship."

***STANDARD SIZES OF BAYLEY-SPRINGFIELD STEEL DOORS**

Single		Double	
Width	Height	Width	Height
Type D1—Hinged			
**2'6"	7'0"	5'0"	7'0"
**3'0"	7'0"	6'0"	7'0"
3'6"	7'0"	7'0"	7'0"
3'0"	8'0"	6'0"	8'0"
3'6"	8'0"	7'0"	8'0"
**4'0"	8'0"	8'0"	8'0"
**4'0"	10'0"	8'0"	10'0"
Type D11—Sliding			
**2'3"	6'10 1/2"	4'9"	6'10 1/2"
**2'9"	6'10 1/2"	5'9"	6'10 1/2"
3'3"	6'10 1/2"	6'9"	6'10 1/2"
2'9"	7'10 1/2"	5'9"	7'10 1/2"
3'3"	7'10 1/2"	6'9"	7'10 1/2"
**3'9"	7'10 1/2"	7'9"	7'10 1/2"
**3'9"	9'10 1/2"	7'9"	9'10 1/2"

*Hinged doors: measure between frames for width and from under-side of frame at head to sill for height; for clear openings, deduct width of stop angles.

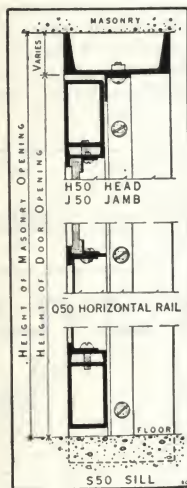
Sliding doors: measure clear opening.

**Indicates stock door.

Catalogue

THE WILLIAM BAYLEY CO. has manufactured metal architectural products, both structural and ornamental, since 1881, and has manufactured Steel Windows since 1909. These years of experience are the test of Bayley-Springfield products today.

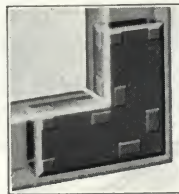
The descriptions of these windows and doors here presented is of necessity brief. A more complete understanding can be had through one of our catalogues. Ask for a copy.



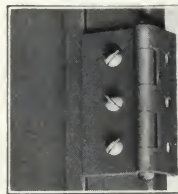
Sectional Detail of Hinged Door



Y70 Extension Bolt for Hinged Double Doors



BEB Corner Reinforcement tubes are welded



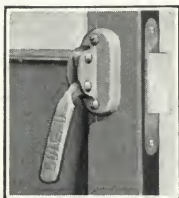
24A Hinge



Y72 Hasp Bolt for Double Doors



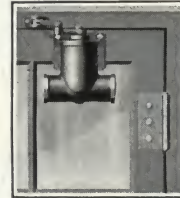
Y1 Cylinder Lock Heavy solid brass working parts



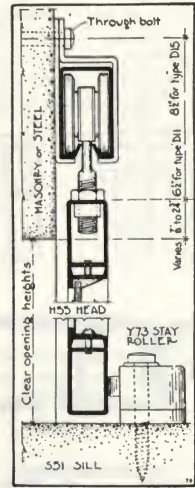
Y5 Panic Release Heavy solid brass working parts



Y55 Panic Release Outside lock may be omitted



Y61 Door Check for Inswinging or Outswinging Doors



Sectional Detail of Sliding Door

STEEL DOORS IN DETAIL—EVIDENCE OF STRENGTH AND GOOD APPEARANCE

SINGLE DOOR, PLATE THROUGHOUT
Most are made with glass



STANDARD HINGED DOUBLE DOOR



D11 DOUBLE DOOR FILLED WITH PLATE
With D1 pass door

BAYLEY-SPRINGFIELD STEEL DOORS

BLISS STEEL PRODUCTS CORPORATION

Manufacturers of Solid Steel Windows

EAST SYRACUSE, N. Y.

Bliss Solid Steel Windows (Patented)

Bliss steel windows are made of solid sections rolled from low carbon steel.

Joints are interlocking and designed for maximum strength. Corners of outside sections are acetylene-welded to develop full strength of the section.

Hinges have a double bearing on the pins so as to insure minimum wear.

Ventilators are center pivoted and operated with cam and stay bar or spring catch and chain. Always specify which is required, otherwise ventilators coming at the bottom or within one light of the bottom will be provided with cam and stay bar operator, and all others with spring catch and chain.

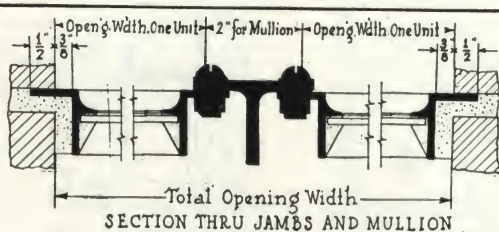
Ventilators have double contact weathering—one

contact of metal to wood and one of metal to metal. This metal to wood contact is an exclusive Bliss feature. The wood is selected clear grained cypress, which is not subject to mechanical wear and will last as long as the steel. It makes a tighter contact than is possible between two pieces of steel. Ventilators are wedged in position after fitting and can not get out of alignment with the sash.

Glass is held in place by glazing springs, four springs being furnished for each light.

Flat bar mullions are provided where necessary, if sash is not more than 3 lights high. T-bar mullions are provided for sash 4 lights high or more.

Where weathertightness is important, specify Bliss steel windows—they will reduce fuel bills.



SECTION THRU JAMBS AND MULLION

STANDARD OPENING WIDTHS

Lights wide	12"x18" lights	14"x20" lights
2	2' 1 1/8"	2' 5 5/8"
3	3' 2 3/8"	3' 8"
4	4' 2 3/8"	4' 10 3/8"
5	5' 2 3/8"	5' 10 3/8"
6	6' 3 3/8"	6' 10 3/8"
3-3	6' 6 3/4"	7' 6"
4-4	8' 6 3/4"	9' 10 3/4"
3-3-3	9' 10"	11' 4"
5-5	10' 7 1/2"	12' 3 1/2"
3-4-3	10' 10 3/8"	12' 6 3/8"
3-5-3	11' 10 3/8"	13' 8 3/8"
4-3-4	11' 10 3/8"	13' 8 3/8"
6-6	12' 8 3/4"	14' 8 3/4"
4-4-4	12' 11 1/8"	14' 11 1/8"
4-5-4	13' 11 1/8"	16' 1 1/8"
5-3-5	13' 11 1/8"	16' 1 1/8"
4-6-4	14' 11 1/8"	17' 3 1/8"
5-4-5	14' 11 1/8"	17' 3 1/8"
3-4-4-3	15' 2 3/4"	17' 6 3/4"
5-5-5	16' 0 1/4"	18' 6 1/4"
6-3-6	16' 0 1/4"	18' 6 1/4"
5-6-5	17' 0 3/8"	19' 8 3/8"
6-4-6	17' 0 3/8"	19' 8 3/8"
4-4-4-4	17' 3 1/2"	19' 11 1/2"
6-5-6	18' 1"	20' 11"
6-6-6	19' 1 3/8"	22' 1 3/8"
3-6-6-3	19' 4 1/4"	22' 4 1/4"
4-5-5-4	19' 4 1/4"	22' 4 1/4"
5-3-3-3-5	20' 7 1/2"	23' 9 1/2"
5-5-5-5	21' 5"	24' 9"
4-6-6-4	21' 5"	24' 9"
4-4-4-4-4	21' 7 7/8"	24' 11 7/8"
4-4-5-4-4	22' 8 3/4"	26' 2 3/4"

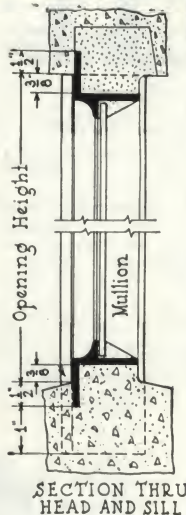
For widths greater than those listed above, multiply the opening width of one unit by the total number of units, and add 2 in. for each mullion.

STANDARD OPENING HEIGHTS

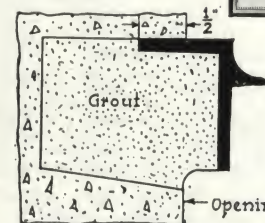
Lights high	12"x18" lights	14"x20" lights
2	3' 1 5/8"	3' 5 5/8"
3	4' 8"	5' 2"
4	6' 2 3/8"	6' 10 3/8"
5	7' 8 3/4"	8' 6 3/4"
6	9' 3 3/8"	10' 3 3/8"
7	10' 9 1/2"	11' 11 1/2"



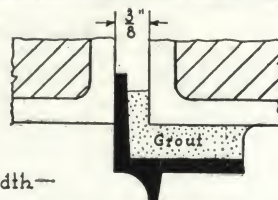
SMALL PART OF 30,000 FT. INSTALLATION



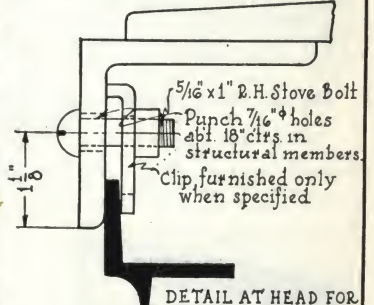
SECTION THRU HEAD AND SILL



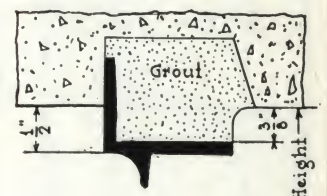
DETAIL OF CONCRETE JAMB



DETAIL AT HEAD FOR DOUBLE ANGLE LINTEL



DETAIL AT HEAD FOR SINGLE ANGLE LINTEL
Commonly used at jambs when sash connects to struct'l. steel



DETAIL FOR CONCRETE HEAD AND SILL
NOTE- Grout head and pour sill after sash is in place.

Details of Bliss Solid Steel Windows

THE BOGERT & CARLOUGH CO.

Manufacturers of Solid Steel Windows

PATERSON, N. J.

TELEPHONE, SHERWOOD 7850

NEW YORK OFFICE, 441 Lexington Avenue
Telephone, Vanderbilt 1627

CHICAGO OFFICE, 163 W. Washington Street
Telephone, State 8016

AGENCIES IN PRINCIPAL CITIES

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STEEL PROJECTED WINDOWS—Architectural and Commercial.
STEEL PIVOTED WINDOWS.
UNDERWRITERS' WINDOWS.
CONTINUOUS MONITOR WINDOWS.



TRADE-MARK

MECHANICAL OPERATORS.
STEEL PARTITIONS.
STEEL BASEMENT WINDOWS.
STEEL INDUSTRIAL DOORS.
STEEL GARAGE DOORS.

Solid Steel Projected Windows, Architectural Standards

Suitable for schools, banks, offices and public buildings where controlled ventilation, assured weather protection and maximum light are of prime importance. Furnished with ventilators: (1) Both slide down from the top and open out at the bottom (Fig. 2). (2) Both slide up from the bottom and

open in at the top (3) upper ventilator opens out, lower ventilator opens in (Fig. 3).

Direct and indirect ventilation and weather protection are thus secured at all times. Ventilators can be tilted for easy cleaning from the inside. See Fig. 4 for standard sizes.

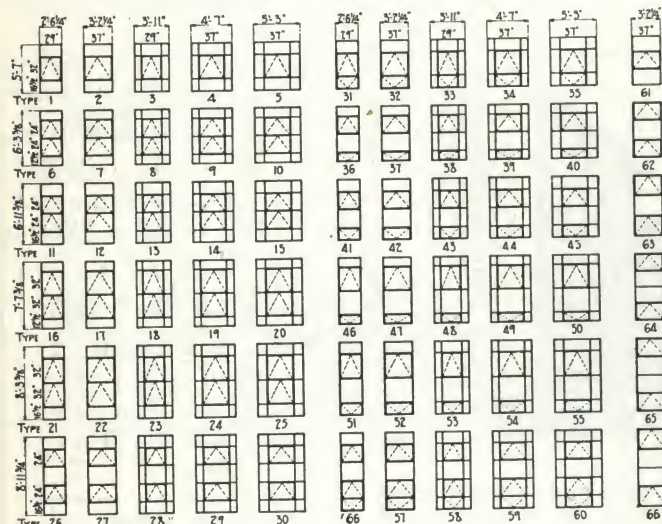


Fig. 4. Standard Sizes of Boca Architectural Projected Windows

Widths and heights given above are wall opening dimensions. Diagonal lines converging at the top indicate ventilators opening outward; diagonal lines converging at the bottom indicate ventilators opening inward. When vertical mullions are used, allow 2 in. for width of tubular mullion and 3 in. for channel mullion (Fig. 6).

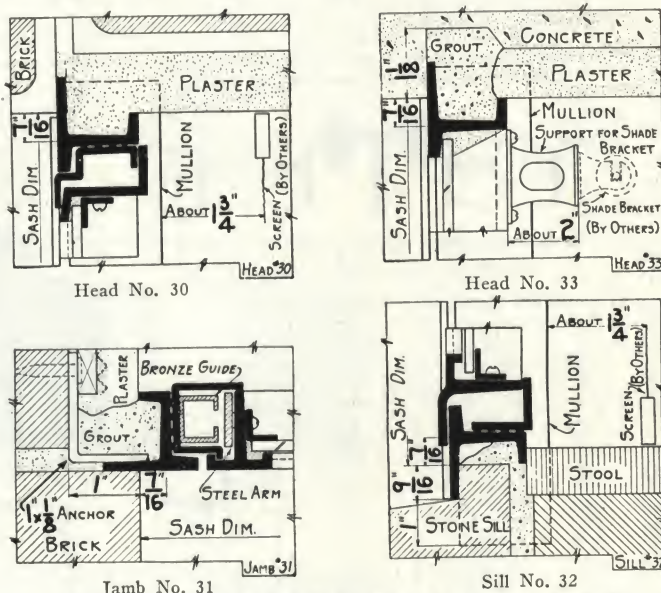


Fig. 5. Standard Installation Details of Architectural Projected Windows

Head No. 30—Standard for brick construction with steel lintel where plaster ceilings occur. Position of window screen indicated.

Head No. 33—Standard for concrete construction with plaster ceiling. Support for shade bracket and location of shade indicated.

Jamb No. 31—Standard for brick openings with interior plastered wall. Section indicates position of bronze guide or runway for open out ventilators. Similar for concrete construction.

Sill No. 32—Standard for stone sill. Sills must be cut to receive vertical mullions where they occur. Sills of concrete, terra cotta or brick are similar in detail. Position of screen indicated.

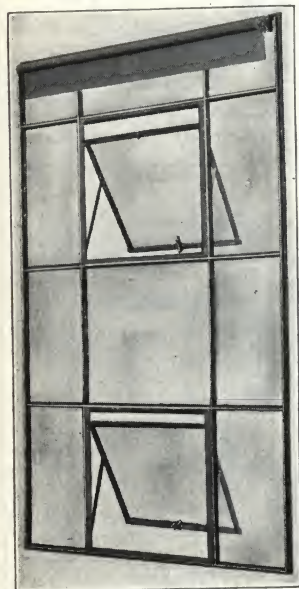


Fig. 2. Boca Architectural Projected Window with Open Out Ventilators

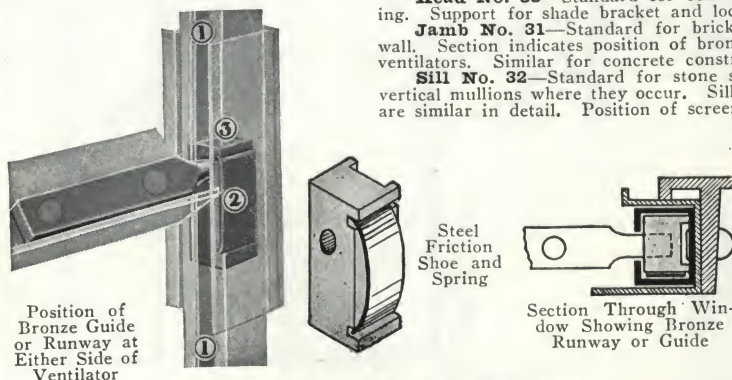


Fig. 1. Boca Bronze Guide or Runway

A new feature found only in Boca Architectural and Commercial Projected Windows. This bronze runway contains a steel friction shoe and spring which give free and uniform operation of the ventilator at all times, and hold it open at any desired angle. This device requires no paint, therefore never sticks, binds nor rusts; always functions with perfect ease and requires no adjustment—all exclusive Boca features.

(1) **Open seam rectangular bronze runway.** Contains the steel friction shoe and spring (2).

(2) **Friction spring.** Specially tempered. Designed as a part of the steel shoe. Exerts even pressure against inside of bronze runway (1) and assures uniform operation of ventilator.

(3) **Steel friction shoe.** Slides within the bronze runway (1) with the action of the ventilator and holds it open at any angle by friction. The ventilator pivots on steel pins at either side, riveted in position and extending into the friction shoes.

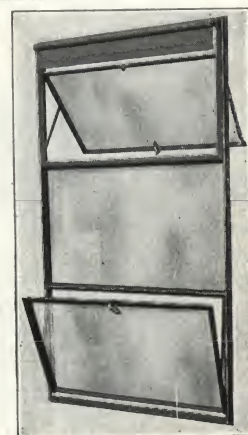


Fig. 3. Boca Architectural Window with Upper Open Out and Lower Open In Ventilators

Equipped with the Boca bronze ventilator runway shown in Fig. 1. No. 115 channel frame member is used all around the window.

Standard hardware is of *bronze*, as follows: For upper ventilators, pole operated—pole ring and spring catch. For lower ventilators within reach—cam and strike for open in ventilators or cam for open out ventilators.

Shade bracket supports (Figs. 5 and 6) are furnished if specified.

Glazing angles furnished when specified.

Furnished with Underwriters' label, if specified, as explained below.

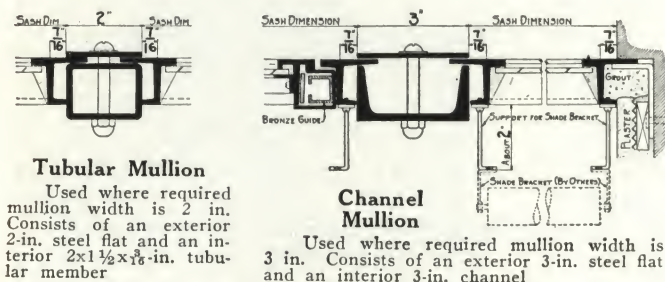


Fig. 6. Boca Vertical Mullions for Architectural Projected Windows

These mullions produce a vertical paneled effect and attractive interior finish. Their heavy design meets the requirements of rigidity, economy and durability. They have a double contact with the outstanding portions of window frame members and are attached to same by a single line of bolts with bronze cap nuts, thus reducing installation cost to a minimum.

Note shade bracket supports (furnished only when specified) which are tap screwed in position before or after window is set. Slotted holes are provided for shade brackets.

Steel Projected Windows, Commercial Standards

Suitable for schools, also office, commercial and light manufacturing buildings where ventilation and light are important factors. Standard glass sizes: 14x20 and 12x18 in.

The top and bottom ventilators may be either open out or open in as specified.

These windows differ from the Boca Architectural Projected Windows in that they are furnished with iron hardware and have a tee frame instead of a channel frame.

These windows are also equipped with the Boca bronze ventilator runways shown in Fig. 1.

Standard iron hardware: cam for open out ventilators within reach; pole ring and spring catch for open out ventilators, pole operated. Upper and lower open in ventilators have similar iron hardware. Bronze hardware and glazing angles same as for Architectural windows will be furnished when specified.

Shade bracket supports (Fig. 8) are furnished if specified.

Furnished with Underwriters' label, if specified, as explained below.

C WIDTH	3'-8"	4'-10 3/8"	6'-0 3/4"
B WIDTH	3'-2"	4'-2 3/8"	5'-2 3/4"
HEIGHT			
C 3'-5 3/8"			
B 3'-1 1/8"	3216	4214	5216
C 5'-2"			
B 4'-8"	33161	43141	53161
C 6'-10 3/8"			
B 6'-2 3/8"	34161 342360Z	44141 442240Z	54161 542360Z
C 8'-6 3/4"			
B 7'-8 3/4"	35161 352360Z	45141 452240Z	55161 552360Z
C 10'-3 1/8"			
B 9'-3 1/8"	36161 362360Z 362614	46141 462240Z	56161 562360Z 562614

Fig. 7. Standard Sizes of Commercial Projected Windows

Widths and heights given above are wall opening dimensions. Glass sizes: C = 14x20 in.; B = 12x18 in. Diagonal lines converging at top indicate open out ventilators. Diagonal lines converging at bottom indicate open in ventilators.

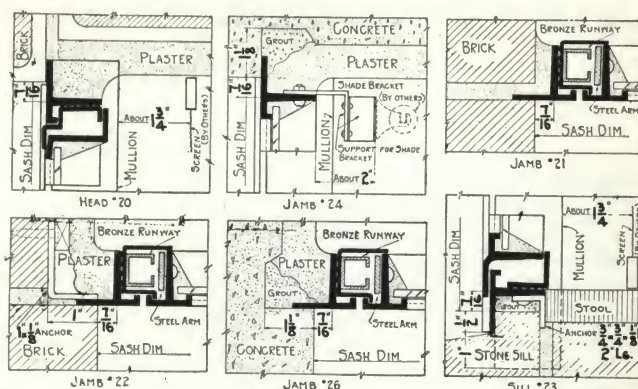


Fig. 8. Installation Details of Commercial Projected Windows

Head No. 20—Standard for brick construction. Window held in position by anchors, if specified. Position of screen indicated.

Head No. 24—Standard for concrete construction. Location of shade and shade bracket support indicated.

Jamb No. 21—Standard for brick openings without interior plaster.

Section shows bronze runway for open out ventilator.

Jamb No. 22—Standard for brick openings with interior plaster.

Section shows bronze runway for open out ventilator.

Jamb No. 26—Standard for concrete walls with interior plaster.

Section shows bronze runway for open out ventilator.

Sill No. 23—Standard for stone sill. Sills of concrete or brick are similar in detail. Position of screen indicated.

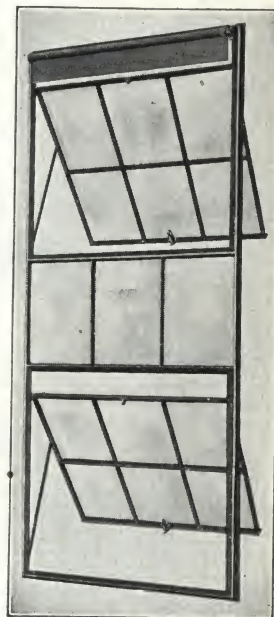
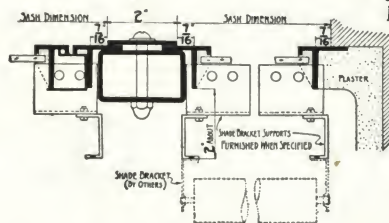


Fig. 9. Boca Commercial Projected Window with Open Out Ventilators



Vertical Tubular Mullion

The vertical mullion is used where mullion width is 2 in. Consists of an exterior 2-in. steel flat and an interior 2 1/2 x 1 1/2 in. tubular member. Interchangeable with Boca standard angle or tee mullions, but costs slightly more.

The horizontal tubular mullion shown at the right is of the same construction as the vertical tubular mullion, and is used in conjunction therewith. Horizontal mullions furnished only when specified.

Fig. 10. Boca Mullions for Commercial Projected Windows

These mullions have the same advantages as the mullions shown in Fig. 6. Note shade bracket support (furnished only when specified) which consists of an angle bracket and a channel extension.

Projected Windows Furnished with Underwriters' Label When Specified

Underwriters' requirements are: All ventilators must open out, not more than two ventilators may be used in one window, mullions must be steel tees bolted to the windows and secured to lintel and sill, all hardware must be of iron, exposed glass area must not exceed 350 sq. in. for any single light, glazing angles must hold glass in position.

Boca bronze runways always furnished with Underwriters' labeled windows.

Boca Solid Steel Pivoted Windows

Made of solid rolled steel members $1\frac{1}{4}$ in. deep. The patented Boca lock-joint produces an exceptionally rigid sash that will not get out of square; the metal is not distorted and the exterior surface is smooth and has a neat appearance.

Ventilators are horizontally pivoted 2 in. above their center. Patented continuous 3-point weathering at the sides and 2-point weathering at top and bottom of the ventilator are special features that give 100% weatherproof construction.

The vertical mullion consists of a $2\frac{3}{4}\times 1\frac{1}{2}$ -in. tee. This tee is occasionally reversed with the stem outside. Another vertical mullion consisting of 2-in. angle and a flat is frequently substituted for the tee mullion to give liberal installation adjustment. Structural horizontal mullions for supporting window units placed one above the other (detail 26) are only supplied when specified.

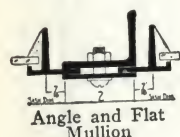
All details of the head, jams and sill sections of the Commercial Projected Windows, described on preceding page, apply to Boca Pivoted Windows.

Hardware consists of either a notched push bar with attachments, or a spring catch and chain. Four spring steel wire glazing clips are furnished for each light.

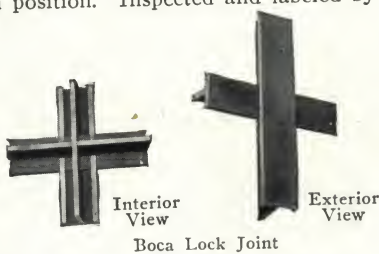
Boca Underwriters' Labeled Pivoted Windows—Same as Boca solid steel windows except that glazing angles are furnished to hold glass in position. Inspected and labeled by the Underwriters.



Tee Bar Mullion



Angle and Flat Mullion

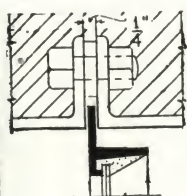
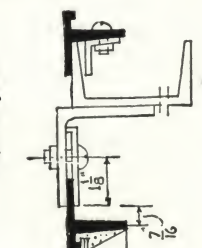


Interior View

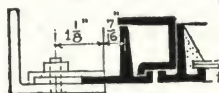
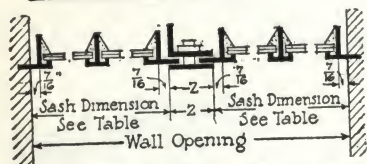
Exterior View

Boca Lock Joint

No of lights wide.	3	3	4	4	5	5
No of lights high.	2	3	4	5	6	7

Detail 24
HEADDetail 26
HORIZONTAL MULLION

Brick Construction

Detail 27
JAMB

Steel Construction

Details of Boca Solid Steel Pivoted Windows

Boca Steel Basement Windows

An exclusive Boca development. No hinges, no pins. Window easily removed from frame (from inside only) for cleaning or replacing glass.

Screwholes provided in frame for attaching screens. A special catch automatically locks the window when it is closed.

Type	Wall Openings		Lights glass	Type	Wall Openings		Lights glass
	Width	Height			Width	Height	
W1	2' 9 $\frac{1}{2}$ "	1' 3"	3-10"x12"	W3	2' 9 $\frac{1}{2}$ "	1' 11"	3-10"x20"
W2	3' 3 $\frac{1}{2}$ "	1' 9"	3-12"x18"	W4	2' 7 $\frac{3}{4}$ "	1' 11"	2-14"x20"

Boca Mechanical Sash Operators

Rack and Pinion Type—For operating continuous windows in any length, height of opening, or slope.

Rocker Shaft Type—For controlling ventilators in side-wall sash in runs or batteries.

Boca Steel Partitions

Constructed of regular Boca steel window units joined by mullions, with sheet steel panels in the lower sections. Built to meet the requirements of any building condition.

Boca Continuous Windows

Top hung and fixed type, for monitor, sawtooth, A-frame, foundry and other types of roof, also sidewalls. May be placed either vertically or sloping. Operated by mechanical operators, arms of which are attached to bottom rail of ventilated portion.

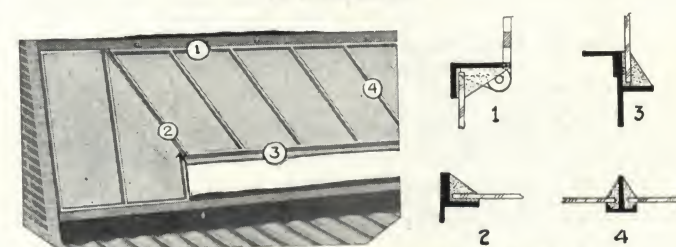
Made of rolled steel members with all joints acetylene welded. Standard panels are 20 ft. long and 3, 4 and 5 ft. high. Special lengths of 10 to 18 ft. can be supplied. Clips are supplied for holding glass in place.

	3'	4'	5'
Sash height.....	23 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "	23 $\frac{1}{2}$ "
Glass width.....	2' 10"	3' 10"	4' 10"
Glass height.....			

A storm panel forming part of a fixed panel directly back of the end light of the top hung panel gives weathering protection against slanting rains.



Types of Roofs Where Boca Continuous Windows Are Adaptable



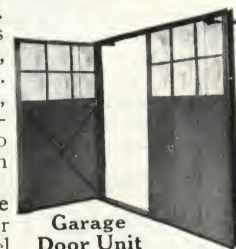
Weathering Features of Boca Continuous Windows

(1) Top rail and hinge. These weather back of girt angle at head of opening. (2) End of panel. Weathering flat used only at end of run. (3) Bottom rail of sash. Closes against girt angle at sill forming weathering. (4) Interior muntin bar. Welded to top and bottom rails.

Boca All-Steel Garage Door Unit

Made and shipped complete, including 4-in. steel channel frame on all four sides, foot bolt, chain bolt, automatic door holders, door latch and pull handles. Each unit comes in four pieces—2 doors with 4-in. jamb channel frame attached, one head channel and one sill channel. Fireproof; do not warp, sag nor bind, and cost approximately the same as old-fashioned wood doors. In two sizes to fit wall openings 8 ft. wide x 8 ft. high and 8 ft. wide x 7 ft. 6 in. high.

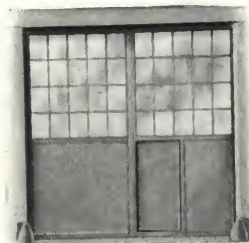
Boca Side Entrance Steel Garage Door—This single door is of similar construction, with 3-in. steel channel frame on all four sides to fit wall opening 2 ft. 8 in. wide x 6 ft. 8 in. high. Complete with lock and other hardware.



Garage Door Unit



Single Swing-ing Door



Double Sliding Door

Boca Industrial Steel Doors

For factories, public garages, etc., or wherever steel doors with glass panels are required.

Hinged doors are complete with standard handle, knob and bronze lock; sliding doors with standard bow handle, foot and chain bolt, hasp and staple and overhead track and hangers.

The standard sizes of single swinging doors given are inside dimensions of steel channel door frames. For single sliding and double sliding doors, the standard sizes given are 3 in. wider and $1\frac{1}{2}$ in. higher than the actual door opening to provide for overlap at head and jambs.

SINGLE SWINGING AND SLIDING		DOUBLE SWINGING AND SLIDING	
Width	Height	Width	Height
2' 6"	7' 0"	5' 0"	7' 0"
3' 0"	7' 0"	6' 0"	7' 0"
3' 6"	7' 6"	7' 0"	7' 6"
4' 0"	8' 0"	8' 0"	8' 0"
5' 0"	10' 0"	10' 0"	10' 0"

MESKER BROTHERS IRON COMPANY

Manufacturers of Solid Steel Sash
Solid Metal and Hollow Metal Windows
ST. LOUIS, MO.

Products

SOLID SECTION STEEL SASH
Cruciform and Tee Bar
Top or Center Pivoted
Reversible Ventilators
Labeled or Non-labeled
Solid Steel Monitor Sash
Mechanical Operators

SPECIAL KINDS STEEL SASH
Steel Casement Windows
Steel Basement Windows
Continuous Top Hung Sash
Steel Garage Windows
Dalite Coal Windows

SOLID ROLLED METAL WINDOWS
Double Hung
Counterbalanced
Labeled or Non-labeled

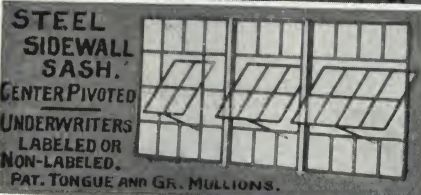
HOLLOW METAL WINDOWS
Double Hung
Counterbalanced
Pivoted
Casement
Stationary
Labeled or Non-labeled

DOORS
Solid Steel
Kalamein
Metal Covered

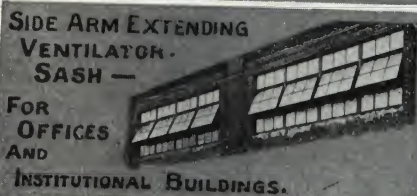
STAIRS
Steel and Concrete
Spiral Stairs
Fire Escapes
Fire Slides



SEVEN-WAL GARAGE, ST. LOUIS, MO.



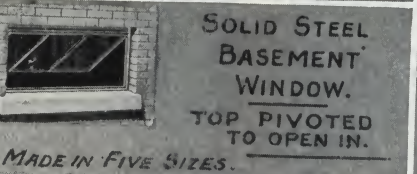
**STEEL
SIDEWALL
SASH.**
CENTER PIVOTED
UNDERWRITERS
LABELED OR
NON-LABELED.
PAT. TONGUE AND GR. MULLIONS.



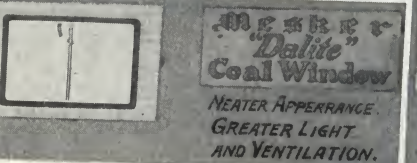
**SIDE ARM EXTENDING
VENTILATOR
SASH —**
FOR
OFFICES
AND
INSTITUTIONAL BUILDINGS.



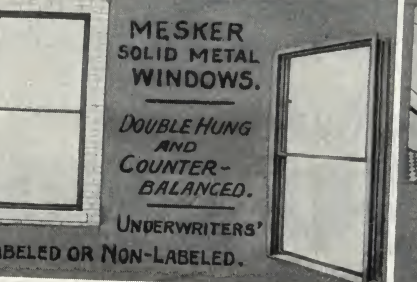
**SOLID STEEL
CASEMENT
WINDOWS**
FOR
COTTAGES
RESIDENCES
APARTMENTS.
WEATHERSTRIPPED.



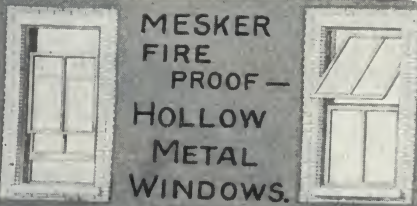
**SOLID STEEL
BASEMENT
WINDOW.**
TOP PIVOTED
TO OPEN IN.
MADE IN FIVE SIZES.



**Mesker
"Dalite"
Coal Window**
NEATER APPEARANCE.
GREATER LIGHT
AND VENTILATION.



**MESKER
SOLID METAL
WINDOWS.**
DOUBLE HUNG
AND
COUNTER-
BALANCED.
UNDERWRITERS'
LABELED OR NON-LABELED.



**MESKER
FIRE
PROOF —
HOLLOW
METAL
WINDOWS.**

DOUBLE HUNG, PIVOTED OR CASEMENT.
GALVANIZED STEEL OR COPPER.

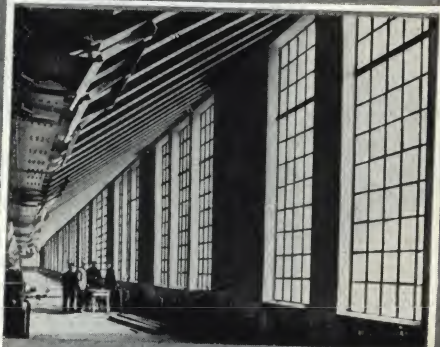


**MESKER
PATENT
STEEL
STAIRS**
QUALITY
DURABILITY
APPEARANCE

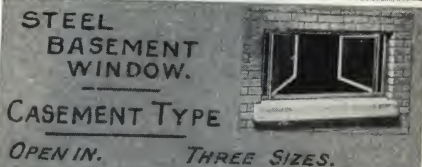
CONCRETE, MARBLE, SLATE OR
COMPOSITION TREADS.
ALL STEEL NEWELS.



UNION STATION, ST. LOUIS, MO.



STANDARD OIL CO. PLANT WOODRIVER, ILL.



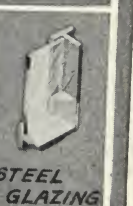
**STEEL
BASEMENT
WINDOW.
CASEMENT TYPE**
OPEN IN. THREE SIZES.



**RUSTLESS
PIVOT.**



**TONGUE AND
GROOVE
MULLION.**



**STEEL
GLAZING
CLIP.**



**TWO WAY
MORTISE
AND TENON
JOINT.**



**SASH
CORNER
BENT
ROUND.**



**SASH
CORNER
BENT
ROUND.**

Mesker's New Sash

Heavier Sections

Arc Welded

Inside or Outside Glazing

DURABILITY
and **GLAZING**
Prominent Engineers say-

*"Sash made of
"Cruciform Bar" sections
permits of outside glazing-
which is a decided advan-
tage in that it provides a
means of maximum pro-
tection to the surfaces
of the sash exposed to the
weather reducing deterio-
ration, which is difficult
to prevent even by frequent
and careful painting."*

PATENT APPLIED FOR

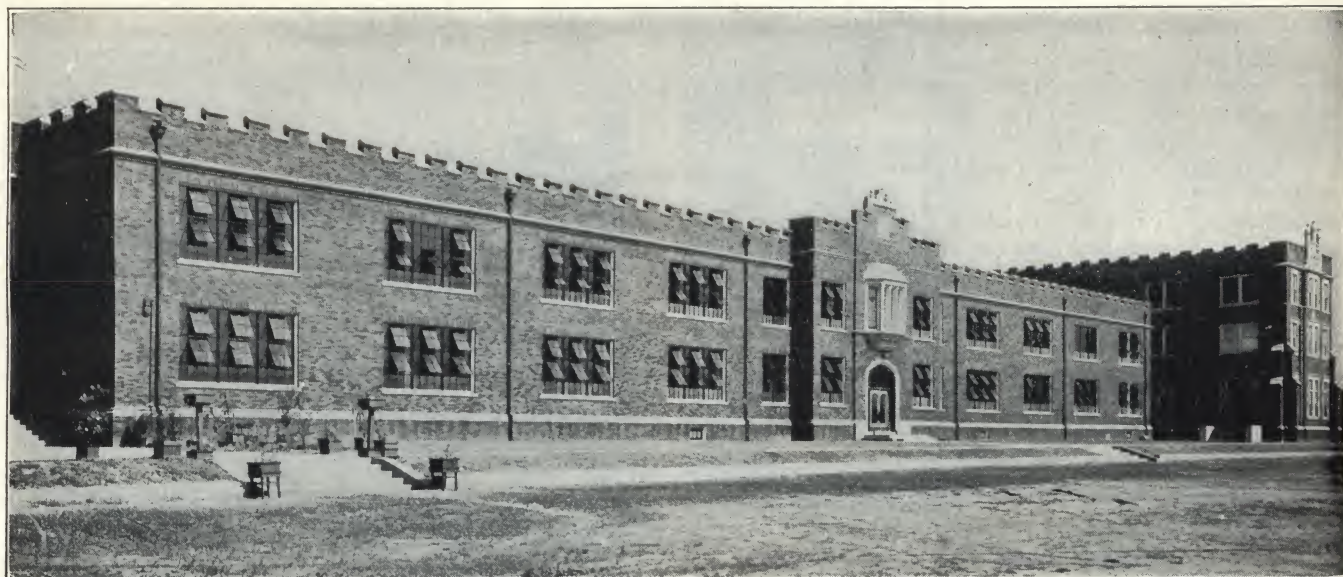
and now

Added Weight
Strength
Rigidity

No Grouting
No Outside Painting
No Leakage

Indestructible from Rust or Corrosion

MESKER **⊕** **CRUCIFORM**



St. Louis University High School Building

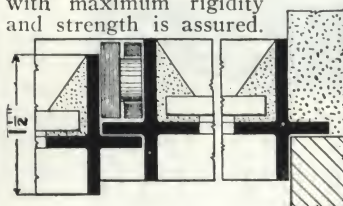
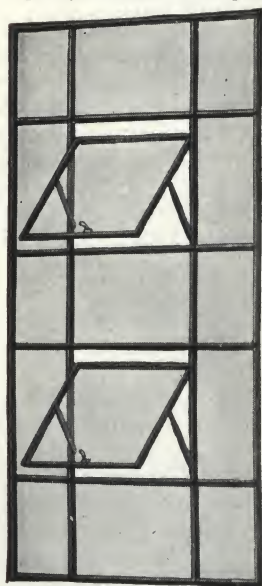
Peter Goulet, Contractor

Mesker's New Sash (Cruciform Type)—Extra Heavy

Not only has sufficient weight been added to this type of sash to make it equal to any on the market but the following principles underlying its construction insure a quality product throughout. Made from solid rolled steel sections of $\frac{1}{8}$ -in. stock, 1 in. by $1\frac{1}{2}$, the vertical or horizontal bars being solid. *No cut outs* of any kind to impair the rigidity of the sash as a whole. All joints and intersections are interlocked and thoroughly *arc welded* giving it excessive strength and rigidity. Handwork practically eliminated in the assembly resulting in uniform perfect fitting. Can be furnished with or without Underwriters Label.

Welding

The sash are assembled in a jig and electrically *arc welded* with Lincoln welders. This process not only gives a perfect fit through the accuracy of the jig which makes all corners true and square, but also causes the sash to become practically one continuous section without any joints. Thus a perfect fit with maximum rigidity and strength is assured.



Outside Glazing

This type of sash permits outside or inside glazing or both. With outside glazing the metal is protected from weather contact by the putty, as merely the thickness of the bars ($\frac{1}{4}$ in.) would be exposed thereby minimizing deterioration through rust and corrosion. Exterior painting is practically dispensed with.

Weathering (Single Contact)

On all types of Mesker Pivoted Windows flat surface contact is used unless otherwise specified. A continuous flat weatherproof contact of $\frac{3}{8}$ -in. around all sides of Ventilator is given except at bottom of Ventilator where two point contact is employed.

Double Contact

This type of weathering furnished on all Extending or Projected types of windows as well as Casements. Can be furnished on Pivoted Types if so specified.

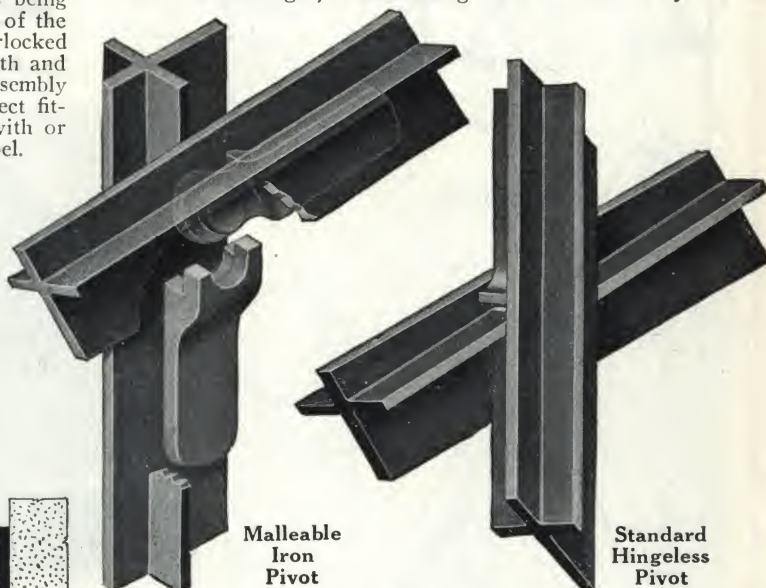
Bronze Weather Stripping

Our patented spring bronze weather strip is a perfect weathering appliance, giving assurance of absolute tightness,

preventing rattle and is wind and dust proof. Furnished only when specified.

Pivots

Standard Pivot—This pivot is simple in construction. It can not rust tight, and breaking off is eliminated by the fact

Malleable
Iron
PivotStandard
Hingeless
Pivot

that the ears, upon which the ventilator rides, are welded to the frame bar of the ventilator. The Ventilator may be removed at will for cleaning or glazing.

Malleable Iron Pivot—The pivot as shown in the sketch is very similar to the above described pivot in its action. The bearing surface is much larger giving smoother operation. It is so constructed as to make the ventilator and the frame practically as solid as one piece and yet when in the proper position the ventilator may be easily removed. This pivot is cast in two pieces and is welded to the sash. There is nothing in its construction to cause it to stick, bind or break.

Specifications

All sash shall be Mesker's as made by MESKER BROS. IRON CO., St. Louis, Mo. All muntin bars shall be made from solid rolled steel sections $1\frac{1}{2}$ in. deep. The vertical or horizontal bar must be solid. *No cut outs* of any kind. All joints and intersections shall be formed by a dovetail wedge and mitre which is to be locked into place and thoroughly *arc welded*.

All ventilators shall be horizontally pivoted by means of our standard pivot unless otherwise specified. $\frac{3}{8}$ -in. lap weathering shall be employed at all points of contact except at bottom where two point contact shall be used. Double contact throughout can be furnished if so specified.

Hardware—Push bars are to be furnished with all ventilators unless otherwise specified. Ventilators inaccessible to the floor shall be operated by cam lock and chain unless otherwise specified.

Mullions—Vertical mullions shall be Mesker patented tongue and groove type, made from open hearth steel plates.

Painting—All sash and mullions to be given one dip coat of grey mineral paint before shipping.

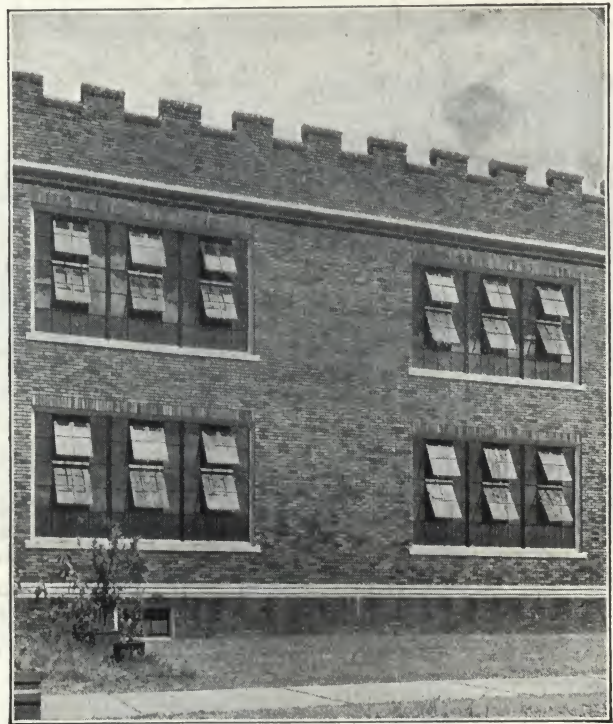
Glazing—All glazing to be done under another contract.

The Mesker Architectural Sash with Reversible Extending Ventilators

Utility—The great advantage in the adoption of the Mesker Cruciform Steel Sections is seen in their application to the Architectural type sash with reversible extending ventilators, illustrated on this page.

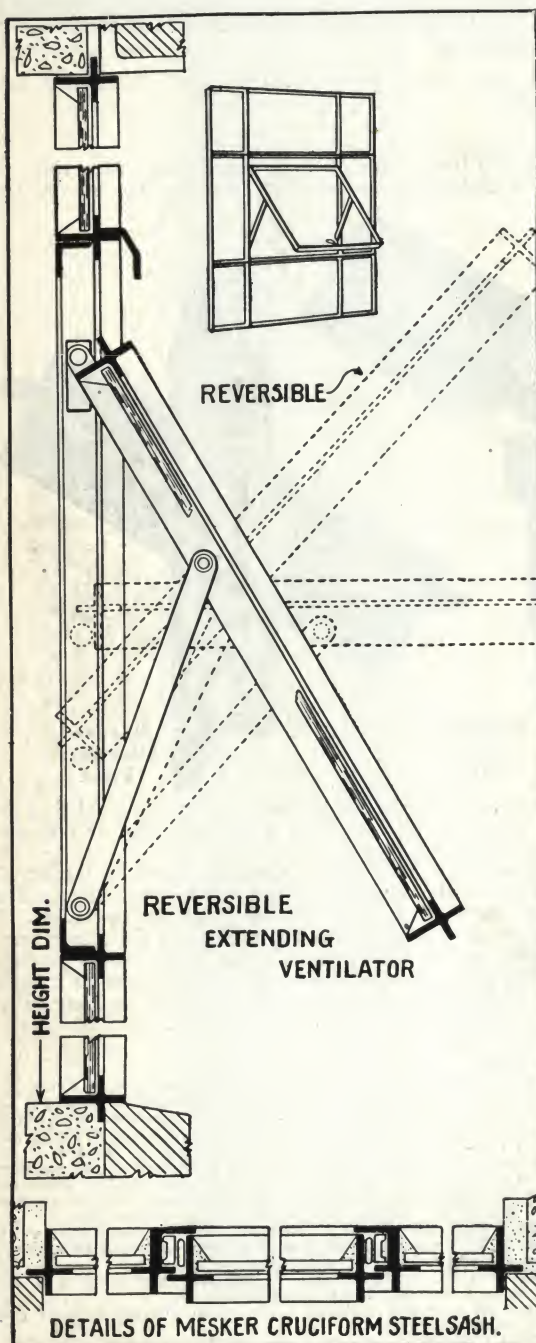
Besides the larger sash units permissible by the use of these heavy steel sections, the ventilators and glass are arranged for more artistic designing to harmonize with finer class of building, as well as for architectural beauty.

Ventilation—The Mesker Reversible Extending Ventilators are a wonderful improvement over the center pivoted industrial type. They are balanced on a pair of extending arms and secured to vertically sliding bronze friction shoes which perfectly function for the smoothest action of the reversible ventilator. Double contact weathering obtains all around the ventilator opening, and the extending side arms are entirely concealed when ventilator is closed.



Mesker Cruciform Reversible Sash

Installed in east and west elevations of St. Louis University High School. 900 lineal feet



GLASS 36"	9' 30" 9'	12' 36" 12'	18' 36" 18'
A1	A2	A3	A4
B1	B2	B3	B4
C1	C2	C3	C4
D1	D2	D3	D4
3'-0"	4'-1 1/4"	5'-1 1/4"	6'-1 1/4"
5'-7 1/4"	6'-7 1/4"	8'-1 5/8"	9'-8"
18' 30" 18'	24' 30" 24'	18' 30" 18'	18' 30" 18'

Outside Glazing—(See second preceding page.) Outside glazing minimizes the exposure of metal to weather, thereby reducing the possibility of rust or corrosion, and almost entirely eliminates painting and maintenance expense.

Outside glazing develops the greatest opportunity for interior color finish and for decorative art.

Inside or Outside Glazing (Patent Applied For)—Mesker Sash, constructed of cruciform or standard steel sections, are adapted for either inside or outside glazing as preferred by the owner, when ordering, at small extra cost.

The new and improved architectural tongue and groove mullions are standard with either type of glazing, but can be improved with inside cover plate.

Dimensions—The unit sizes vary slightly from the Mesker Standard Industrial Type. By conforming to these sizes, the window designer will be assisted in his lighting layout—with the use of Mesker tongue and groove mullions for openings of any dimensions required for large or small buildings.

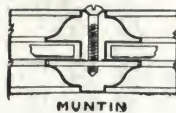
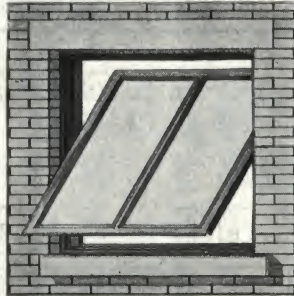
Mesker Fireproof Hollow Metal Windows

Approved by the National Board of Fire Underwriters. Suitable for new and old buildings. Designed along the same lines and contain the same glass area as wood windows. Frames and sash of No. 24 gauge galvanized steel or 20-oz. copper. Concreting of subsill must be done at building.

Underwriters' label is a guarantee that windows comply with every requirement and are accepted everywhere by rating bureaus as standard. Removal and replacement of sash is accomplished as easily as in wood windows, an important cost factor.

Glass—Must not exceed 720 sq. in. exposed area per light and no light longer than 54 in., except for windows in street elevations where such light is limited to 2916 sq. in.

Transoms—Hinged, pivoted or stationary types may be used over all windows or multiples. Transom bars are all sheet metal for windows 10 ft. high and under.



Mesker Solid Metal Window Double Hung and Counterbalanced Labeled and Non-labeled

Double Hung—Construction—Frames are made of No. 16 gauge or heavier, if required, to No. 20 gauge blue annealed steel, No. 24 gauge galvanized steel, or from 18 oz. to 48 oz. cold rolled copper.

Sash—Are of solid rolled steel, or bronze No. 10 gauge.

Glass—Large lights are permitted in non-labeled windows secured in place with steel glazing clips and putty.

Access—To weights is obtained by removing the grooved plates in the jambs.

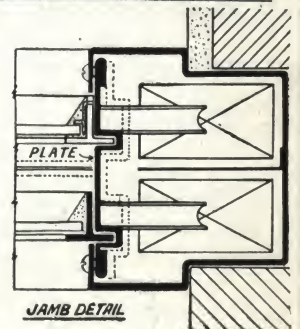
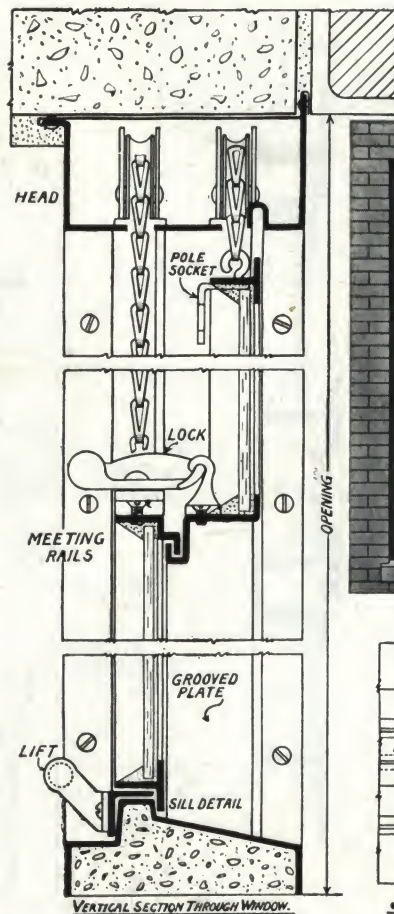
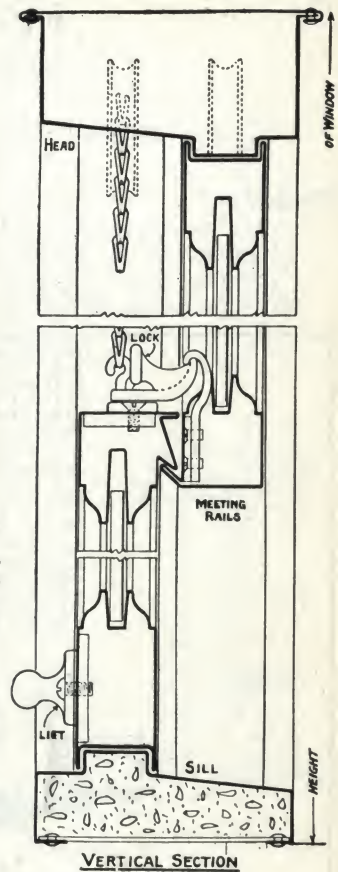
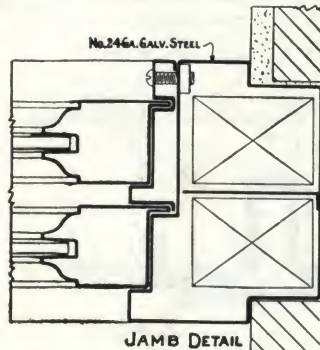
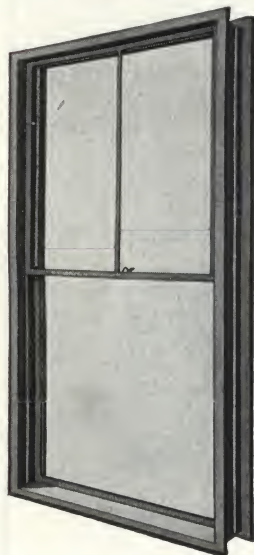
Underwriters' Labeled Windows—Have frames of No. 15 gauge blue annealed steel or No. 24 gauge galvanized steel.

Sash—Are of solid rolled steel. The windows are specially designed and constructed to meet the requirement of the National Board of Fire Underwriters' specifications and their label is attached to each window.

Glass—Is held in place with steel glazing angles.

Counterbalanced Windows—Are made of same material as the double hung. They have no sash weights but the two sashes are balanced one against the other, supported by chains running over pulleys in the window head.

Practical in operation, they give ready ventilation, when needed, through openings at the head and sill simultaneously. They are absolutely weather-proof when closed and locked.



FEDERAL STEEL SASH COMPANY

Manufacturers of Welded Solid Steel Windows

WAUKESHA, WIS.

CHICAGO OFFICE, 165 Wacker Drive

NEW YORK OFFICE, 103 Park Avenue

Sales Representatives in Principal Cities

Products

WELDED SOLID STEEL PIVOTED WINDOWS.

WELDED SOLID STEEL STORE FRONT WINDOWS.

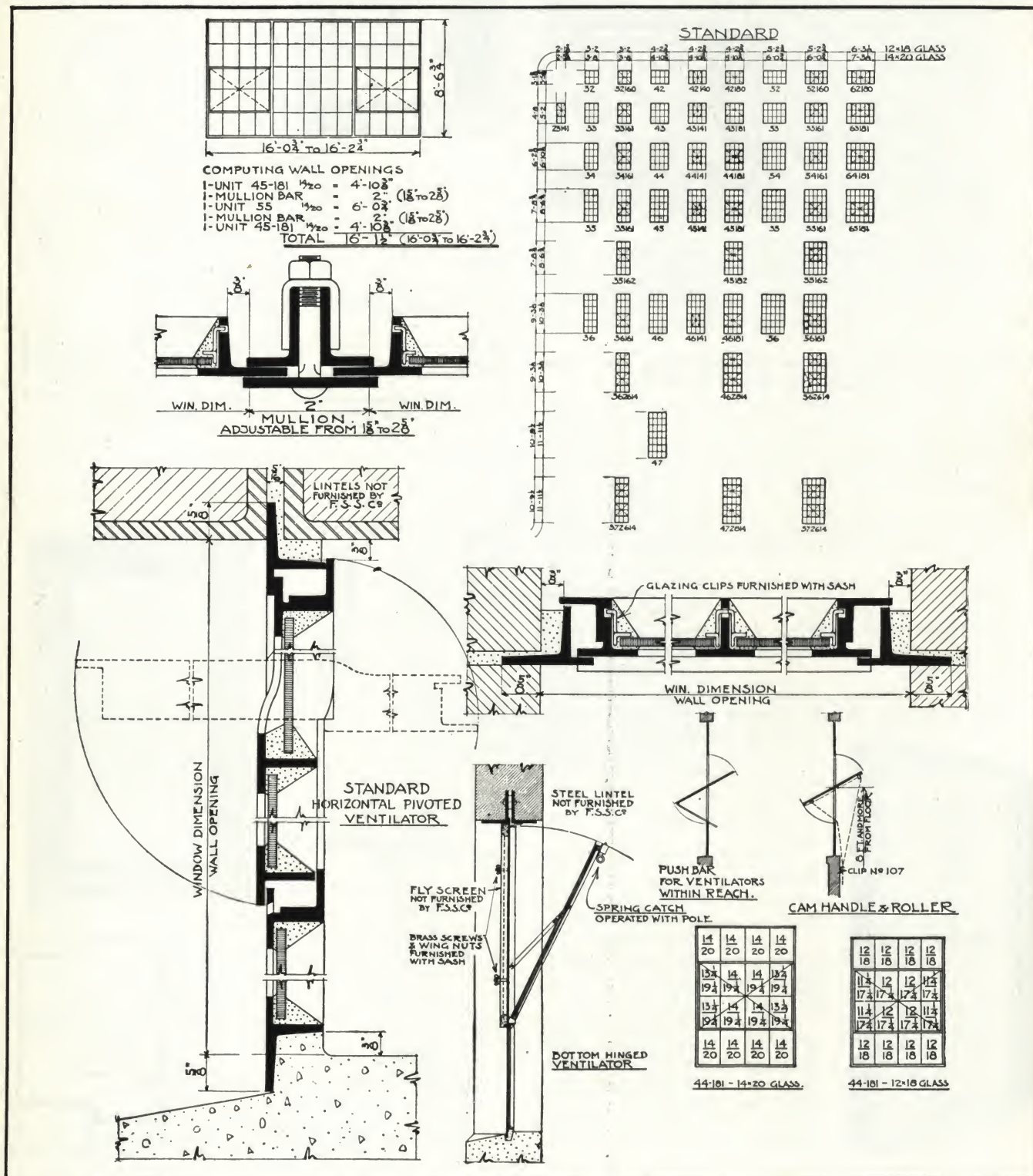
WELDED SOLID STEEL CONTINUOUS WINDOWS.

WELDED SOLID STEEL BASEMENT WINDOWS.

WELDED SOLID STEEL RIDGE VENTILATED SKY-
LIGHTS.

WELDED SOLID STEEL COMMERCIAL and ARCHITECTURAL PROJECTED WINDOWS.

WELDED INDUSTRIAL DOORS.



Federal Welded Solid Steel Pivoted Windows

Federal Welded Solid Steel Pivoted Windows

Federal construction of solid rolled copper steel with welded joints insures not only the greatest possible strength, but what is equally important, a window absolutely square and true; one which cannot be racked out of shape by careless and rough handling or warped by settlement of the building walls or foundation.

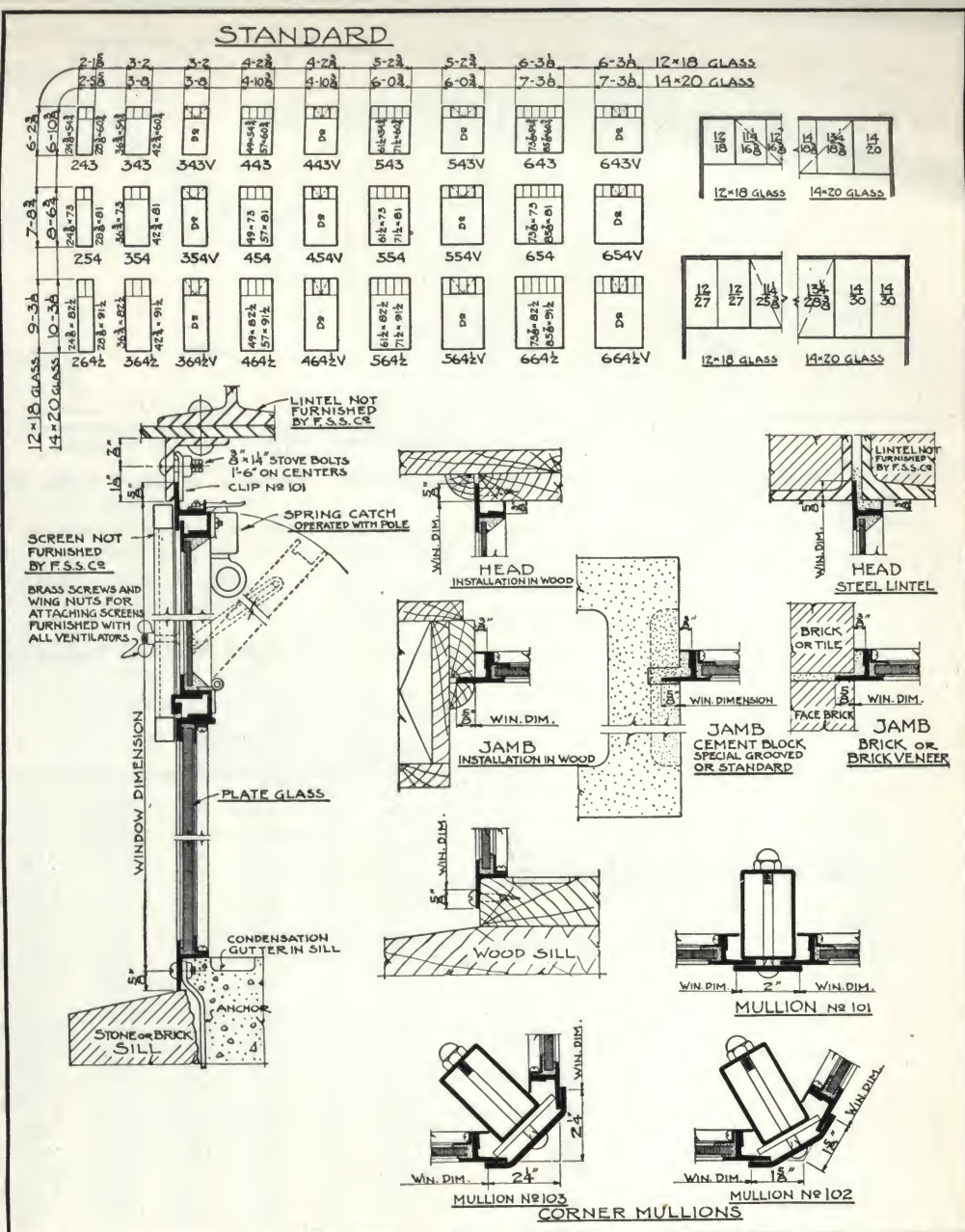
All joints are welded, making the window one complete steel structure. The individual pieces are assembled in a fixed form before joints are welded, insuring perfect squareness and accurate dimensions.

The weather side, which withstands the action of the elements, is flush and smooth. This improves the appearance of the windows and prevents dirt, dust and moisture collecting, and the resulting corrosion of steel.

Ventilator Operation

—By push bar or cam latch and chain, as desired. The push bar is attached to the ventilator by a substantial double hinge. When closed, bar folds back against the window, slips over a locking piece and securely locks the ventilator. The cam latch is operated by a chain over a roller at the head of the ventilator.

Underwriters' Labeled Windows—Underwriters' windows with glazing angles are furnished in this type.



Federal Welded Solid Steel Store Front Windows

Federal Welded Solid Steel Store Front Windows

Made of solid rolled steel, all joints electrically arc-welded into one solid structure, insuring a rigid unit and eliminating glass breakage. Gives maximum light and reduces area of plate glass required.

All ventilators double weathered with pole operated latches. Can be screened without interfering with ventilator.

Have no ledges or projections to collect dirt or moisture or interfere with painting. Can be combined by adding mullions to give combinations to meet local conditions.

Small lights held by spring wire glazing clips and steel window putty. Large plate glass is back puttied and secured by continuous glazing angles firmly screwed to the frame members.

Federal Welded Solid Steel Ridge Ventilated Skylights

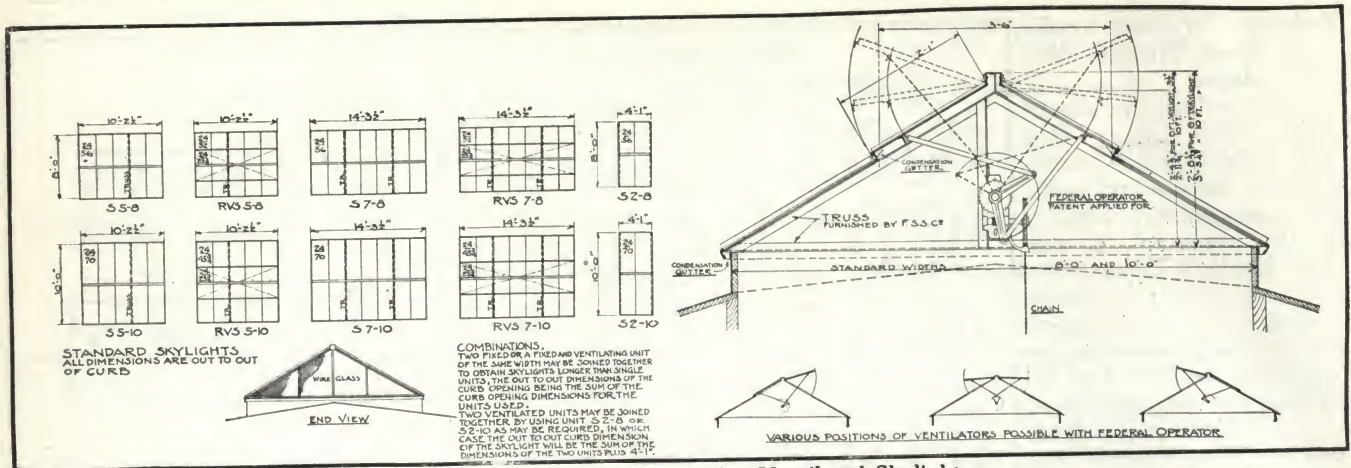
Will not rack out of shape, warp, bind or shrink. Always square and true, eliminating glass breakage. End panels are glazed, giving additional lighting.

Operators, in the case of ventilated units, control both leaves with the motion of the chain in one direction only, giving any of the positions shown.

Easily and quickly erected with ordinary tools and without skilled labor.

Glazed from the outside with continuous glass stops provided at the bottom of the lights.

Shipped complete (except for glass) including condensation gutters, all screws, bolts, etc., needed for erection, also complete erection instructions and diagrams.



Federal Welded Solid Steel Ridge Ventilated Skylights

Federal Welded Solid Steel Commercial and Architectural Projected Windows

Designed for public and semipublic buildings, such as hospitals, courthouses, schools, libraries, hotels, apartment buildings and similar structures. They have all the advantages of the solid steel pivoted windows and at the same time their lines permit the architect to give a pleasing effect to the window openings. Ventilators open from the head down and project from the sill out. The head of the ventilator is also provided with a wide drip plate.

Small ventilators at sill are bottom hinged, swing in, with stay bars at each jamb, which construction prevents direct draft at the sill when ventilator is open.

Federal Welded Solid Steel Basement Windows

The same rigid design. Shipped complete with glazing clips, cam lock and mason guides.

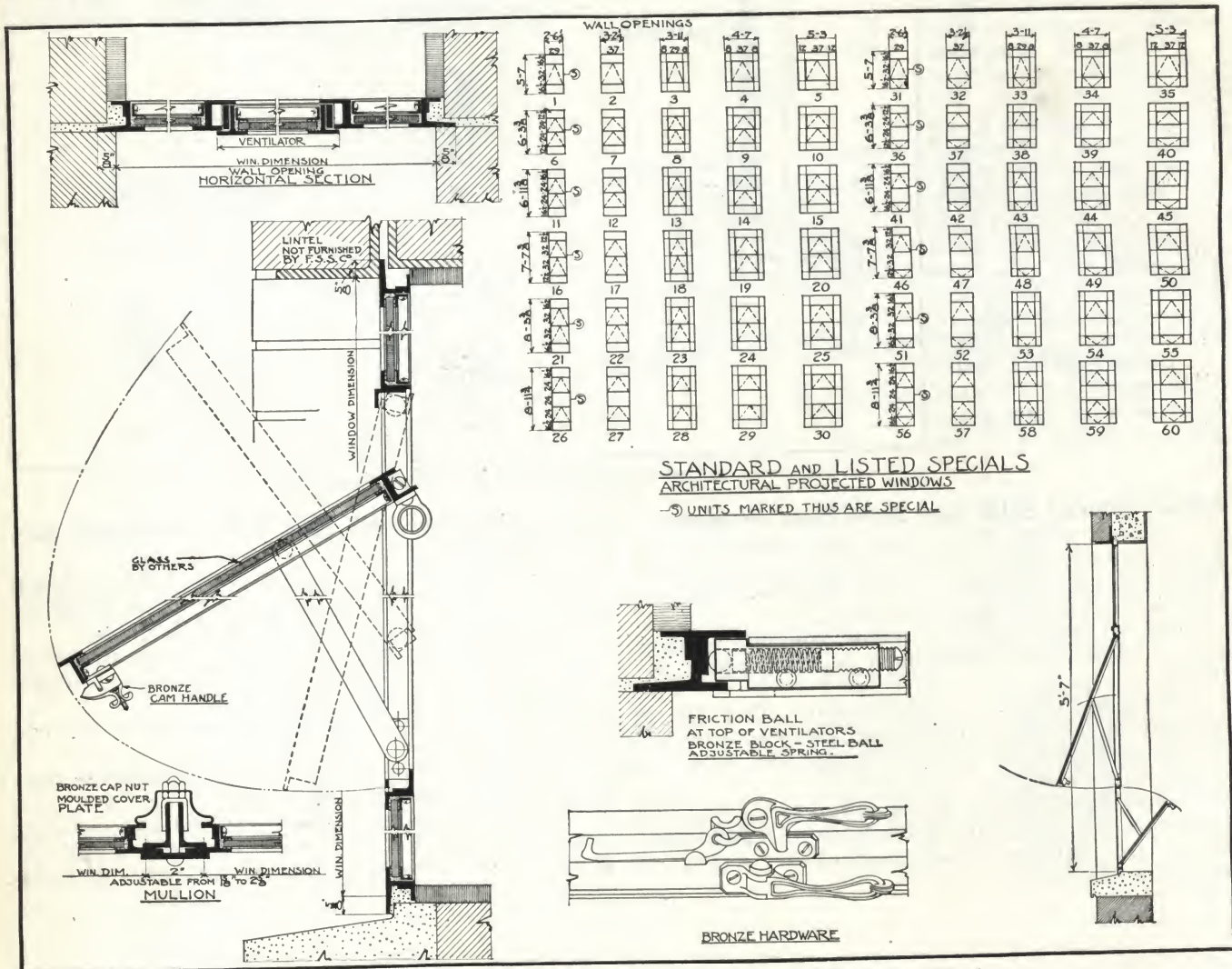
Made in the following sizes:

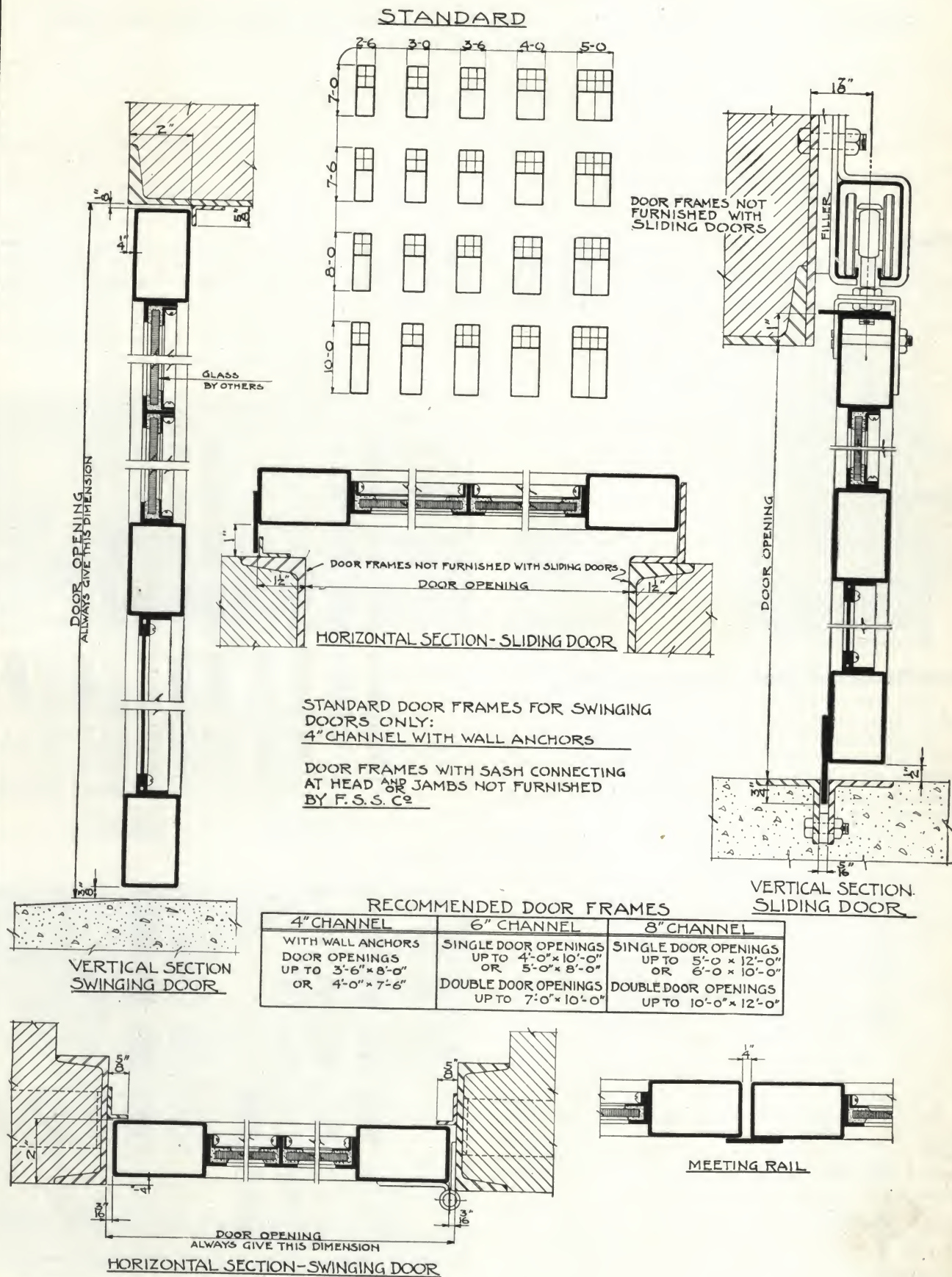
3-light, 10x12-in. glass. 3-light, 10x20-in. glass.
3-light, 10x16-in. glass. 2-light, 14x20-in. glass.

Federal Welded Industrial Doors

Made in both swinging and sliding types from drawn steel tubing, with all corners mitered and all joints electric-welded.

See illustration for details.





J. S. THORN COMPANY

Manufacturers of Solid Steel Windows, Continuous Steel Sash and Sash Operating Devices

Allegheny Avenue and Twentieth Street
PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y., 21 East 40th Street

BOSTON, MASS.

Products

STANDARD PIVOTED SIDEWALL STEEL SASH.

PROJECTED and REVERSIBLE STEEL SASH.

CONTINUOUS STEEL SASH.

SASH OPERATING DEVICES: Hand and Motor Driven.

STEEL BASEMENT SASH.

Also Steel Partitions and Doors, and Rolled Steel Skylights.

For Steel Casements, see pages A1056-1057.

Catalogues

Thorn Pivoted Sash—F.S-5.

Thorn Casements, Medium and Heavy Type—M.H-1.

Thorn Manor Casements—M.C-1.

Thorn Residence Casements—R.C-3.

Thorn Sash Operating Devices.

Thorn Rolled Steel Skylights.

Thorn Standard Pivoted Sidewall Steel Sash

This type of window is for use in factories, mills, powerhouses, garages, etc.

Made of solid rolled steel moulded members $1\frac{3}{8}$ in. deep. Muntins at intersections are mitered and electrically welded, making neat flush joints of pleasing appearance, and a very rigid sash that will not easily be racked out of square.

Ventilators in standard sash are pivoted 2 in. above center on heavy wrought iron hinges double riveted to sash members, and form a double contact weathering at top, bottom and sides. Ventilators within reach of floor are operated by stay bar, and those higher up are controlled by spring catch and chain.

The jamb members of all standard sash are punched with horizontally slotted holes for connection to T-bar mullions when used in openings requiring two or more units. The T-bar mullions have vertically slotted holes, and can be readily attached outside the sash with stem projecting either inward or outward. The necessary bolts and washers are furnished with mullions.

Standard sash are furnished only in 12x18 and 14x20-in. glass sizes. These glass sizes, however, occur only in the stationary portion of the sash. In the ventilators, all the lights at the top and bottom are 1 in. shorter, and all the lights at the sides are 1 in. narrower than in the stationary portion of the sash.

Thorn standard pivoted sash are given one shop coat of paint. Two additional coats of paint should be given all sash after erection. Before glazing, all hardware should be applied to ventilators, and should operate properly. Each light of glass is held by four spring clips, which are furnished with the sash.

Dimensions of sash shown are measured from a

THORN

STEEL WINDOWS

point $\frac{1}{2}$ in. in from the edge of the out-standing leg, and wall openings should be held to these dimensions. Where mullions occur, add 2 in. for each mullion.

STANDARD STEEL SASH UNITS											
3 LIGHTS WIDE S 12x18 glass 3'-2" T 14x20 glass 3'-8"						4 LIGHTS WIDE S 12x18 glass 4'-2" T 14x20 glass 4'-10"					
1 LIGHT HIGH S 12x18 - 1'-7" T 14x20 - 1'-9"	S 3113 T 3113						S 4114 T 4114				
2 LIGHTS HIGH S 12x18 - 3'-1" T 14x20 - 3'-5"	S 32 T 32	S 3216 T 3216					S 42 T 42	S 4214 T 4214	S 4218 T 4218		
3 LIGHTS HIGH S 12x18 - 4'-8" T 14x20 - 5'-2"	S 33 T 33	S 3316 T 3316					S 43 T 43	S 4314 T 4314	S 4318 T 4318		
4 LIGHTS HIGH S 12x18 - 6'-2" T 14x20 - 6'-10"	S 34 T 34	S 3416 T 3416	S 34162 T 34162				S 44 T 44	S 4414 T 4414	S 4418 T 4418	S 44182 T 44182	
5 LIGHTS HIGH S 12x18 - 7'-9" T 14x20 - 8'-6"	S 35 T 35	S 3516 T 3516	S 35162 T 35162				S 45 T 45	S 4514 T 4514	S 4518 T 4518	S 45182 T 45182	
6 LIGHTS HIGH S 12x18 - 9'-3" T 14x20 - 10'-3"	S 36 T 36	S 3616 T 3616	S 36163 T 36164	S 36264 T 36264			S 46 T 46	S 4614 T 4614	S 4618 T 4618	S 46183 T 46184	S 46284 T 46284
7 LIGHTS HIGH S 12x18 - 10'-9" T 14x20 - 11'-11"	S 37 T 37	S 3716 T 3716	S 37164 T 37164	S 37264 T 37264			S 47 T 47	S 4714 T 4714	S 4718 T 4718	S 47184 T 47184	S 47284 T 47284
5 LIGHTS WIDE S 12x18 glass 5'-2" T 14x20 glass 6'-0"						6 LIGHTS WIDE S 12x18 glass 6'-3" T 14x20 glass 7'-3"					
1 LIGHT HIGH S 12x18 - 1'-7" T 14x20 - 1'-9"	S 5113 T 5113						S 62 T 62	S 6218 T 6218			
2 LIGHTS HIGH S 12x18 - 3'-1" T 14x20 - 3'-5"	S 52 T 52	S 5216 T 5216					S 63 T 63	S 6318 T 6318			
3 LIGHTS HIGH S 12x18 - 4'-8" T 14x20 - 5'-2"	S 53 T 53	S 5316 T 5316					S 64 T 64	S 6418 T 6418	S 64182 T 64182		
4 LIGHTS HIGH S 12x18 - 6'-2" T 14x20 - 6'-10"	S 54 T 54	S 5416 T 5416	S 54162 T 54162				S 65 T 65	S 6518 T 6518	S 65182 T 65182		
5 LIGHTS HIGH S 12x18 - 7'-9" T 14x20 - 8'-6"	S 55 T 55	S 5516 T 5516	S 55162 T 55162				S 66 T 66	S 6618 T 6618	S 66183 T 66184	S 66284 T 66284	
6 LIGHTS HIGH S 12x18 - 9'-3" T 14x20 - 10'-3"	S 56 T 56	S 5616 T 5616	S 56163 T 56164	S 56264 T 56264			S 67 T 67	S 6718 T 6718	S 67184 T 67184	S 67284 T 67284	
7 LIGHTS HIGH S 12x18 - 10'-9" T 14x20 - 11'-11"	S 57 T 57	S 5716 T 5716	S 57164 T 57164	S 57264 T 57264							

In openings where mullions occur add 2" for each mullion

Shaded units carried in stock assembled ready for immediate shipment. Other units carried in stock in knocked down condition ready for assembly.

Thorn Standard Pivoted Steel Sash

Thorn Underwriters' Pivoted Sash

Thorn standard pivoted sash bearing the Underwriters' label can be furnished in any type not exceeding 7x12 ft., either dimension being taken as width or height.

These sash must have continuous glazing angles and special clips on ventilators, and are inspected and labeled before leaving factory.

These sash must be glazed with $\frac{1}{4}$ -in. wire glass.

Thorn Projected Steel Sash

Designed for use in schools, hospitals, offices, banks, apartments, etc.

Ventilators are arranged to slide on pivots with friction adjustment, and held in perfect balance by side arms.

Ventilators are made to open in at top or out at bottom, and can be made reversible to permit washing from the inside of building.

Ventilators in projected type sash should not exceed 36 in. in width and 34 in. in height.



Thorn Projected Steel Sash

Thorn Continuous Steel Sash

Designed for monitors, sawtooth construction and sidewalls of foundries, forge shops, powerhouses, and other heat and gas producing buildings.

Made of special solid rolled steel sections and hung on heavy malleable iron hinges.

Standard panels carried in stock 3, 4, 5 and 6 ft. high, that will make up any continuous length. End



Typical Installation of Thorn Steel Sash

Thorn standard pivoted steel sash in sidewall, also Thorn continuous steel sash and Thorn sash operating device in monitor

panels and storm panels keep rain from entering building while sash are open.

All joints are riveted and welded.

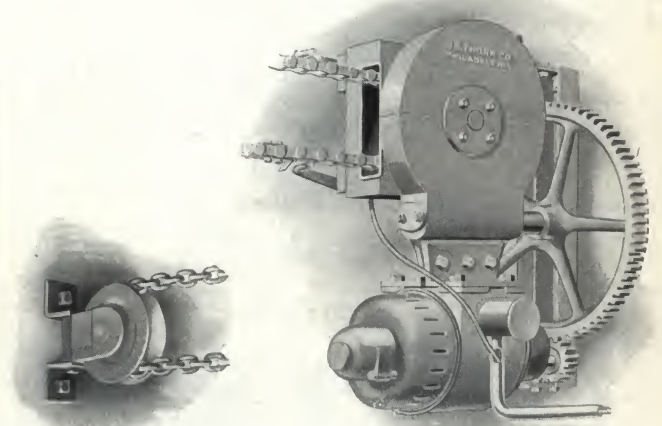
Thorn Sash Operating Devices

Thorn worm and gear rocker arm operator is furnished for operating short runs of pivoted sidewall sash, manually.

Thorn tension pivoted sash operator is designed for operating long runs of pivoted sidewall sash, either manually or electrically.

Thorn continuous sash operator is designed for use on long runs of top hung Thorn continuous sash, and can be operated either manually or electrically.

All parts of the tension devices are of wrought steel and malleable iron, and all gears are cut steel. All motor driven devices are equipped with automatic limit switches.

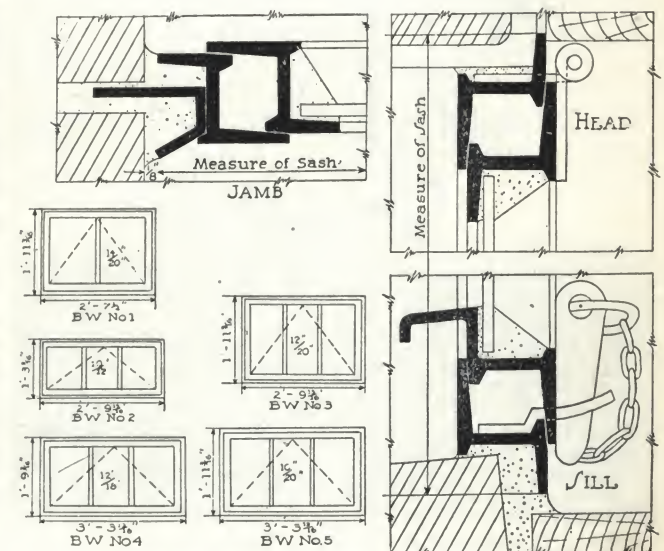


Idler

Thorn Motor Driven Power

Thorn Steel Basement Sash

Made from specially rolled casement sections, which form a double contact weathering. Shipped with all hardware attached ready for installation. Give more daylight than wood windows, are fireproof, and will not warp, swell or stick. Cost compares very favorably with wood. Standard types shown below.



Thorn Standard Steel Basement Sash

TRUSCON STEEL COMPANY

Manufacturers of Steel Windows and Doors

YOUNGSTOWN, OHIO

WAREHOUSES AND OFFICES IN ALL PRINCIPAL CITIES

RAILROAD DEPARTMENT, 228 North La Salle Street, CHICAGO, ILL. FOREIGN TRADE DIVISION, 90 West Street, NEW YORK, N. Y.
TRUSSED CONCRETE STEEL COMPANY OF CANADA, LIMITED, WALKERVILLE, ONT.

The Truscon Line

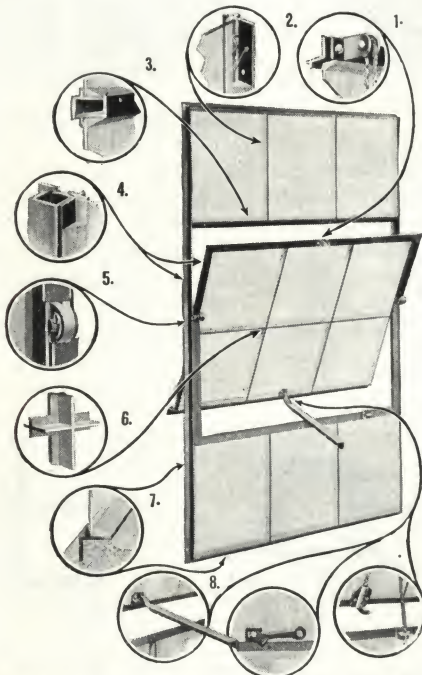
Truscon manufactures a complete line of STEEL WINDOWS and STEEL DOORS for industrial, commercial, public and residential buildings. The completeness of the Truscon Line offers great latitude of selection and application.

TRUSCON SASH OPERATORS, hand and power.

For Concrete Reinforcement, see pages A134-135; for Steel Roof Decks, see page A171; for Steel Joists, see page A578; for Metal Lath, etc., see pages B1306-1307.

Truscon Horizontally Pivoted Windows

For use in factory buildings, warehouses, public and private garages, store and loft buildings, inexpensive schoolhouses, gymnasiums, manual training rooms and, in general, where an inexpensive steel window is needed.



Construction Features of Pivoted Windows

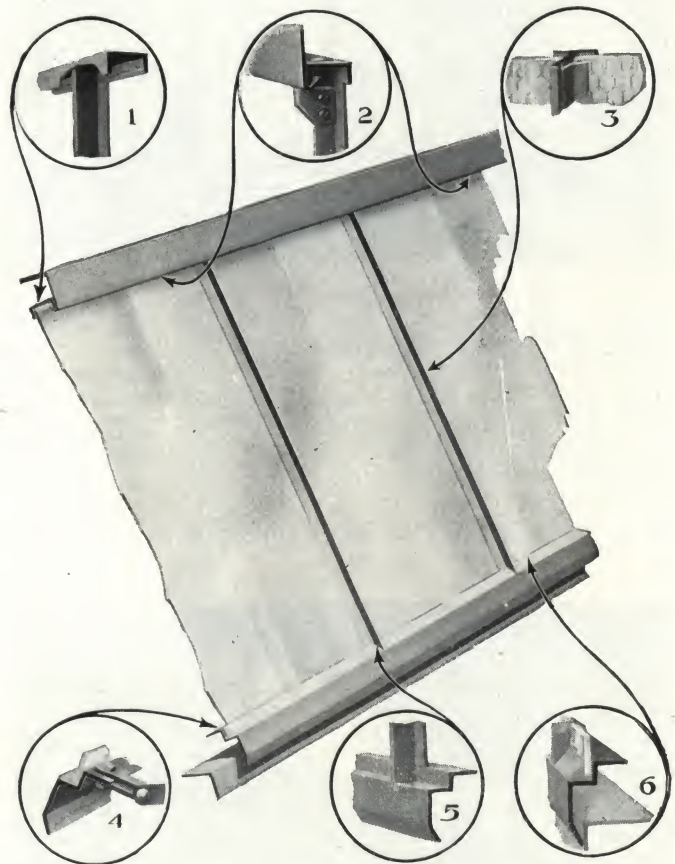
- (1) Roller bracket at head of ventilator—permits use of chain operators on windows out of hand reach.
- (2) Inside glazing with spring steel glazing clips, makes glazing easy and glass replacements simple.
- (3 and 4) Double contact weathering at head and jambs assures protection from rain and wind.
- (5) Solid steel pivots with removable pins mean life-long operating service.
- (6) Dovetail miter joints at intersections of muntins give strength and rigidity to the windows.
- (7) Heavy, close fitting jamb and sill sections, mean windows that will withstand the hardest service.
- (8, 9 and 10) Three types of hardware to select from meet every building requirement.

TRUSCON
STEEL WINDOWS
TRADE-MARK

Truscon Continuous Steel Windows

For maximum daylight and positive control of ventilation in industrial buildings having sawtooth or monitor type roofs. All types of Truscon Continuous Steel Windows may be operated with hand or mechanical operators.

Truscon experts will gladly co-operate with architects in securing the most practical and economical installation.



Construction Details of Top Hung Continuous Windows

- (1) Welded mortise and tenon joint prevents twisting.
- (2) Hinge member forming continuous bearing gives perfect weathering.
- (3) Heavy brass glazing clips on vertical muntin bars.
- (4) Wide flange for attachment of mechanical operator.
- (5) Mortise and tenon joint showing welding.
- (6) Showing glass embedded in putty.

Specifications and Drafting Room Standards

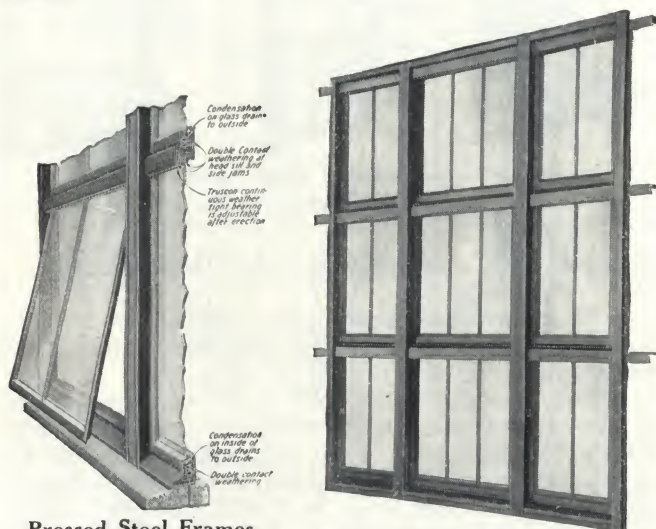
Specifications and drafting room standards free on request.

Truscon Pressed Steel Frames

In modern power house design, the architectural effect most sought after is that of massive strength. Truscon pressed steel frames, used in conjunction with either pivoted windows, projected windows or continuous top hung sash, harmonize perfectly with the massive lines of this and other types of monumental architecture, and though light in weight, their scientific construction is such that they have all the strength, permanence and dependability which their appearance suggests.

Of extra gauge rust resisting copper-alloy steel, Truscon Pressed Steel Frames are practically indestructible. The contours of the frames are absolutely uniform because of the heavy dies used in building them, an important factor in reducing the cost.

Truscon Pressed Steel Frames have the Truscon continuous type hinge, an exclusive feature. No flashing is required. Double contact weathering throughout and slotted holes which permit easy adjustment of the weathering members, assure absolute tightness of the frame.



Pressed Steel Frames
Sectional view through typical panel with continuous sash

Truscon Pressed Steel Frames with Truscon Steel Windows

Truscon Mechanical Operators (Hand and Power)

All types of hand and power operators are included in the Truscon line which has been steadily developed over a quarter century. Positive and prompt control of sidewall and monitor units is always assured with Truscon Operators.

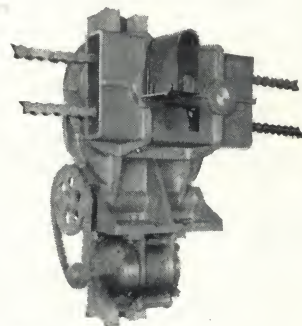
Each Truscon Operator is low in initial cost and is low in maintenance, because designed to give satis-

factory service even when neglected over long periods of time.

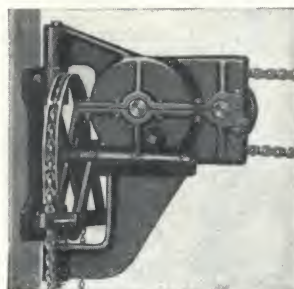
Truscon operator specialists will gladly confer with architects and engineers on the proper type for any specific installation.

Types—Truscon Mechanical Operators include torsion type operators for center pivoted sash in runs up to 120 and 220 ft. Torsion type for group control of center pivoted ventilators, Type "C" rack and pinion operators for pivoted ventilators in standard windows or short runs of continuous sash and for runs up to 400 ft.

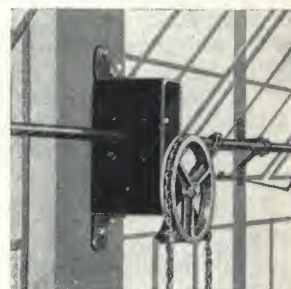
Any special problem can be solved by Truscon's skilled experts.



Tension Type Operator Duplex Power



Tension Type Operator Hand Power



Torsion Type Operator Hand Power

Truscon Industrial Type Doors

Truscon is equipped to manufacture steel doors of any desired size, in either fold, swing or lift types, for railroad shops, pier warehouses, airplane hangars and other buildings which require unusually large doors to meet specialized working conditions.

Specifications and Drafting Room Standards

Specifications and drafting room standards free on request.



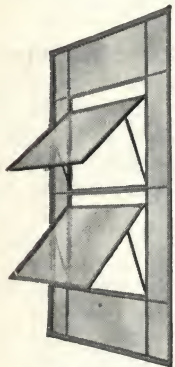
Four Runs of Continuous Windows All Electrically and Independently Controlled



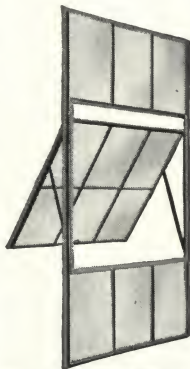
Folding Type, Railroad Steel Doors

Truscon Projected Windows, Architectural Type

Truscon Projected Windows are built in two types, the Architectural and the Commercial. The Architectural type is especially designed for buildings of massive, monumental proportions. Its outside frame is a heavy channel and all corners of the frame are welded and ground. They are completely weathertight. The ventilators are formed of hot rolled angle members. The elimination of needless joints and cracks so common in built-up sections of light gauge metal increases the strength of the units. Resistance to rust and corrosion is assured by Truscon copper-alloy steel and the use of strong, rigid, but slender sections secures maximum daylighting. Adjustable ventilators give complete control of ventilation.



Architectural Type, Projected Steel Window



Commercial Type, Projected Steel Window

Truscon Projected Windows, Commercial Type

The Commercial type of Truscon Projected Window is regularly used for the office sections of structures housing both plant and office. The glass size of this type of window is the same as that of Truscon Standard Factory Sash, so that there is no break in the uniformity of the exterior architectural effect.

These windows may be kept open even in wind and rain since the tilted ventilator eliminates direct drafts. When open, it acts as a deflector and effects a continuous change of air.

The frame of the ventilator is welded at the pivot corners.

All hardware is sherardized malleable iron. Outward opening ventilators within reach of floor have cam latch handle. Those not easily accessible have pole hole ring in addition. Those opening inward have automatic spring latch.

Truscon-Built Donovan Awning Type Windows

Designed by John J. Donovan, a national authority on school architecture, the Truscon-Built Donovan Window provides the schoolroom with properly diffused sunlight and accurate ventilation control. Its success in this field has led to the adoption of Donovan Windows for many other types of buildings such as hospitals, offices and public structures of a similar nature.

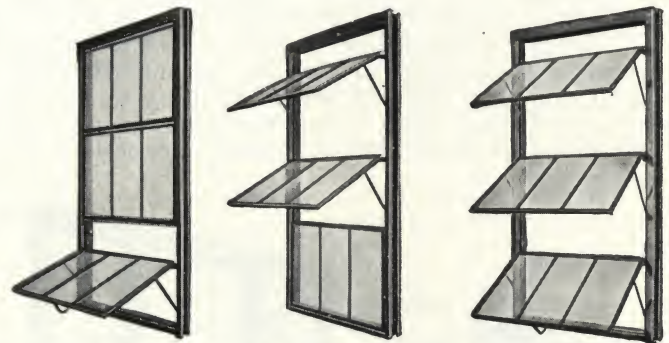
Construction and Operation—The frame opening of the Donovan Window is divided into three sashes. These open outward in parallel and do not protrude into the room. Thus, in this design, the ventilating possibilities of each window are 100% of the window opening and, at the same time, can be controlled to any degree. Horizontal and downward drafts are avoided without the usual sacrifice of fresh air, by deflecting all air currents upward; and the awning-like operation of the sash protects the interior against rain without necessitating the closing of the windows. Nor does shading impede ventilation, because individual shades are attached to each separate sash and the shade and sash operate as a unit.



The Donovan Window is simple in construction, yet strong and durable. It is so perfectly balanced that a child can open or close all sashes in one simple motion without the use of window poles or heavy hand lifting and pulling. Both sides of the glass are easily and quickly cleaned from within.

Built of copper-alloy steel, it is thoroughly protected against rust or corrosion and reduces fire risk to a minimum.

The Donovan Window permits the use of large glass areas to harmonize with any type of architectural treatment.



Donovan Awning Type Windows

A few of the numerous sash positions obtainable for the purpose of directing air currents and diffusing the direct rays of the sun

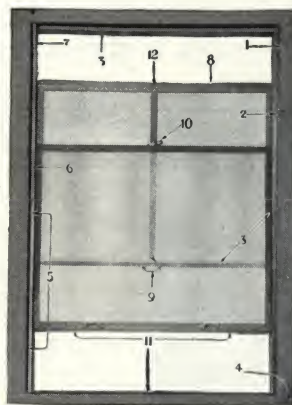
Truscon Solid Steel Model "A" Double-Hung Windows

These windows have been designed to combine beauty with durability, strength, practical simplicity and fireproofness.

They are single unit solid frame windows welded at all corners to insure weathertightness, solidity, rigidity and perfect alignment. Sash rails and muntin bars are unusually heavy. Perfect jamb slots are provided—absolutely true and even in width. Double contact weathering with air channels prohibits capillary or molecular attraction at all points.

Construction throughout is of permanent copper-alloy steel and high quality hardware accompanies each window. Recesses in back of frame assure perfect bond with masonry.

Construction Features of Double-Hung Windows



- (1) Concealed roller bearing pulley.
- (2) Concealed chains.
- (3) Weathertight meeting rail, sash guides, head and sill.
- (4) Frame welded at corners—rigid and solid, no bolts, and weathertight.
- (5) Weights accessible through opening provided with weathertight cover.
- (6) All exposed metal No. 12 gauge or heavier.
- (7) Weathertight frame.
- (8) Sash made up with heavy hot rolled sections—therefore strong and durable.
- (9) Handle (two if desired) for lowering upper sash.
- (10) A complete sweep lock.
- (11) Two lifting handles.
- (12) Window pole socket.

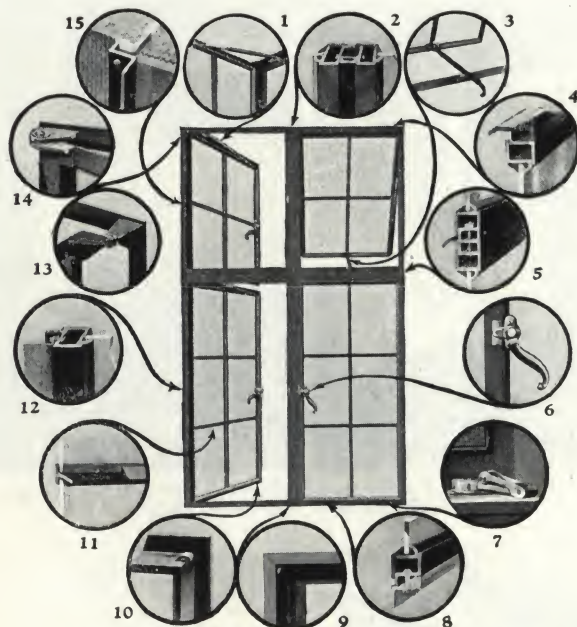
Specifications and Drafting Room Standards

Specifications and drafting room standards free on request.

Truscon Casement Windows

Constant improvements in design and manufacture have resulted in low priced copper-steel casement windows which are both beautiful and practical, and well suited for apartments and residences.

They open and close easily, never stick, warp or get out of line. Moreover, they open outward, offering 100% ventilation without interfering with screens or drapes within. They are fireproof and permanent—but no more expensive than the ordinary wooden window.



Construction Features Casement Windows

- (1) Adjustable friction stay holds casement open in any desired position.
- (2) Vertical mullion provides neat paneled appearance inside.
- (3) Steel push bar can be furnished with BT-114 unit.
- (4) Continuous head drip insures proper weathering.
- (5) Transom bar used when two or more units are combined one above the other, forming a drip over lower sash and providing rigidity in combination of units.
- (6) Cam handles furnished in malleable iron for both right and left hand. Solid bronze handles of same design if desired.
- (7) Flexo-Stay adjuster, for use under screen, operates the casement from the inside without opening screen.
- (8) Continuous subsill section provides extra weather protection at the sill.
- (9) Corners of frame are mitered and electrically welded with the welds inside concealed from view.
- (10) Corners of sash welded same as frame.
- (11) Spring wire glazing clips hold glass any thickness firmly in place. Outside glazing gives neat interior finish.
- (12) Jamb angle provides secure anchorage into masonry wall construction.
- (13) Cleaning hinges are supplied if desired.
- (14) Standard heavy hinges are spot-welded to frame and sash.
- (15) Anchored in any type of wall construction

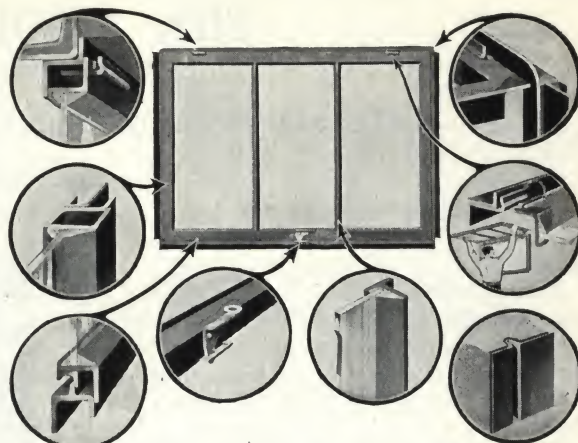
Truscon Casement Doors

Truscon Steel Casement Doors, specially designed for use in conjunction with Truscon Casement Windows, are practical and beautiful for porch and terrace, or as connecting doors to solariums and conservatories.

Truscon Basement Windows

Copper-steel basement windows always open and close easily, lock securely, never stick, leak or need repairs.

They are permanent, durable and trim-looking in appearance.

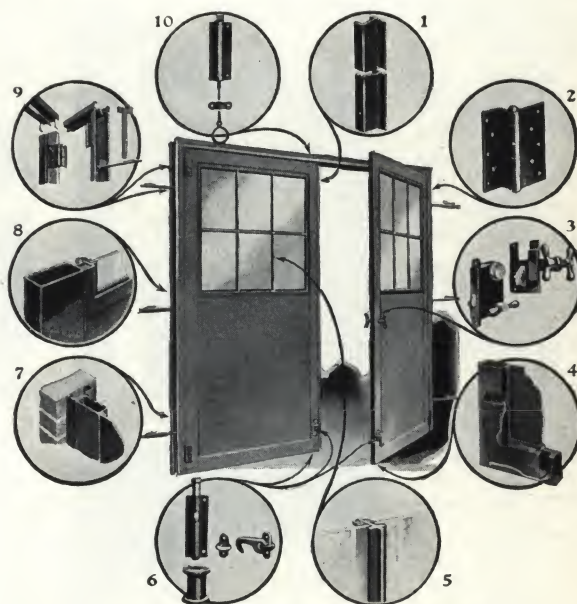


Construction Features Basement Windows

- Head—double contact weathering; overhanging drip.
 Sill—protective overhanging drip; double contact.
 Jamb—double contact weathering; protruding fin for anchorage, inside and outside leg masonry guide.
 Hook type pinless hinge, ventilator hooks on keeper welded on frame, ventilator easily removed.
 Rigid corners, continuous outside frame; extremely rigid corners, windows will not distort.
 Cam-acting latch, positive lock; foolproof and easy to operate

Truscon Stock Doors

For use in factories, warehouses, depots, public garages and wherever sturdy, fireproof doors are desired. Made in either single or double slide or swing types in sizes to meet practically all requirements.



Construction Features Stock Doors

- (1) Astragal used at meeting rail.
- (2) Offset hinge—Reversible for in-swinging or out-swinging doors.
- (3) Lever latch and padlock (Set B). Mortise cylinder lock (Set A).
- (4) Internal reinforcing of corners.
- (5) Muntin. Glazing angles hold glass in place.
- (6) Hook back and ring to hold doors open. Lock bolt and socket for inside locking.
- (7) Pressed steel door frame anchored in wall construction.
- (8) Section through rail of door at jamb.
- (9) Assembling of door frame and adjustable tee anchor.
- (10) Chain bolt used at top of doors.

Specifications and Drafting Room Standards

Specifications and drafting room standards free on request.

THE AIROLITE COMPANY

FORMERLY THE WINDOW-WALL COMPANY

Manufacturers of Natural Air Ventilating Equipment

MARIETTA, OHIO

Products

THE WINDOW-WALL UNIT, a patented type of window and wall construction for bedrooms and sleeping porches built in combination with either double hung or casement windows.

"AIROLITE" ADJUSTABLE WINDOW VENTILATORS.

"AIROLITE" STEEL SASH VENTILATORS.

"AIROLITE" VENTILATING SASH.

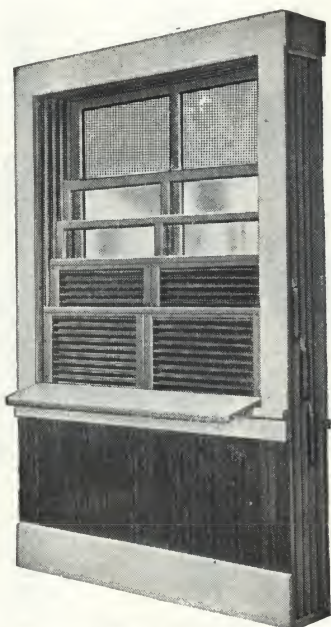
For all kinds of Adjustable and Stationary Louvered Panels for natural air ventilation, see page B1162.

Window-Wall Unit

The Window-Wall Unit is a combination of screen, glass and "Airolite" Ventilating Sash, ideal for sleeping porches, fresh air bedrooms and sun parlors, both in private homes and institutions. Affords protection, ventilation, privacy, comfort, convenience and health to the occupants of any room in which it is installed, and the original cost is only slightly more than the cost of an ordinary window. With Window-Wall, no awnings, inside window blinds or drapes are necessary. In other words, with Window-Wall you live outdoors with indoor protection. It is installed practically the same as an ordinary window.

The Window-Wall Unit consists of a wooden frame, a screen which is hung on the outside, a set of glass sash, a set of "Airolite" Adjustable Ventilating Sash and a tuck-away pocket with hinged sill. When the glass and "Airolite" Sash are lowered into the tuck-away pocket, a screened opening effect is obtained.

With the glass sash run up into place, you have a regular window or sun parlor. With the "Airolite" Sash raised and the glass sash lowered you have an all-year, open air, sleeping room. Both glass and "Airolite" Sash can be run up into place at the same time. By this arrangement the "Airolite" Sash serves as an awning or shade. The steel louvers can be tilted or adjusted to keep out excessive sunlight and at the same time retain absolute privacy.



Window-Wall Unit with Double Hung Sash as It Appears When Installed



Window-Wall Sleeping Porch, in Use More Than Ten Years in Home of W. R. Metcalf, Marietta, Ohio



Mr. Metcalf Says:
"I would give up the rest of the house before I would my Window-Wall Sleeping Porch. We sleep in the fresh air every night, regardless of the weather and the Window-Wall is the only thing I ever heard of that will permit of this and at the same time give you proper protection. I am strong for the Window-Wall."

Suggested Window-Wall Specifications for Architects' Use

(For insertion in Carpentry section.)

Specifications vary with the designs and construction desired. The following specifications cover all items, which may be segregated and used to specify construction for double hung windows:

Where indicated on the plans, the [Carpenter] [Contractor] shall furnish and install Window-Wall Units as manufactured by THE AIROLITE COMPANY, Marietta, Ohio.

Each Window-Wall Unit as shipped by the manufacturer shall consist of a substantially constructed wood framework built with window openings, each unit built up by framing pulley jambs (with pulleys, outside blind stops and parting stops), head jamb, weather pan board and copper weather pan in the proper manner. This does not include any interior or exterior trim.

The following material shall be furnished by the manufacturer and be installed by the [Carpenter] [Contractor].

One pair double hung, metal louvered "Airolite" Adjustable Ventilating Sash (louvers to be finished in standard baked enamel paint, olive green color; frames, three coats air-dried enamel paint, olive green color.)

One pair double hung glazed sash, one full length copper wire screen, outside sill, hinged sill, inside sill, sash weights and weight guides.

One pair sill hinges, one pair copper drain tubes and one set full length screen hangers.

The [Carpenter] [Contractor] to leave proper openings to receive Window-Wall Units and to furnish all labor and material required to install these units in first class workmanlike manner and in line with all exterior and interior construction.

The details in the next column are for frame construction, also for stucco if 1½-in. casing is used. For casement windows, brick or other construction write for detail drawings.

Widths

Glass size, in.	Over-all glass sash, in.	*Over-all clearance required between studding or structure opening, in.
20 in.—One-light wide . .	24	31 $\frac{3}{4}$
22 in.—One-light wide . .	26	33 $\frac{3}{4}$
24 in.—One-light wide . .	28	35 $\frac{3}{4}$
26 in.—One-light wide . .	30	37 $\frac{3}{4}$
28 in.—One-light wide . .	32	39 $\frac{3}{4}$
30 in.—One-light wide . .	34	41 $\frac{3}{4}$
32 in.—One-light wide . .	36	43 $\frac{3}{4}$
18 in.—Two-lights wide . .	41	48 $\frac{3}{4}$
20 in.—Two-lights wide . .	45	52 $\frac{3}{4}$
22 in.—Two-lights wide . .	49	56 $\frac{3}{4}$
24 in.—Two-lights wide . .	53	60 $\frac{3}{4}$

Note: For brick construction, etc., where weight boxes are required, add 1½ in. to the above dimensions on over-all width clearance required.

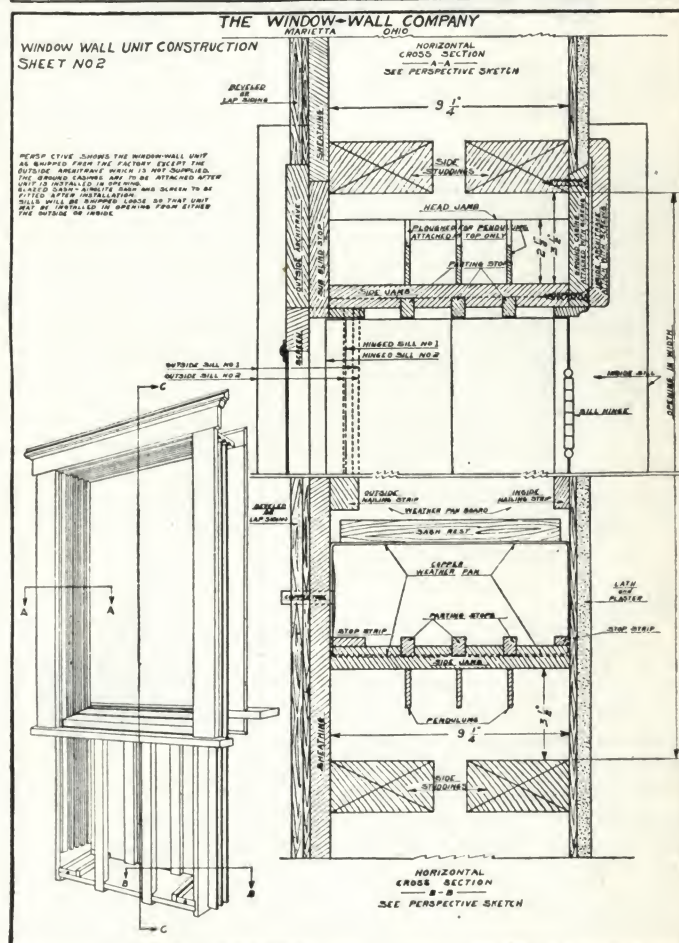
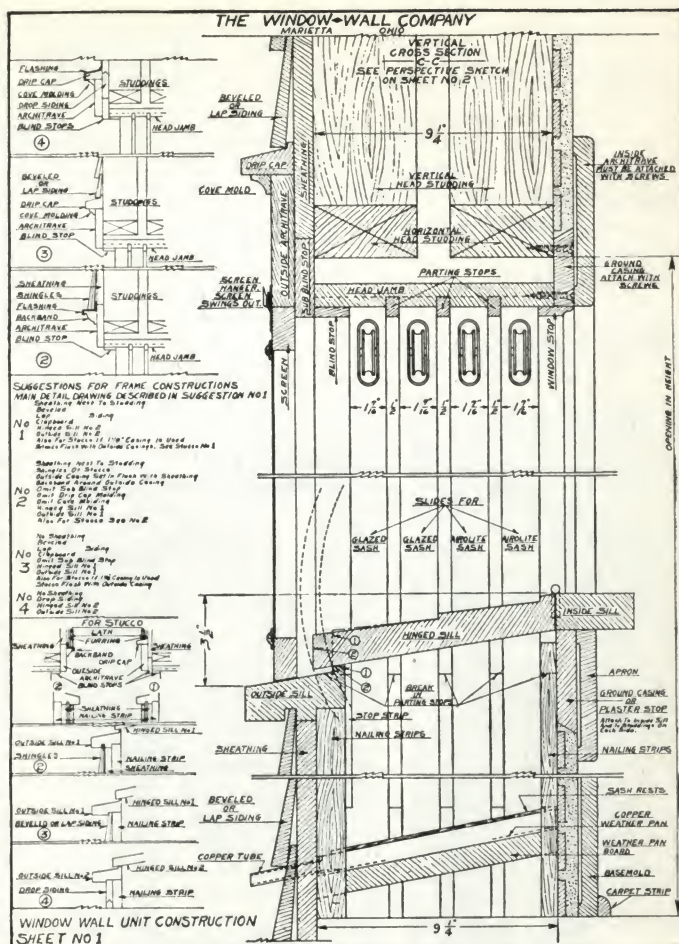
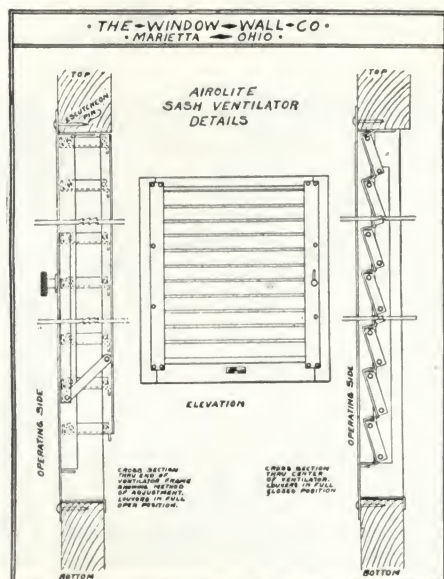
Mullion Casing: When the Window-Wall Units are to be installed with mullions between units, the ground casing and finished interior casing fitting between the units will each be 10% in. wide. This will be increased by 1½ in. when used in brick or masonry walls.

Heights

Glass size, in.	Over-all glass sash, in.	Floor line to top of inside sill, in.	Over-all clearance required between floor line and headers, in.
20	46 $\frac{3}{4}$	31 $\frac{1}{16}$	78 $\frac{5}{8}$
22	50 $\frac{3}{4}$	33 $\frac{1}{16}$	84 $\frac{5}{8}$
24	54 $\frac{3}{4}$	35 $\frac{1}{16}$	90 $\frac{5}{8}$
26	58 $\frac{3}{4}$	37 $\frac{1}{16}$	96 $\frac{5}{8}$
28	62 $\frac{3}{4}$	39 $\frac{1}{16}$	102 $\frac{5}{8}$
30	66 $\frac{3}{4}$	41 $\frac{1}{16}$	108 $\frac{5}{8}$

Caution: The above dimensions cover the actual openings required to receive the Window-Wall Unit. Take care of top and side trim. "Aiolrite" Ventilating Sash, Glazed Sash and Screen are the same in width.

"Airolite" Sash is a patented ventilator constructed with wood frame and adjustable louvers, made of rust resisting steel, each louver having a $\frac{1}{4}$ -in. flange. A slight pressure of the thumbscrew sets the louvers at any desired angle, quickly and silently, thus affording privacy, shade or light as desired, fresh air without draughts and protection against storms. While "Airolite" Sash is used as part of the Window-Wall Unit it can be installed as a separate unit in old and new construction as ordinary double hung glazed sash, as full length screen, or as half sash to fit against outside blind stops and flush against upper glass meeting rail; the bottom to rest upon the main sill. "Airolite" Sash can be supplied with or without screen. When screen is desired, we use 16-mesh copper wire cloth. On large sizes, the "Airolite" Sash is divided up into various size lights.



DAVID LEVOW

"Fitrite" Skylight Gearing and "Fitrite" Bronze Strainers

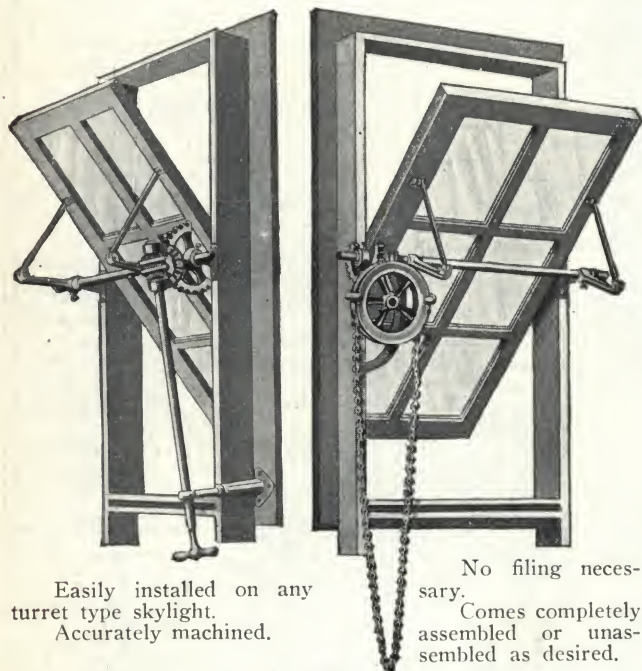
TELEPHONE
CHELSEA 2400

542 West 23rd Street

NEW YORK, N. Y.

"Fitrite" Skylight Gearing

Features—Instead of the usual round pipe holes (where the only point of contact is at the setscrew),



"Fitrite" Skylight Gearing has special oval pipe holes on arms and lifting gear.

The result is a much firmer grip (contact at *three* points instead of one) and absolute freedom from rattling in any position.

Material—Made in both best quality gray iron and in solid bronze, which is rustproof and harmonizes with copper skylights.

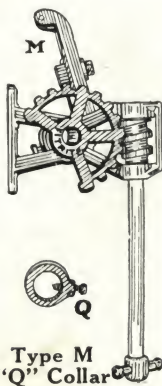
Sizes—Made for standard 1/2-in. pipe size.

Also furnished in 3/8-in. pipe size for smaller skylights.

Type "M"—For single skylights or concrete work. Type "M" requires no horizontal piping. It is therefore suitable for small skylights and for installation in concrete buildings.

Type "M" requires no extensions, thus eliminating the problem of fastening extensions to concrete walls.

"Fitrite" Bronze Gearing is especially recommended (1) for industrial buildings as it resists corrosion due to chemical fumes, acids, etc., (2) for laundries, kitchens or wherever excessive moisture causes iron to rust away. The slight extra cost of "Fitrite" Bronze Gearing assures a permanent trouble-free job.



"Fitrite" Roof Strainers—for Flat Roofs Having Inside Cast Iron Leaders

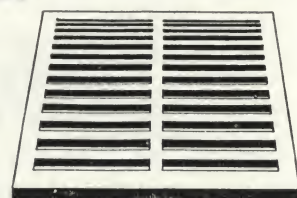
Type F—Perfectly flat. Extensively used for roofs and roof gardens requiring freedom from all obstruction; also for swimming pools.

Type R—The slight crown (1 in. high) does not seriously obstruct the roof, yet the construction is such that debris slides off easily. Especially recommended for flat tile or slag roofs having inside leaders, at center of roof.

Type X—Recommended where drainage efficiency is the prime consideration. The extra high crown (3 1/2 in.) and narrow slits effectively keep out gravel, sticks, etc. Type X is especially desirable where leaders are at edge of roof.

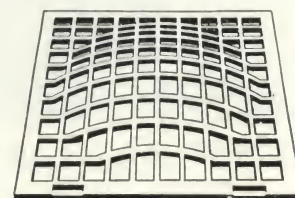
Materials—All types made in solid bronze.

Features—"Fitrite" bronze strainers are about 1/4 in. thick, will not rust, and are practically unbreakable—will easily support the weight of three husky men. Each strainer has two hinges allowing easy attachment by copper strip to leader box.



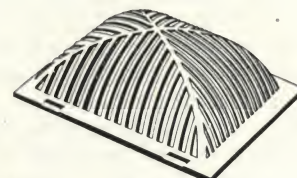
Type F

Cross-section of Type F



Type R

Cross Section of Type R
1 in. high

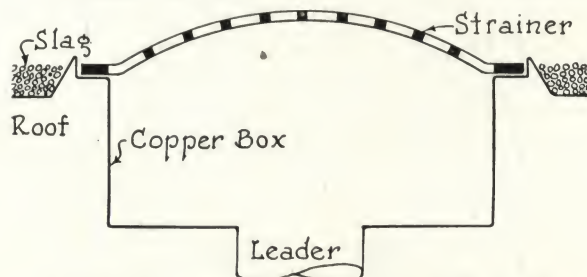


Type X

Cross-section of Type X
3 1/2 in. high

STRAINER SIZES

No.	Exact size, in.	Types
12-in.	11 3/4 x 11 3/4	F, R and X
10-in.	9 3/4 x 9 3/4	R and X
8-in.	8 x 8	R and X
6-in.	6 x 6	F and R



Application of "Fitrite" Strainer to Slag Roofs

Information concerning installations on other types of roofs gladly supplied on request

LORD & BURNHAM CO.

Manufacturers of Sash Operating Apparatus for Hinged and Pivoted Sash
IRVINGTON-ON-HUDSON, N. Y.

Products

SASH OPERATING APPARATUS in various styles and sizes for Operating Hinged and Pivoted Sash in factories, foundries, car barns, roundhouses, powerhouses, machinshops, steamers, banks, churches, prisons, greenhouses, also for Heavy Transoms in such places as store fronts, hotels, public buildings, etc.

For Greenhouses, see pages C3422-3425.

Rocker Shaft Apparatus

Our standard apparatus (Fig. 1) consists of a worm and gear to turn a rocker shaft, to which are attached arms that, in turn, act directly on the sash through suitable rods. Arms are secured to shaft by combined bolting and setscrew cap, or by setscrew only if desired.

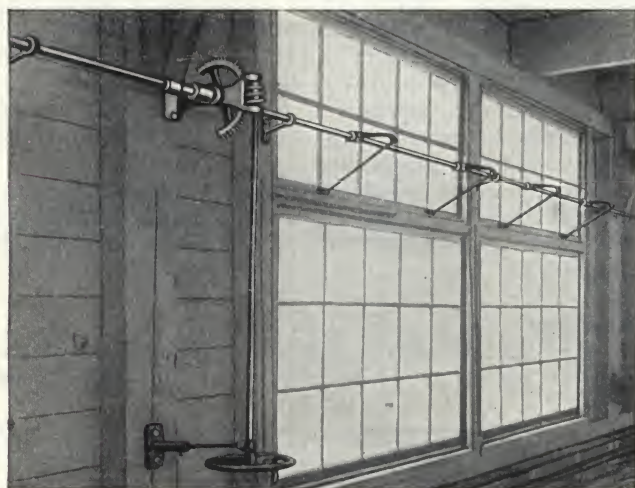


Fig. 1. Rocker Shaft Apparatus

Rack and Pinion Apparatus

This type of apparatus (Fig. 2) is intended primarily for long runs of heavy hinged sash. On account of the small pitch radius of the pinion ($1\frac{1}{2}$ in.) the leverage on shaft is so much reduced that torsion in the shaft is reduced to a minimum. The simplicity of this apparatus is a strong point in its favor. The direct horizontal thrust given to the sash prevents all harmful strains.

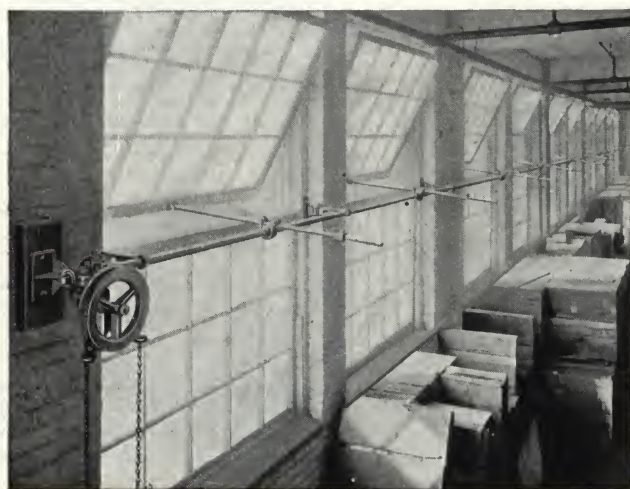


Fig. 2. Rack and Pinion Apparatus

Screw Thread Transom Operators

Transom operators (Fig. 3) made in 2 sizes: No. 1 for heavy and No. 2 for extra heavy transoms. This apparatus consists of two enclosed miter gears, one of which is threaded and engages with a vertical rod linked to a rocker shaft at bottom of transom, thus allowing it to be supported by an arm and rod at either end, relieving it of all injurious strains, and holding it rigidly in position against wind pressure.



Fig. 3. Screw Thread Transom Operators

Tension Lever Apparatus

Fig. 4 for runs too long or too heavy for practical operation with either our rocker shaft or rack and pinion type. Special circular on request.

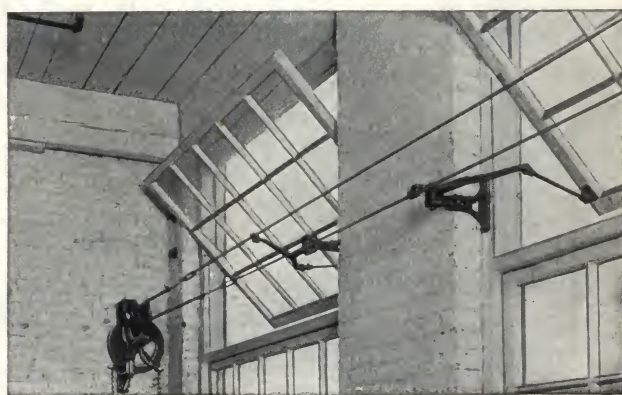


Fig. 4. Tension Lever Apparatus

Erection

Full directions for erecting are sent with apparatus so that it can be easily installed by any mechanic.

Estimates and Co-operative Service

On receipt of data giving description of sash and that part of the building where it is intended to install the apparatus, we will gladly submit sketches, suggestions, and estimates for furnishing our stock apparatus, or one specially designed to meet unusual conditions; also, estimates for erecting the apparatus when desired.

Catalogue

Catalogue giving full and detailed description of each apparatus sent on request.

ESTABLISHED 1875

THE PAYSON MANUFACTURING COMPANY

Manufacturers of Sash Operating Devices and Builders' Hardware

2920 Jackson Boulevard
CHICAGO, ILL.

Products

SASH OPERATING DEVICES.

Also manufacturers of: Simplex Transom Lifter, for all types of transoms; Casement Adjusters, friction, geared, and thumbscrew control for all types of casement sash; Signal Sash Lock, for double hung windows; No. 49 Harris Concealed Transom Lifter, for transoms where concealed device is required.

Types of Payson Sash Operating Devices

Torsion Type Using Levers to Sash—Ideal, chain control, for pivoted sash.

Superior, hand wheel control, for pivoted sash.

Triumph, hand wheel control, for pivoted sash in monitors, also for store front transoms.

Torsion Type Using Racks and Pinions to Sash—Reliance, chain or hand wheel control, either straight or curved rack, for top hinged or heavy pivoted sash.

Gem, for single top hinged, skylight sash.

Screw Type Using Levers to Sash—Crown, for short runs of bottom hinged sash opening in.

Duplex, for heavy transoms.

Signet (new), for long runs of hinged sash opening in or out.

Tension Types—Peerless, chain control for top hinged continuous steel sash.

Victor chain wheel control for vertically pivoted sash.

Monarch, for short runs of vertically pivoted or side hinged sash.

All types furnished with electric or pneumatic equipment if desired.

Payson Products Give Satisfaction

This list of Payson products is selected with the hope that it may be used freely by architects in writing specifications. The list contains standard articles that are guaranteed to give perfect satisfaction.

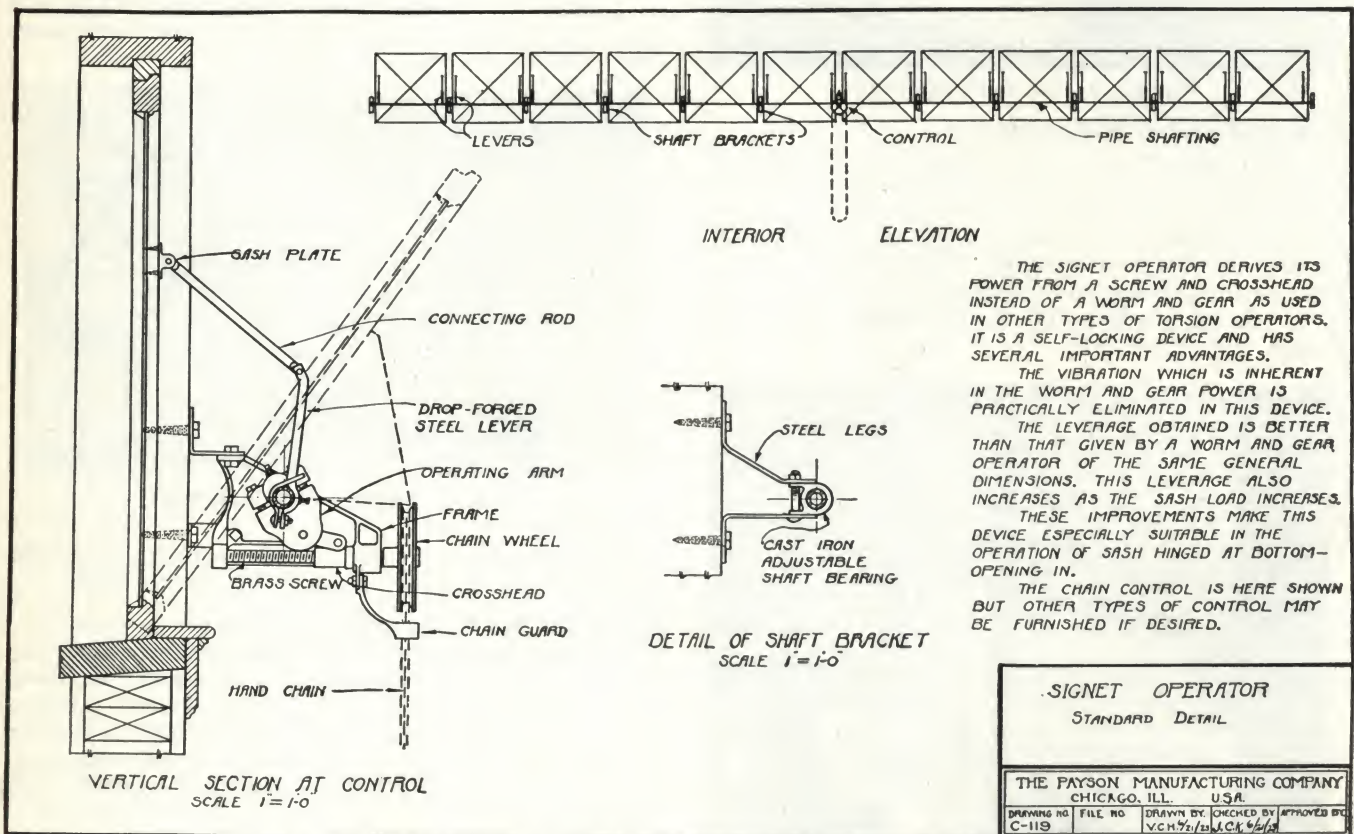
Service

Payson sash operating devices are made to order, using measurements taken from the plans and checked at the building. Every job is exhaustively studied by Payson engineers, and a drawing showing the scheme thought most satisfactory is prepared and submitted to the architect for approval as to layout and general design. After this approval is obtained, if there is any question as to measurements, drawings are forwarded to the building to be checked.

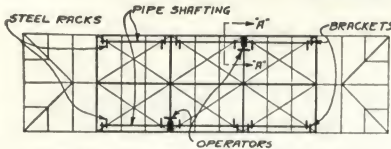
Time is really saved in this way, because the operators can then be erected from the blue print with the certainty that every part will fit the place for which it is intended.

Catalogue

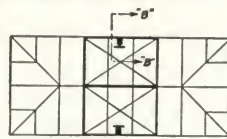
We have a very complete catalogue of Payson products which we would be glad to forward on request.



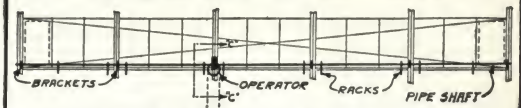
Detail of Signet Operator for Use on Top or Bottom Hinged Sash, Opening In or Out



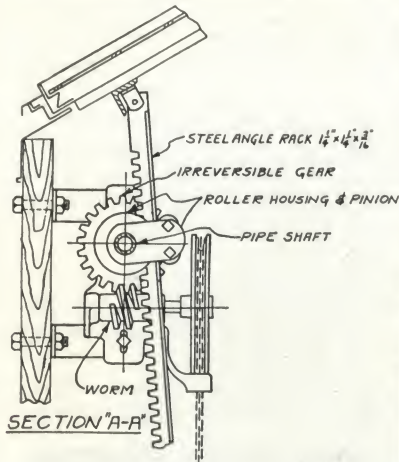
TYPICAL PLAN VIEW OF VENTILATED
RIDGE TYPE SKYLIGHT.



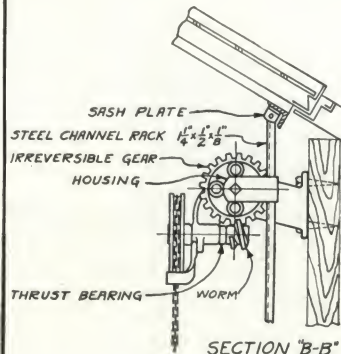
TYPICAL PLAN VIEW OF VENTILATED
RIDGE TYPE SKYLIGHT.



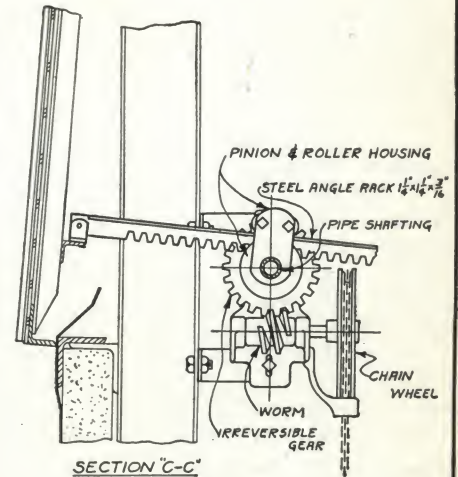
INTERIOR ELEVATION OF TOP HUNG
CONTINUOUS STEEL SASH.



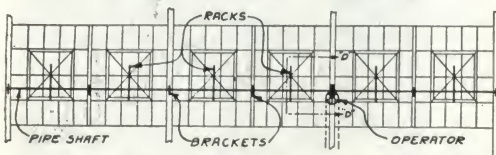
RELIANCE "C."



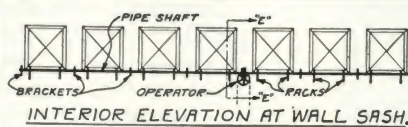
GEM.



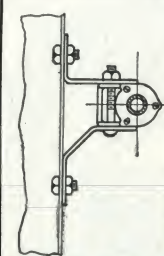
RELIANCE "C."



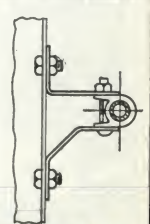
INTERIOR ELEVATION AT WALL SASH.



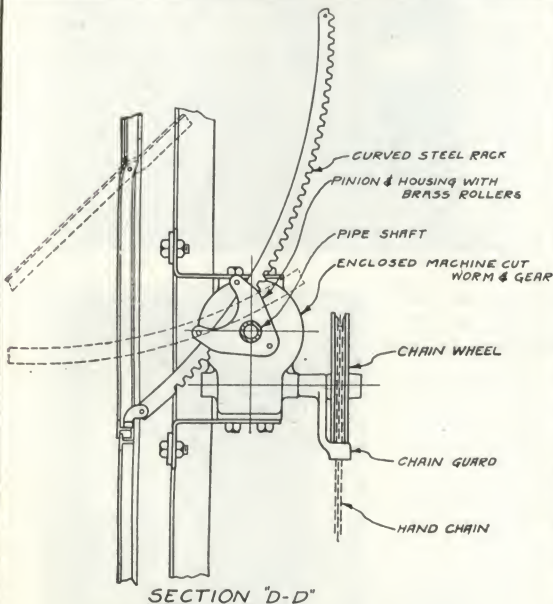
INTERIOR ELEVATION AT WALL SASH.



BALL BEARING
SHAFT BRACKET.

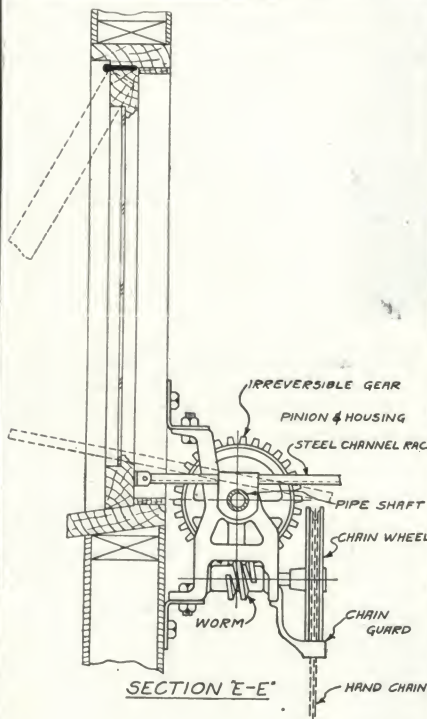


SINGLE POINT
CONTACT SHAFT
BRACKET.



SECTION "D-D"

RELIANCE 521.



SECTION "E-E"

RELIANCE #80.

THE RACK AND PINION OPERATOR AS SHOWN ON THIS PAGE IS THE MOST POWERFUL OF ALL DEVICES COMMONLY KNOWN AS THE TORSION TYPE. THE LEVERAGE IS SO REDUCED THAT THE TORSIONAL STRAIN ON THE OPERATING SHAFT IS VERY SLIGHT.

ITS SIMPLICITY OF ACTION MAKES ITS USE ADVISABLE WHEREVER THE WORK TO BE DONE COMES WITHIN ITS LIMITS.

THE TYPES SHOWN HERE COVER IN A GENERAL WAY PRACTICALLY ALL OF THE CONDITIONS ON WHICH THE DEVICE MAY BE USED TO ADVANTAGE. IN SELECTING THE TYPE DESIRED THE GOVERNING FACTOR IS AMOUNT OF DUTY TO BE PERFORMED. THIS IS BASED ON THE LENGTH OF RUNS, WEIGHT AND STYLE OF SASH AND LOCATION IN BUILDING.

RACK & PINION OPERATORS.

THE PAYSON MANUFACTURING COMPANY.
CHICAGO, ILL. U.S.A.
DRAWING NO. FILE NO. DRAWN BY CHECKED BY APPROVED BY
C-126 E.A.R. 6-25-27 JACK

DIEBOLD SAFE & LOCK COMPANY

FACTORY AND GENERAL OFFICES
CANTON, OHIO

CLEVELAND, OHIO NEW ORLEANS, LA. PITTSBURGH, PA. NEW YORK, N. Y. BOSTON, MASS.
DETROIT, MICH. CHICAGO, ILL. ST. PAUL, MINN. OMAHA, NEB.
REPRESENTED IN OTHER PRINCIPAL CITIES

Products

BANK and SAFE DEPOSIT VAULTS and VAULT FRONTS, including: Safe Deposit Boxes, Linings and Complete Equipment; FIREPROOF VAULT DOORS, plate and filled; FIREPROOF SAFES and FILING SAFES; STEEL MONEY CHESTS, rectangular and round doors.

Exclusive Features

Embodied in Diebold Vault Doors, Series 600 and 1000 are three exclusive Diebold features: (1) Diebold Daylight Automatic Lock, protection against daylight holdup; (2) Electric Alarm Grid *built into* the door, connects with any standard electric alarm system and is approved by manufacturers of leading electric alarms.

On all Diebold Bank Vault Doors 7 in. or greater in thickness the Diebold patented Thermatic Locking Device may be installed when requested. Approved by Underwriters Laboratories and National Bureau of Casualty

and Surety Underwriters, it entitles the bank to 10% preferential insurance discount.

65 Years of Successful Safe Building

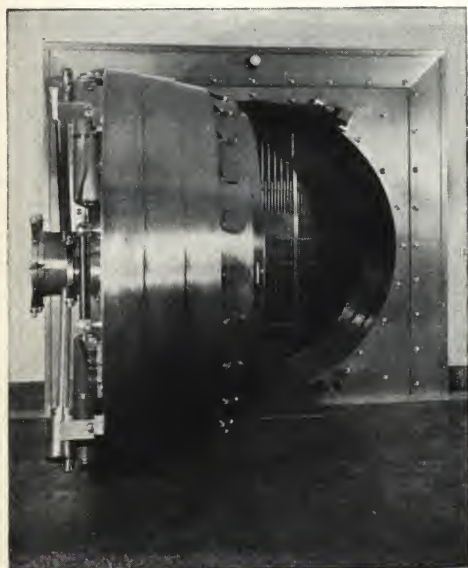
The recognized quality of the Diebold product is the result of experience as designers, engineers and manufacturers of bank vaults and safes since 1859.

During this period many Diebold safes and vaults have successfully withstood the severest tests, in actual service, as is attested by the many letters on file in this office.

Co-operative Service to Architects

Our Engineering Department, together with the entire personnel of our various branch offices is at the disposal of the architect or contractor.

Sketches and estimates on special work, as well as stock designs will be gladly furnished, without charge.



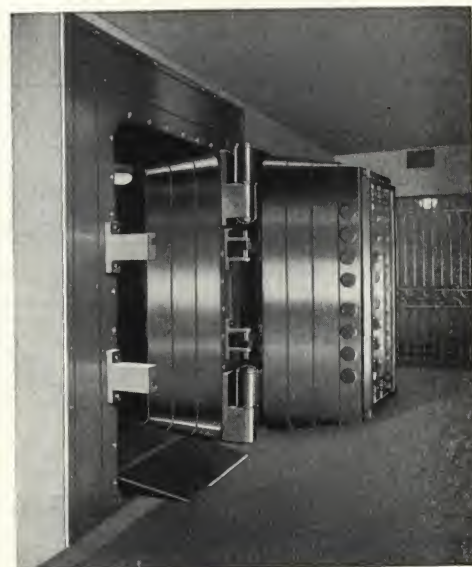
Bank and Safe Deposit Vaults and Doors Complete Vaults

—Complete Diebold bank vault outfits are in use in many of the largest banks throughout the United States.

These include all styles and sizes from the simplest to the most elaborate.

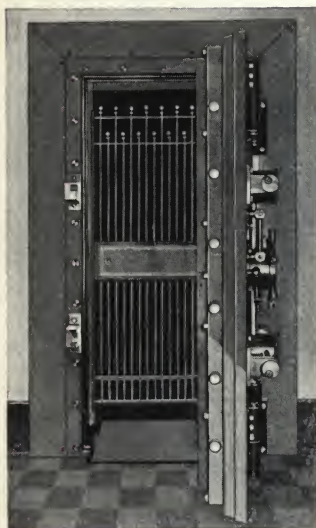
In this work all necessary equipment such as safe deposit boxes, linings, etc., can be furnished.

Catalog sent upon request.

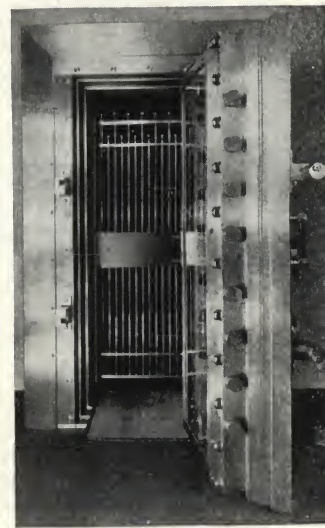


Burglarproof Vault Fronts—In addition to our lines of standard vault doors described below, we are prepared to build any style or size to meet special or unusual conditions.

Door No.	Solid steel, thickness in.	Wall opening, in.		Depth of vestibule (without lining), in.	Clear opening between jambs, in.		Outside over all, in.	
		High	Wide		High	Wide	High	Wide
Rectangular Doors								
235	3½	84⅞	40	20	78	32	91½	56½
507	7	93	49	20	78½	32½	95	60
610	10	93	49	20	78½	32½	96½	62½
612	12	95½	52½	20	78	34	105¾	80
616	16	98	56	21	78	34	107½	82½
620	20	99	60	24	80	38	109½	88½
625	25	111½	72¾	27½	84	40	116½	97¾
Circular Doors								
1010	10	96	96½	20	80	80	102¼	119
1016	16	100	100	24	80	80	106	123¾
1020	20	106	106	27	82	82	109¼	126
1025	25	111¾	111½	33	84	84	115	133



Bank Vault Door No. 235



Bank Vault Door No. 507

Fireproof Vault Doors

All Diebold fireproof vault doors are designed with removable rear frame, for quick and easy placing after all masonry is completed. All standard single swing doors are right-hand swing; left-hand swing doors built to order.

Single Swing Doors—Style "R" door is constructed of $\frac{3}{8}$ -in. plates and angles mounted on heavy pin hinges. It is equipped with one top, one bottom and four horizontal bolts, bakelite lever handle and Diebold 3-tumbler combination lock with anti-dynamite device. Has folding inner doors equipped with T-handle and flat key lock. Door is painted green with gold striping throughout. Locking bolts, handles, tips, etc., buffed nickel.

Style "S" is similar to Style "R," except for clear opening and wall thickness.

Filled Vault Door—Door No. 154 consists of a $\frac{1}{4}$ -in. front plate backed by $3\frac{3}{4}$ -in. Diebold patent fireproof filling, hung on three heavy pin hinges and equipped with lever bolt handle and 3-tumbler Diebold combination lock. Finished in olive green with gold striping and buffed nickel trim.

Door No. 152 involves a new principle of fireproof vault door construction. An offset $2\frac{1}{2} \times 4$ in. is necessary in the masonry around the outer edge of the wall opening. Attached to the front edge of the vestibule is a specially formed insulated stop which sets into the step provided in the masonry. The spaces formed by the section of the frame forming the stops are filled with insulating material similar to that used in the door. Thus added protection is given to the joint between masonry and vestibule. This door carries Underwriters' Label, Classification 2-hours.



Vault Door Style "R"



Vault Door No. 215



Filled Vault Door No. 152

Door		Clear opening outer jambs, in.	Clearance inner doors, in.	Min. depth of vestibule, in.	Outside over all, in.	Wall opening, in.	Wall thick., in.	Door		Clear opening between jambs, in.	Outside over all, in.	Wall opening, in.	Depth of wall, in.
Style	Thickness, in.							No.	Thickness, in.				
Tile	$2\frac{1}{4}$	75x28	.....	.....	$80\frac{5}{8} \times 38\frac{1}{4}$	79x33	9	152	$3\frac{5}{16}$	$77\frac{7}{8} \times 29\frac{3}{4}$	$86\frac{1}{2} \times 40\frac{1}{2}$	$79\frac{1}{2} \times 33$ with $2\frac{1}{2} \times 4$ offset	20
R	$2\frac{1}{4}$	75x27	.....	.....	$80\frac{5}{8} \times 38\frac{1}{4}$	79x33	18	154	6	78x32	$90\frac{1}{8} \times 49\frac{1}{2}$	90x47	20
S	$2\frac{1}{4}$	75x34	.....	.....	$80\frac{5}{8} \times 45\frac{1}{4}$	79x40	20	215	$1\frac{1}{2}$	78x32	$93 \times 60\frac{1}{2}$	$86 \times 44\frac{1}{2}$	20

Fireproof Standard Safes

Diebold fireproof safes embody several unusual structural features. The heat-resisting filler, besides furnishing perfect resistance to heat, possesses a high degree of inherent structural strength and thus provides a continuous, solid insulation between the walls of the safe. It retains its fire-resisting qualities regardless of age. The special drillproof plate and the anti-dynamite lever protect the lock and prevent its being tampered with.

Heavy hinges provide easy operation of door and prevent sagging. Outside finish is olive green satin enamel, gold striped; combination dial, spindle, bolt throwing handles and hinge tips are heavily nickelplated.

Key locking inside doors are provided at small additional cost when desired.

SAFES BEARING UNDERWRITERS' LABORATORIES LABEL

No.	Width, in.	Height, in.	Depth, in.
42	18	34	$19\frac{1}{4}$
44	18	50	$19\frac{1}{4}$
46	$35\frac{3}{4}$	30	$19\frac{1}{4}$
47	$35\frac{3}{4}$	50	$19\frac{1}{4}$
48	$35\frac{3}{4}$	62	$19\frac{1}{4}$

Fireproof Filing Safes

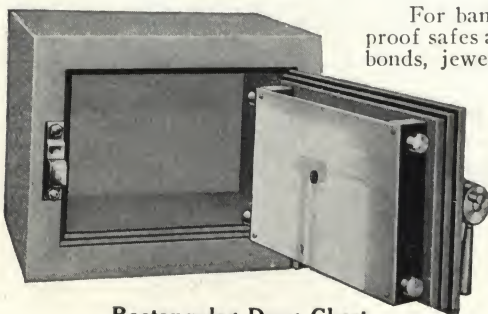
These embody the same materials and construction as the regular safes, differing only as to interior arrangement. Interior equipment is of metal and is based on the unit system, the various units being interchangeable.

Catalog showing all types and sizes sent upon request.

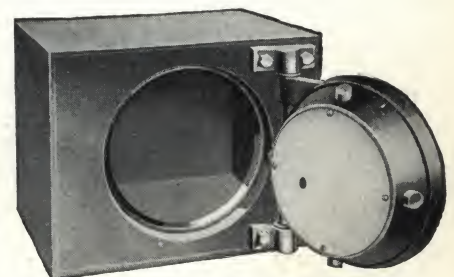
Steel Money Chests

For bank use and for placing in standard fireproof safes and filing safes for protection of money, bonds, jewelry, etc., wherever burglary protection is required. Regularly made with rectangular and round doors in 5 sizes from $14 \times 17\frac{1}{2} \times 15$ in. to $24 \times 24 \times 24$ in.

Constructed of alternate layers of open hearth steel plates, torch resisting plates and drillproof chrome steel plates. Ball bearing hinges and high grade bank combination locks. Finished in green enamel, striped in gold; combination dial black with white numbers; hinges and bolt work heavily nickeled.



Rectangular Door Chest



Round Door Chest

THE HALL'S SAFE CO.

FACTORY AND GENERAL OFFICE

Spring Grove Avenue (P. O. Box 846)
CINCINNATI, OHIOCABLE ADDRESS
"HALL'S SAFE"

Products

FIREPROOF SAFES, FIREPROOF VAULT
DOORS, VAULT EQUIPMENT.

For Banking Institutions in All Branches:
Fireproof Book Vault and Storage Vault
Doors of various styles; Steel Vault Lin-
ings; Grilles and Grille Partitions; Safety
Deposit Boxes; Tellers Chests; Heavy Bur-
glarproof Chests; Filing Safes; Express or
Messenger Boxes; Combination Locks; Key Locks.

*For Offices, Business Houses, Hotels, Churches,
Residences and Apartment Houses:* Fireproof Vault
Doors of various styles; Steel Vault Linings; Fireproof
Safes with Wood or Metal Cabinet; Burglarproof Safes
(jewelers style); Burglarproof Chests; Fireproof Safes
with Burglarproof Chests installed; Deposit Boxes for
Hotels having Jewelry Salesman's Storage Compart-
ment; Lockers; Altar and Tabernacle Safes; Wall
Safes; Coin and Silver Safes. We specialize in Cedar

Lined Burglar and Fireproof Garment, Silk
and Fur Safes in many popular sizes.Send for blue prints showing these
safes.

Service and Quality

Our engineering department has been
created for the purpose of assisting the archi-
tect in connection with proposed vault work,
equipment, installation, etc., and the company invites
inquiries and will be pleased to furnish plans, layouts and
specifications on request without charge or obligation.
Charts, cuts and photographs are on hand fully describ-
ing in detail the various elements of our work.

Our plant and organization is devoted exclusively
to the manufacture of the above described work which
is made with utmost skill and care, from the highest
grade materials of their respective kinds. Stock of all
our products carried for prompt delivery.



No. 15 AA Style Fireproof Vault Door

Right-hand swing door. For wall opening, 79 in. high, 36 in. wide,
20-in. finished wall. Clear walkway, 76 in. high, 30 in. wide



No. 1 Style Insulated Fireproof Vault Door

Right-hand swing door. For wall opening, 79 in. high, 32 in. wide,
20-in. finished wall. Clear walkway, 76 in. high, 26 in. wide

FIREPROOF VAULT DOORS

No.	Wall opening, in.			Clear opening, in.		Door plate, in.	Door on edge, in.	Bolts			Bolt frames, in.	Door	Weight, lb.
	High	Wide	Deep	High	Wide			Cross	Up	Down			
Tile A.....	76½	26	13½	73½	20	3/16	3/8	2	1	1	Angle, 2x2x3/16	Single	500
1-AA.....	79	32	20	76	26	3/16	3/8	4	1	1	Angle, 2x2x3/16	Single	635
15-AA.....	79	36	20	76½	30	3/16	3/8	4	1	1	Angle, 2x2x3/16	Single	750
10-AA.....	82	44	24	78½	38	1/4	7/16	8	2	2	Angle, 2x2x3/16	Double	1000
1-Insulated.....	79	32	20	76	26	*	*	3	1	1	Angle, 3x3x1/4	Single	900

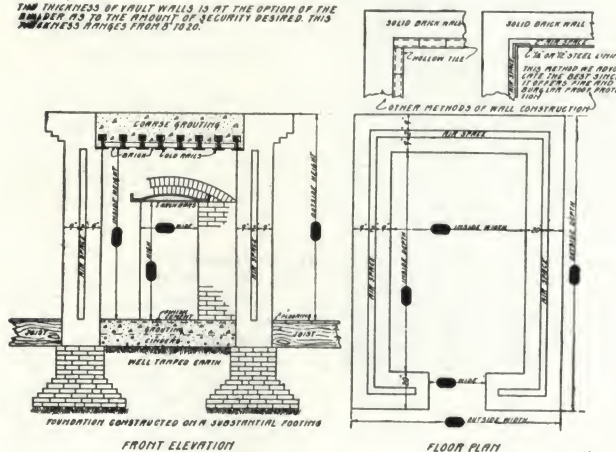
*Thickness of door, 3 in.

Remember the Trade Mark.

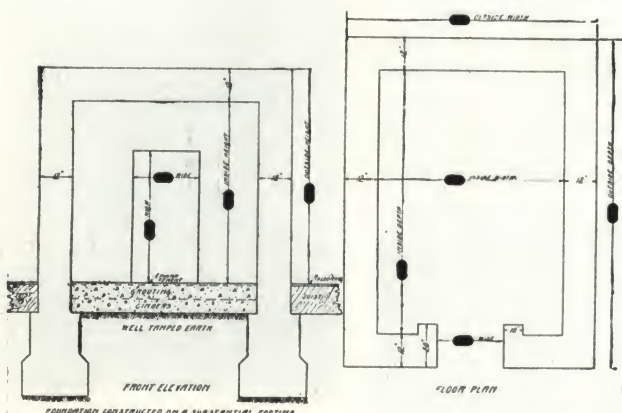
Specifications—The contractor shall furnish and install a Hall's Safe Co., No. 15-AA Style Fireproof Vault Door for wall opening 79 in. high, 36 in. wide and 20-in. thick finished wall. Clear walkway through doorway, 76 in. high, 30 in. wide. Outer door $\frac{3}{8}$ -in. thick solid open hearth steel plate, reinforced at all edges with 2x2x $\frac{3}{8}$ -in. steel angles, making door $\frac{3}{8}$ -in. thick on edge. This door secured by 4 horizontal 1 up and 1 down locking bolts 1-in. diameter cold drawn steel, and checked by a 4-tumbler combination lock having innumerable changes in its combination. Vestibule, No. 16 gauge steel plates securely fastened to front and rear angle frames. Inner doors constructed of solid $\frac{3}{8}$ -in. thick open hearth steel plates, and, when opened, to swing back against vestibule on each side. When closed, these doors to overlap and be secured by flat up and down bolts operated by a lever handle, and checked by a flat key lock having duplicate keys. Vault door to have flanges overlapping the walls at front and back. Back flanges to be removable for setting vestibule in place. All handles, tips, dials and bolts to be polished and heavily nickelplated. Inner and outer doors to be painted black with gold ornamentation and varnished. Door to weigh 750 lb.

Specifications—The contractor shall furnish and install a Hall's Safe Co. No. 1 Style Insulated Fireproof Vault Door for wall opening 79 in. high, 32 in. wide, 20-in. thick finished wall. Clear walkway through doorway, 76 in. high, 26 in. wide. Outer door plate $\frac{5}{8}$ -in. thick open hearth steel reinforced at all edges with 3x3x $\frac{1}{4}$ -in. steel angles bent to form door jambs that close against corresponding frame jambs. This entire

THE THICKNESS OF VAULT WALLS IS AT THE OPTION OF THE
BUYER AS TO THE AMOUNT OF SECURITY DESIRED. THIS
THICKNESS RANGES FROM 8 TO 20.



SPECIMEN PLAN ILLUSTRATING MODERN METHOD OF BRICK CONSTRUCTION FOR FIRE-PROOF VAULTS



SPECIMEN PLAN ILLUSTRATING MODERN METHOD OF CONCRETE CONSTRUCTION FOR FIRE-PROOF VAULTS:

This latest type of wall safe is used extensively in apartment houses, dwellings and offices, due to its special feature of fastening directly on the room walls and removing same when vacating with no destruction to walls. It can be anchored or stone walls during its construction or

an opening left and safe grouted in later. May also be placed in the floor under carpets (for secrecy) with no obstruction whatever when walked upon. These safes are constructed of heavy double gauge steel all around, including back, with a monolithic insulation between, making all walls and door solid 1½ in. thick. Doors hung on concealed hinge pins and checked by a regular safe combination lock having innumerable changes in its combination. A shelf divides the safe into two compartments.

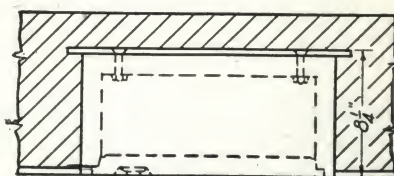
IN THE WALL METHOD

ON THE WALL METHOD

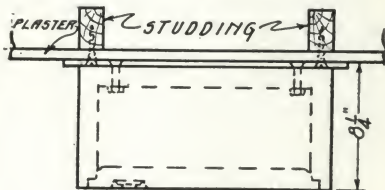
FINISH FLOOR

This safe affords convenience and secrecy and protects hourly valuable wills, deeds, documents, mortgages, policies, jewelry, silverware and currency against the ravages of fire, sneak thieves and dishonest help, and is indispensable to those who appreciate the real qualities that such a safe affords.

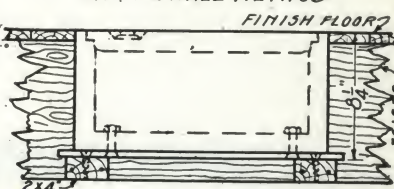
Full detailed instructions for installation furnished with each safe. Write for pamphlet.



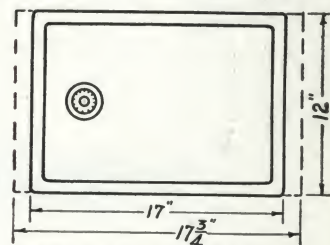
IN THE WALL METHOD



ON THE WALL METHOD



IN THE FLOOR METHOD



FRONT VIEW OF SAFE

INSULATED FIRE AND THEFTPROOF WALL SAFE

Exterior size:			
Height.....in.	12		
Width.....in.	17		
Depth.....in.	8		
Width over flange.....in.	17 $\frac{3}{4}$	Inside content area.....cu. in.	692
Clear interior size:		Approx. shipping	
Height.....in.	9 $\frac{1}{2}$	weight.....lb.	50
Width.....in.	14 $\frac{1}{2}$		
Depth.....in.	5 $\frac{1}{2}$		

HERRING-HALL-MARVIN SAFE CO.

GENERAL SALES OFFICE AND FACTORIES

HAMILTON, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 400 Broadway
CHICAGO, ILL., 223-225 West Lake StreetBIRMINGHAM, ALA., 1807 First Avenue North
SAN FRANCISCO, CAL., 214 California Street

Products

FIREPROOF SAFES, Underwriters' Laboratories, Inc., Class "A" and Class "B" Label; BURGLARPROOF BANK and SAFE DEPOSIT VAULTS; FIREPROOF VAULT DOORS; VAULT EQUIPMENTS.

Also manufacturers of Filing Devices; Safe Deposit Boxes; Steel Lined Safe Deposit Safes for hotels and clubs; Silver Safes and Special Safes and Vaults for residences; Burglarproof Chests, Messenger Boxes, etc.

Fireproof Safes

The greatest possible structural strength is built into these safes. Angles and panel bars are of heavy steel and are fully welded together.

The insulation is of monolithic type and its engagement with the outer and inner walls of the safes is such as to consolidate strength and maximum heat resistivity. Perfect engagement of the doors with the safe structure is assured through pressed steel jambs with interlocking tongues and grooves supplemented with interlocking rear flanges. A patent strip seals the entire joint between the jamb and the rear flange of the doors. The doors are hung on ball bearing hinges. Heavy round steel locking bolts and their related connections are fully insulated from the face of the door. The combination lock is protected with a chrome steel drillproof plate. All safes are equipped with adjustable filing devices installed in accordance with specific requirements.

A selection of fifteen sizes is provided in the Class "A" safes and twelve sizes in the Class "B" safes, ranging from 38½ cu. ft. to 1¼ cu. ft. in capacity.

Standard finish is olive green.



Class A Fireproof Safe No. 4030

Outside, 58 in. high, 40½ in. wide, 30 in. deep. Inside, 40 in. high, 30½ in. wide, 19¼ in. deep

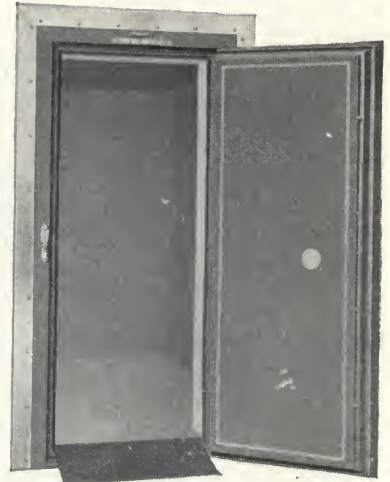
Fireproof Vault Fronts

Specifications—Sides and top No. 16, bottom ⅛-in. sheet steel. Front frame formed of 3⅞x⅜-in. open

hearth steel bars, riveted at the bottom into 2½x¼-in. sill bars, fastened at the top by bar clips.

The rear frame is formed of 1¼x1¼x⅜-in. open hearth angles, securely fastened to the vestibule. Removable bars 4x⅜ in. are fastened on the back of the rear angles. These bars may be removed until the vestibule is set into the wall, after which they are to be replaced, thus holding the vestibule securely in position.

Outer door plate formed of ⅜-in. open hearth steel, reinforced on sides, top and bottom by 2x¼-in. bars, making doors 7⅞ in. thick on edge.



No. 7830 Certified Fireproof Vault Door Bearing the Six-hour Label of the Underwriters' Laboratories, Inc.

Door is 5½ in. thick with pressed steel jambs, containing the fireproof insulation. Jambs are built with two flanges and one tenon and groove at top, front and bottom and have an interlocking flange with patented spring seal at rear. Clear opening through vestibule is 77 in. high by 30 in. wide. Shipping weight approximately 1650 lb.

FIREPROOF VAULT FRONTS

No.	Wall opening		Clear opening		Weight lbs.
	Height, in.	Width, in.	Height, in.	Width, in.	
22	81½	34½	77¾	29	920
21	81½	34½	77¾	29	890
20	81½	34½	77¾	29	835
19	79	32	75½	26½	740
17	79	32	75½	26½	740
14	81½	44	76¾	36½	1180

Burglarproof Vault Equipments

Factories are fully equipped to manufacture both the simplest and cheapest, and the heaviest and most elaborate vault equipments of every description. The record and reputation established through a period of continuous service, covering over eighty years, are so well known as to require no comment.



Burglarproof Vault Door

Co-operative Service

The Engineering Department is at the disposal of architects and customers, and will gladly submit designs, specifications and estimates promptly. All inquiries will receive immediate attention.

THE MOSLER SAFE CO.

GENERAL SALES OFFICE AND FACTORIES

HAMILTON, OHIO

BRANCH OFFICES

ATLANTA, GA., 38 Arcade Building
BOSTON, MASS., 84-90 Sudbury Street
CHICAGO, ILL., 58-60 West Lake Street
CINCINNATI, OHIO, 615-16 Dixie Terminal Building
DALLAS, TEX., 427 Santa Fe Building

LOS ANGELES, CALIF., 727 Citizens National Bank

KANSAS CITY, MO., 714 Delaware Street
NEW ORLEANS, LA., 1026 Hibernia Bank Building
NEW YORK, N. Y., 373 Broadway
PORTLAND, ORE., 205 Railway Exchange Building
SEATTLE, WASH., 1217 Alaska Building
Building, 453 South Spring Street

Products

SAFES AND VAULTS:

Fireproof Safes, Burglarproof Safes, Chests, Bank Vaults, Safe Deposit Boxes, Book Vaults, Record Vaults, Silver and Fur Storage Vaults; Safes and Vaults for hotels, clubs, jewelers, residences, oil and service stations, etc.

Fireproof Vault Doors

The type shown as No. 51 is made in various sizes and thicknesses. Especially constructed for book vaults, record vaults, storage and office buildings. Right or left swing.

Specifications—The contractor shall furnish and install a Mosler No. 51 Vault Front for a wall opening, 77 in. high, 27½ in. wide and 13½ in. deep. Clear opening of this door, 74 in. high x 23½ in. wide. The outer door plate to be ⅝ in. thick of open hearth steel, reinforced with ⅝-in. angle bolt frames, making the door ¾ in. thick on all edges and across center for lock protection. This door to have three single acting locking bolts 1 in. in diameter, operating across the door through the angle bolt frames mentioned above and controlled by a Mosler Combination Lock and Lever handle. The door to be equipped with an antidynamite device to protect the combination lock and bolts against explosives or external violence. The door swings to the right on pintle hinges.

The inner doors to be ⅝ in. thick, of open hearth steel. The right-hand door to overlap the left-hand door and have flat bolt work at top and bottom and interlocking at the center, controlled by a patent key lock. Vestibule to have removable flange bars secured to the rear frame, so that this vault front can be placed in position after the walls are built and plastered. Outer door and inner doors to be finished in black and varnished—outer doors striped; inner vestibule finished in gray. Bolt work, hinge tips, handles, trimmings, heavily plated, nickel rubbed to satin finish.



Mosler No. 51 Vault Front

To fit finished masonry opening 77 in. high, 27½ in. wide, 13½ in. deep. Wall thicknesses can be increased or reduced, if desired



Counter Height Safe

Designed especially for use in banks, with or without wheels

Fireproof Safes

For books, filing, etc.

We manufacture and have for immediate delivery

fireproof safes bearing the Underwriters' Class A and Class B Label for fire protection, and T 20 for burglar protection.

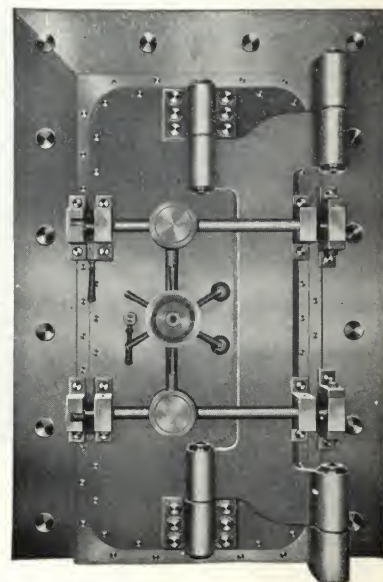
These safes equipped with metal interiors to suit requirements. Built in all sizes including counter height as shown.

Engineering Service

Any of our branches will cheerfully furnish you with competent engineering service to aid you in preparing plans and specifications for burglarproof bank or safe deposit vaults.

Write, or wire our factory collect, and our nearest representative will call on you.

We build these vaults in various sizes and thicknesses; in each case to meet the particular requirements.



Burglarproof Vault Front

INSURANCE REQUIREMENTS

Class	Minimum thickness of door, in.	Thickness reinforced concrete walls, in.	Thickness non-reinforced concrete walls, in.	Note
1	Fireproof			
2	1½	12	12	The floors and roofs of vaults must coincide with walls. Reinforcing can be of any practical type such as ¾-in. bars, 6 in. on centers, railroad rails, etc.
3	1½	12	12	
4	2½	12	18	
5	3½	12	18	
6	3½	18	36	
7	5½	18	36	
8	6	18	36	
9	7	18	36	
10	9½	27	54	

Explanation—No. 10 Class is the best rating given. The wall thicknesses above mentioned can be reduced if the inside walls, floor and ceiling are lined with a continuous steel lining equivalent. These equivalents are as follows:

Non-reinforced Concrete	Reinforced Concrete
12 in. equals ¼-in. lining	12 in. equals ½-in. lining
18 in. equals ½-in. lining	18 in. equals 1-in. lining
Each additional 3 in. equals ¼-in. lining	27 in. equals 1½-in. lining

ESTABLISHED 1872

THE SCHWAB SAFE COMPANY

Manufacturers of Vault Doors, Safes and Burglarproof Chests

LAFAYETTE, IND.

Products

VAULT DOORS, SAFES, FILING SAFES, FUR SAFES, WALL SAFES and BURGLARPROOF CHESTS.

Service

We maintain at all times a carefully selected group of experts in our line, and will be glad to receive correspondence covering any special requirements, as well as our standard products.

Catalogue will be sent on request, without obligation.

Schwab Insulated Vault Doors (Underwriters' 2-Hour Label)

Specified where maximum fire protection is required.

Schwab's 2-hour Vault Doors have a wide extra margin of safety—the equivalent to approximately a $3\frac{1}{2}$ -hour door. No greater protection will ever be needed. The strain on a vault door, where only one side is exposed to the fire and heat, is not nearly so great as on a safe where all four sides are exposed. And on an insulated safe, a 4-hour label is maximum.

Both the No. 2674B (single door) and the No. 3674B (double door) are of



TRADE-MARK

new type, with interlocking tongue and groove, insulated doors and joint.

It has been tested at the Underwriters' Laboratories, Inc., for:

- (1) Ease and practicability of installation.
- (2) Fire endurance test.
- (3) Fire and hose stream test.

The official Underwriters' report says:

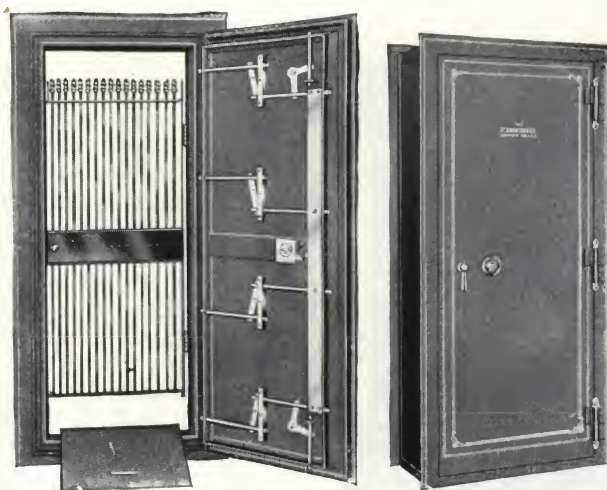
"At the close of the test the papers were found to be in good condition with no traces of heat and no discoloration from smoke."

In every Schwab insulated vault door or safe, there is a substantial extra margin of safety.

Send for our complete Architect's Portfolio, containing architects' specifications and details of vault doors, vault construction, underwriters' requirements, and contractors' and engineers' specifications.

Locking Mechanism—

On inside of door are four double acting horizontal bolt bars $\frac{7}{8}$ -in. diameter cold rolled steel, operated by a cam working forward and backward and two $\frac{7}{8}$ -in. diameter bolt bars, one up and one down, all extending $\frac{3}{4}$ in. into jamb, checked by a 4-tumbler combination lock. Lock fastened to reinforcing strip on inside of door, engaging cam operated by handle on outside face of door.

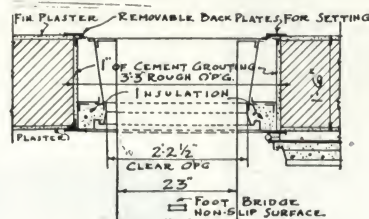


No. 2674B, Schwab 2-Hour Vault Door

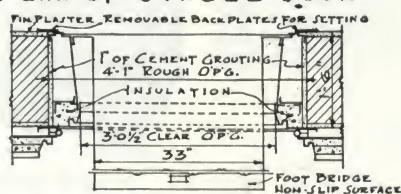
No. 3674B is the same with double door

NOTATIONS

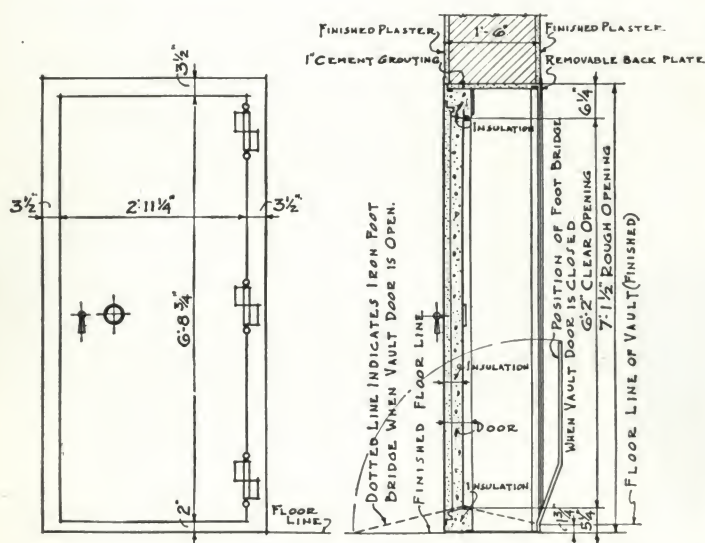
JAMBS AND HEADS GROUTED WITH CEMENT AS INDICATED ON DRAWINGS.
REFER TO INSTALLATION SPECIFICATIONS WHICH ARE DEMANDED BY THE UNDERWRITERS LABORATORIES



PLAN OF SINGLE DOOR



PLAN OF DOUBLE DOOR



ELEVATION

VERTICAL SECTION

Elevation, Section and Plan of Schwab Insulated Vault Door

Foot Bridge—A $\frac{1}{4}$ -in. thick safety tread steel plate foot bridge, hinged to turn inside when vault door is closed.

Day Gate—The day gate, complete with lock and alarm bell, as illustrated in the open view on this page, can be furnished at additional cost.

Hardware and Finish—Dark olive green lacquer, gold striped. All trimmings and bolt work heavily nickelplated.

Size—Vault doors bearing Underwriters' label can not exceed clear door opening size 38 in. in width, 78 in. in height, nor less than 10 in. in depth. The same fireproof construction can be furnished in larger size doors or in doors with narrower vestibule, but without Underwriters' label attached.

STOCK SIZES SCHWAB 2-HOUR VAULT DOORS

Door No.	Clear opening, in.	Wall opening, in.	App. shipping weight, lb.
Single door No. 2674-B...	26 $\frac{1}{2}$ x74x18	39x85 $\frac{1}{2}$	1500
Double door No. 3674-B...	36 $\frac{1}{2}$ x74x18	49x85 $\frac{1}{2}$	1800

Architect's Specification—No. 2674-B, or No. 3674-B—For the convenience of the architect the following specification to cover the New Type Insulated Door Vault is furnished:

The contractor shall furnish and install a No. 2674-B (or 3674-B) Schwab Insulated Fireproof

[Single] [Double] Vault Door with interlocking tongue and groove, drawn steel frame and door flanges and jambs, as manufactured by THE SCHWAB SAFE COMPANY, Lafayette, Ind. Outside door shall have four double acting horizontal bolt bars operating on a cam working forward and back and two vertical bolt bars, one operating up and one down, $\frac{7}{8}$ -in. in diameter, cold rolled steel, checked by 4-tumbler combination lock. The outer door shall be insulated with $3\frac{1}{2}$ in. of insulating material tested by the Underwriters' Laboratories, Inc., and bearing the Underwriters' Laboratories 2-hour heat label. The frame and door jambs with interlocking tongue and groove shall be No. 16 U. S. gauge cold drawn steel and interlocked perfectly, one within the other. Vault shall be finished in dark olive green lacquer finish and striped. All trimming and bolt work shall be heavily nickelplated.

The masonry wall shall be * in. thick with opening for vault door [39] [49] in. wide and 85 $\frac{1}{2}$ in. high.

Rear flange of vault frame shall be removable so that door can be installed after the building is completed.

Inside clearance of door shall be [26 $\frac{1}{2}$] [36 $\frac{1}{2}$] in. wide, 74 in. high.

Note: Masonry wall must not be less than 10 in. thick in order to obtain Underwriters' approval.

Note:—Our complete Architect's Portfolio, containing specifications and details on vault doors, vault construction, Underwriters' requirements, contractors' and engineers' specifications, will be sent you on request.

Schwab Standard Fireproof Vault Doors

These vault doors do not bear the Underwriters' Label, but will meet the requirements of the majority of installations.

DIMENSIONS STANDARD FIREPROOF VAULT DOORS

Style	Clear opening through vestibule		Rough wall opening		Weight, lb.
	Width, in.	Height, in.	Width, in.	Height, in.	
No. 10	25	74	32	77	580
No. 20	25	74	32	77	620

Carried in stock sizes with 18-in. vestibule, and can be made proper size to fit any wall opening.



No. 10

No. 20

Schwab Standard Fireproof Vault Doors

Installation Requirements, No. 10—For installation, the clear opening in the vault wall should be 77 in. high, 32 in. wide, and 18 in. deep. The vestibule can not be made less than 16 in. for our standard width vault for the inside doors to pocket in the vestibule.

A vault 2 in. less in width will allow the inside doors to pocket in a 15-in. vestibule; 4 in. less in width will allow inside doors to pocket in a 14-in. vestibule, and so on.

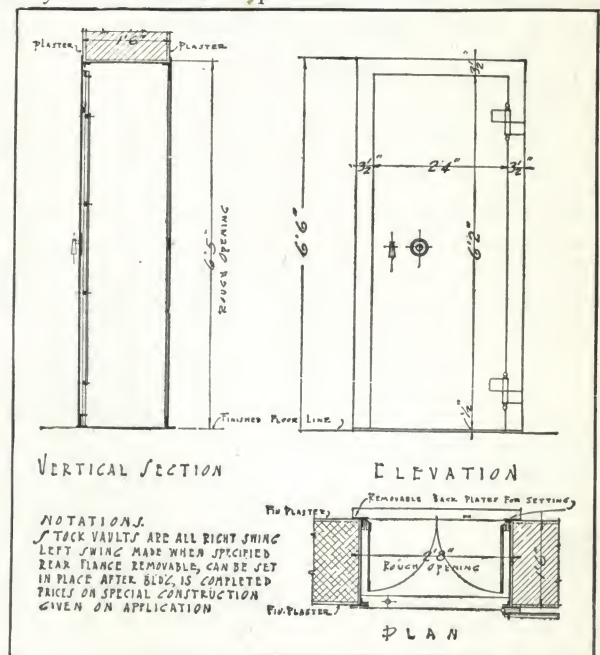
Locking Mechanism—Outside door has three cross bolts 1-in. diameter cold rolled steel and checked

by a 4-tumbler lock. Inside doors have one up and one down bolt checked by a heavy key lock.

Hardware and Finish—The handles, hinge tips, lock dials, cross bolt and carrying bars are polished and heavily nickelplated. Door handsomely finished in dark olive green with gold striping.

Installation Requirement No. 20—This style is similar in construction to the No. 10 vault door. Bolt work on this door, however, consists of four horizontal bolts, and one up and one down bolt 1-in. diameter of cold drawn steel.

Estimates—We can build any vault door to specification or duplicate any vault door specified in your plans, regardless of construction. Allow us to figure with you. It will be a pleasure.



Dimension Diagram, Schwab Vault Doors Nos. 10 and 20

Architects' Specifications, No. 10—The contractor shall furnish and install Schwab's No. 10 Fireproof Vault Door manufactured by THE SCHWAB SAFE COMPANY, Lafayette, Ind. Outside door to have three cross bolts, 1-in. diameter cold rolled steel, checked by a 4-tumbler combination lock. Inside doors to have heavy flat bolts and key locks. Vault to be finished in dark olive green with gold striping. All trimmings and bolt work heavily nickelplated. The vault wall opening to be 77 in. high, 32 in. wide, 18 in. deep and must be built square, plumb and level; rear flange of vault frame to be removable so contractor can install vault door after building is completed and

not mar the finish. Inside clearance of vault door, 74 in. high and 28 in. wide. Approximate weight, 580 lb.

Architects' Specifications, No. 20—The same as No. 10, with this change in bolt work: "Outside door to have four cross bolts, one up and one down bolt, 1-in. diameter cold rolled steel, checked by a 4-tumbler combination lock."

We can furnish special vault doors in either double or single door, with any desired number of bolts and any thickness of door plate up to ½ in. thick.

Can be made with either right or left-hand swing doors and proper size to fit any vault wall opening.

Schwab Safes and Burglar Proof Chests

We will gladly furnish specifications or measurements upon request and assist beforehand on any built-in features contemplated in any of your plans.

Safes—Schwab builds perhaps the most complete line of safes of any manufacturer in this field. For maximum protection against fire Schwab builds the "A Label Safe" (4-hour Underwriters' Label); for a slightly lesser degree of protection, the "B Label Safe" (2-hour Underwriters' Label); and for ordinary protection the standard line of medium walled and heavy walled safes.

Insulated Filing Safes—For the protection of valuable records Schwab's Insulated Filing Safes give complete protection; complies with the Underwriters' requirements and carry their label for insulated cabinets. These safes can be equipped with any filing arrangement to fit the requirements of the purchaser.

Fur Safes—In addition to building a very comprehensive line of standard single type and multiple type fur safes, we build fur safes to any specification.

Besides the added protection, fur safes beautify the modern display room, create an impressive atmosphere and effect a considerable saving in burglary insurance rates. We would be pleased to have you refer to any number of notable installations we have made. Confer with our engineering and designing staff.

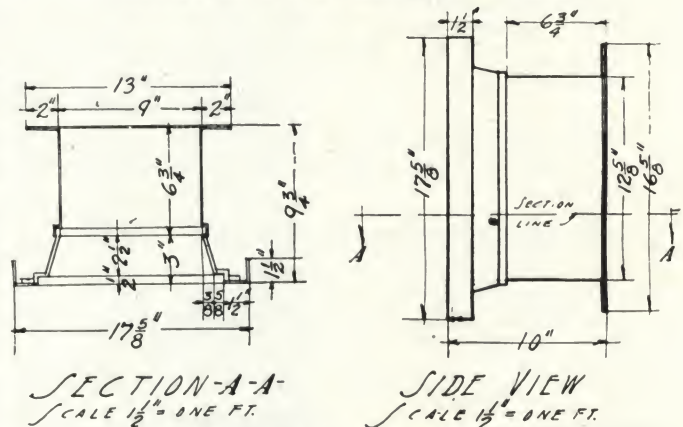
Jeweler's Safes—These safes afford maximum burglary protection combined with an attractiveness that will add beauty to any jewelry establishment. The inside may be arranged in any manner to suit the requirements of the jeweler. The standard safe, however, is ready equipped with cabinets, drawers, etc. We will be pleased to submit suggestions for the interior arrangements of these safes.

Burglarproof Chests—Filling stations, chain stores, theaters, etc., where considerable moneys or valuables are carried at all times, need, or rather are practically forced, to provide the protection of a burglarproof chest.

Schwab's Burglarproof Chests are built to install in the wall, anchor in a cement block or to place inside a regular safe. The line includes a circular door chest, a heavy steel chest and a lighter semisteel chest. Send for details.



Schwab No. 10 Wall Safe (Phantom View)



Detail of No. 10 Wall Safe

Wall Safes—This fireproof wall safe No. 10 is especially adapted for installation in homes, apartment houses, offices and hotels. Placed in the wall, it releases for other uses floor space otherwise occupied by a floor safe and, at the same time, affords greater secrecy together with protection and safety.

The interior of this wall safe is most conveniently arranged for utmost service and facility of use.

This safe is sturdily constructed throughout. The door is insulated 2½ in. thick. It has regular T-handle and combination lock, and tongue and grooved door and frame. There is a ¾-in. back plate to anchor in the wall and to prevent tampering from the back. The approximate weight of the safe is 75 lb.

Schwab's Architectural Service

Engineering Staff

We maintain a most competent staff of engineers to assist you with any problems within our scope.

Literature

Upon request we will gladly send you a copy of a recent set of specifications and details on vault doors and vault construction. This is prepared in letter file size and the entire series sent enclosed in a jute file folder with cross filing cards—A.I.A. 18 G. This series has been heartily endorsed by hundreds of architects.

We also would be pleased to send you data on fur safes, filing safes, wall safes, or our general catalogue.

The Company

The Schwab Safe Company has been building quality safes for more than 55 years. We have a very modern up-to-date plant with all modern manufacturing facilities.

Shipments

Shipments are made promptly, due to the large capacity of our plant and the excellent railroad connections.

YORK SAFE AND LOCK COMPANY

FACTORY AND HOME OFFICE

YORK, PA.

BRANCH OFFICES AND SALESROOMS IN PRINCIPAL CITIES

Products

High grade BANK and SAFE DEPOSIT VAULTS; SAFES; SAFE DEPOSIT BOXES, and general Vault Equipment; special BURGLAR CHESTS and SAFES for theaters, gas stations and furriers.

York No. 402 Vault Entrance

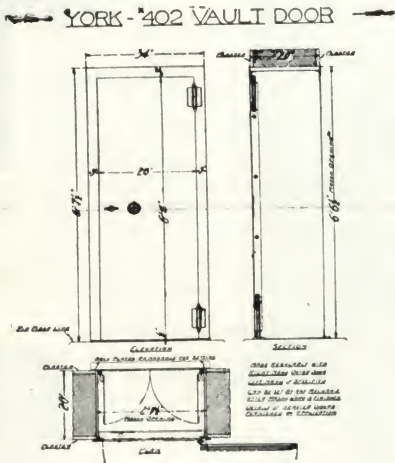
Standardized to fit opening 78½ in. high and 31½ in. wide for wall 20 in. thick. Can be furnished for walls of greater or lesser thickness when required.



No. 402 Vault Entrance

The illustration shows one of a type of York vault entrances which can be furnished in a variety of sizes and designs. The No. 402 has outer door ¾ in. thick equipped with four horizontal and two vertical locking bolts, checked by a high grade combination lock. The inside doors are ⅜ in. thick and locked by a flat key lock. The back frame of the entrance is detachable, permitting the entrance to be set after the walls are finished. The entrance is handsomely finished in black with gold striping. Bolt-work, handle and hinge tips are heavily nickelplated.

Illustrations and complete specifications of other sizes of entrances will be sent on request.



Insulated Doors

When walls cannot be made of sufficient thickness to accommodate an entrance with both outer and inner doors the York No. 423 vault entrance with single insulated door 4½ in. thick is recommended.

Descriptive pamphlet will be mailed on application.

Round Door Burglary Chests

A thoroughly modern and up-to-date receptacle for safeguarding money and valuables with a splendid record for protecting its contents.



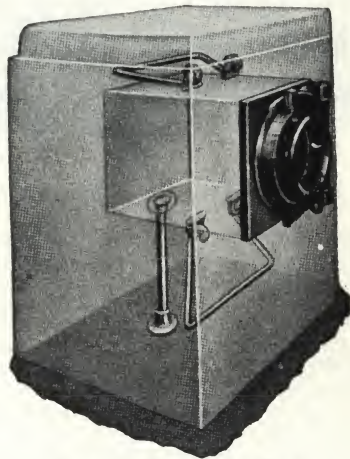
Round Door Chest

Made in five sizes from 14 to 30 in. high; 14½ to 24 in. wide; 14¾ to 24 in. deep. Body and door are solid steel castings hardened by special process. The door is ground to a perfect fit with the jambs and is equipped with a specially designed combination lock and auxiliary locking device.

Installed in York fireproof safes these chests are especially adapted to the requirements of theaters and amusement parks.

For use in gas stations and garages they are provided with lugs, anchor bars and leveling post as shown in the accompanying illustration and embedded in a concrete block.

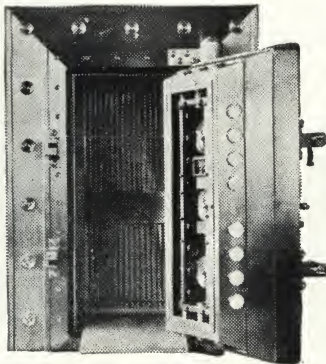
The top of the concrete block may be left exposed or be provided with a wood or metal desk top.



Chest in Concrete Block

Bank and Safe Deposit Vaults

We are designers and builders of bank and safe deposit vaults, large and small; safes, safe deposit boxes and other vault equipment. Established standard sizes and styles usually in stock for quick shipment. Especially constructed vaults in minimum time.



Bank Vault Door
15 in. thick

York bank vaults have been installed in many of the largest banks and financial institutions including the principal Federal Reserve Banks. Plans and specifications for any requirement will be submitted on request without charge or other obligation.

SARGENT & GREENLEAF, INC.

Bank Locks and Hardware

GENERAL OFFICES AND WORKS

Norton Street and Joseph Avenue, ROCHESTER, N. Y.

NEW YORK OFFICE, 79 Fifth Avenue

BOSTON OFFICE, 62 Summer Street

CHICAGO OFFICE, 166 West Lake Street

Products

TIME, COMBINATION, SAFE DEPOSIT and KEY LOCKS for Banks: Locks for Vault Doors and Gates, Cashiers' Lockers, Grille Gates and Tellers' Cages.

Also manufacturers of Lavatory Hardware, Door Pulls, Push Plates, and Locks and Bolts for all purposes.

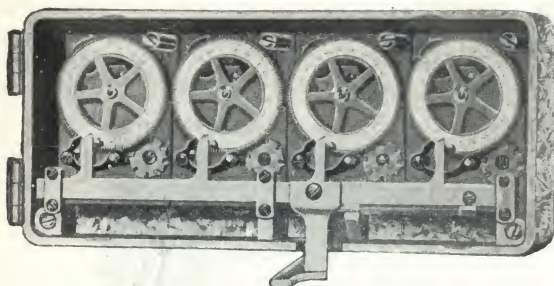
For Reversible Panic Locks, see page B2034.

Standard Bank Lock Specifications

(1) Sargent & Greenleaf locks shall be furnished unless written permission for substitution is granted the contractor before his bid is submitted.

Main Vault Door

Time Lock—(2) Furnish one 72-hour quadruple movement time lock, all parts including the movement to be made by lock manufacturer in its own factory. Hair springs shall be non-corrosive and non-magnetic. Each movement shall have a reserve power to lift at least 15 lb. when movement is at zero. Strength of "train" to be proportioned to spring power.



Quadruple Movement Time Lock

Manufacturer shall furnish guaranty against defects in material or workmanship for one year, after which period an inspection and cleaning service is to be maintained. Finish of all exposed parts of the lock shall match the bolt work.

(3) *Note:* Should a triple or double movement be desired, substitute the one desired in preceding paragraph.

Combination Lock—(4) Furnish two four-wheel, key-changing combination locks having a minimum of one hundred million changes and having extension bolts of positive actuating mechanism and outside spindle drive. Wheels shall be of "positive locking" type. Bolt actuating mechanism to have no springs or friction tubes. Dials and dial rings shall be cast bronze with black enamel finish and with 100 numbers and graduations filled with white enamel. Finish of all exposed parts of the lock shall match the bolt work.

Vault Emergency Door

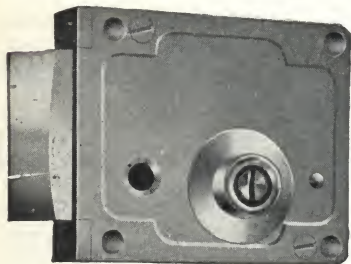
Time Lock—(5) Same as paragraph 2.

(6) Same as paragraph 3. Covers shall be locked in place by either the combination or by separate key locks set in the covers.

Combination Locks—(7) Same as paragraph 4.

Vault Day Gate

(8) Furnish one spring bolt lock No. 57. Lock shall be steel bushed and operative by push knob from inside and by key from outside. Lock shall be mounted back of frame and covered by finish plate outside. Bolt shall pass through frame. Lock case finish shall match polished steel gate.



No. 57 Iron Workers' Lock

Cashiers' Lockers

Combination Locks—

(9) Same as paragraph 4, except that first line shall read "Furnish two C-71 E key changing combination locks."

Safe Deposit Boxes

Locks for Boxes 2 in. Deep and Larger—(10) Furnish changeable key locks 4140 for single horn, 4340 for double horn; or 4240 for single horn, 4440 for double horn. Case shall be cast bronze.

Locks for 1½ and 1¾ in. Boxes—(11) Furnish changeable key locks 4120 for single horn, 4320 for double horn; or 4220 for single horn, 4420 for double horn. Case shall be cast bronze.

(12) *Note:* When installation contains large and small boxes use both paragraphs 10 and 11 and add to paragraph 11, "These locks shall be set to same preparatory key as the lock specified in paragraph 10—No. 4140, 4340, etc."

Note: For full line of safe deposit locks see catalogue, Safe Deposit Lock section.

Grille Gates

Swinging Gates—(13) Furnish one spring bolt lock No. 57 which shall be steel bushed with key operative both sides. Locks shall be master-keyed as instructed.

Lock shall be mounted back of frame and covered by finish plates both sides. Bolt shall pass through the frame. Case finish shall match polished steel gate.

Sliding Gates—

(14) Furnish spring bolt lock No. 57½ steel bushed. Locks shall be operated by key both sides and master-keyed as instructed.

Locks shall be attached back of frame with bolt passing through frame. Bolt shall be guarded against lifting with any thin instrument inserted in jamb. Finish plates on both sides. Key horns shall extend through the plates.

Tellers' Cages

Sliding Gates—(15) Furnish spring bolt lock No. 222 operating by sunken handle from inside and by key from either side, master-keyed as instructed.

Locks shall be attached back of frame with finish plates each side and with bolt passing through frame. Bolt shall be guarded against lifting with any thin instrument inserted in jamb. Finish plates both sides.

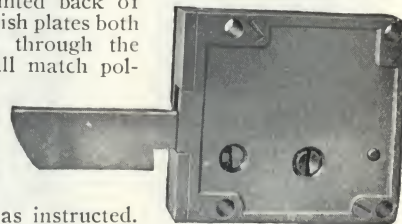
Alternate—(16) Furnish lock No. 226 with self-locking flush bolt operating by sunken handle from inside and key from either side, master-keyed as directed. Bolt shall be guarded against lifting with any thin instrument inserted in jamb. Finish plates on both sides.

Swing Gates—(17) Furnish mortise latch No. 11 with spring bolt operating by knob from inside and key from outside, master-keyed as instructed. Finish plates on both sides of gate.

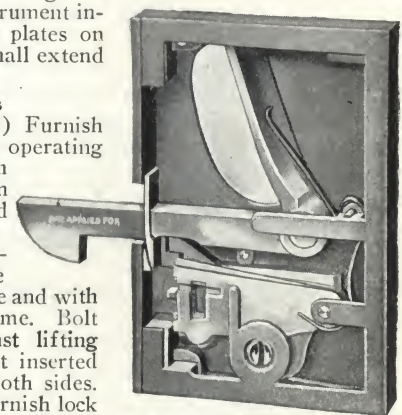
Tellers' Wickets

Swing Wickets—(18) Furnish spring latch No. 310½ key operating inside only.

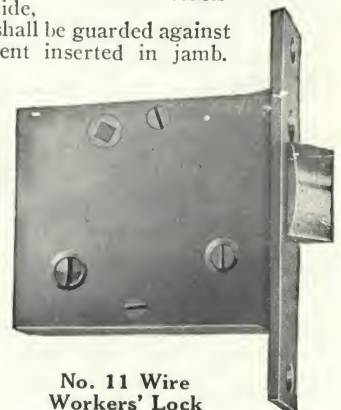
Alternate—(19) Furnish one lock No. 310-R with interlocking striker and key operating inside only.



No. 57½ Iron Workers' Lock



No. 222 Wire Workers' Lock



No. 11 Wire Workers' Lock

THE CONSOLIDATED EXPANDED METAL COMPANIES

Steelcrete Bank Vaults

GENERAL OFFICES

Steelcrete Building, Main and South Streets, WHEELING, W. VA.

SALES OFFICES AND WAREHOUSES

ATLANTA, GA., 232 Marietta Street
BOSTON, MASS., 201 Devonshire Street
BUFFALO, N. Y., 50 Wecker Avenue
CHICAGO, ILL., 2531 Arthington Street

CLEVELAND, OHIO, 9913 Elk Avenue
NEW YORK, N. Y., 103 Park Avenue
PHILADELPHIA, PA., 1075 Germantown Avenue
PITTSBURGH, PA., Oliver Building

ST. PAUL, MINN., 1429 Marshall Avenue
EXPORT OFFICE, 152 West 42nd Street, NEW YORK, N. Y.

Product

"STEELCRETE" EXPANDED METAL for the construction of burglarproof and mob-proof vaults.

For "Steelcrete" Expanded Metal Concrete Reinforcement see page A128; for "Steelcrete" Expanded Metal Plastering Lath, Stucco Binder, Corner Beads and Cold Rolled Channels, see page B1293.

"Steelcrete" Armor Vaults

The new principle on which vaults are now constructed is namely—"Given sufficient time and tools—any vault can be penetrated." The question of comparative resistance is, therefore, one of comparative time. The weight and size and number of tools required to penetrate are also factors and should be considered. The most accessible and most dangerous tools are: (1) explosives; (2) the cutting flame.

Concrete resists the cutting flame, hence the new principle of embedded Armor Mat is to so place the steel that it can not be attacked with a flame. Armor Mat Construction has been shown to be practically drill-proof and by almost inconceivable tenacity to resist attacks by explosives.

Vault designing has always been many years ahead of the tools of penetration. It is, therefore, only vaults in new buildings that are being designed to provide this "new safety." One of the oldest principles of protection which has never been surpassed is that of entanglement. "Steelcrete" Armor Mats are entanglements embedded in flintlike concrete. The design of these entanglements on account of their structural character are problems for engineers familiar with the application and design of concrete.

Construction Details

The high, uniform grade of steel, cold drawn, possesses great unit strength and high elastic limit. In mass, as used in vault construction, it is admirably suited to resist the force of powerful explosives. A grille work of chiselproof rods is closely threaded through the mat and binds it on all sides.

Specifications

Complete specifications and typical details furnished any architect on request.

Services

We furnish all Steelcrete and bars necessary to construct the Steelcrete Mats complete.

We furnish all necessary working drawings.

We give lump sum estimates.

We (by arrangement) supervise the installation of the "Steelcrete."

Send for "Protection Book."



TRADE MARK

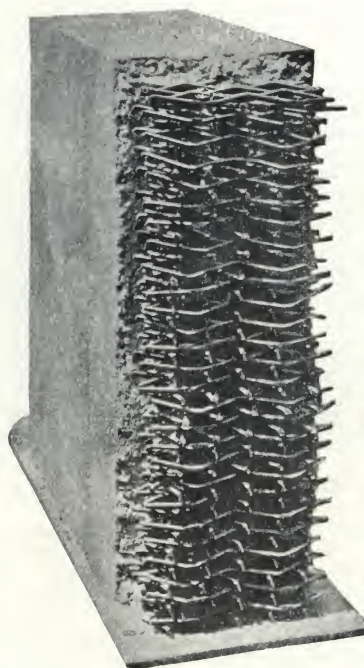
Installations

Probably the largest and strongest vault man ever attempted to construct is the new stronghold installed in the Federal Reserve Bank of New York. This financial institution was the first to use "Steelcrete" as vault protection. The vault has walls several feet in thickness, is three stories in height and an entire city block in length.

"Steelcrete" Armor Vault Protection has been used in the New Federal Reserve Branch Banks at Nashville, Tenn., Oklahoma City, Okla., New Orleans, La., Birmingham, Ala. and Jacksonville, Fla., Royal Bank of Canada, Bank of England and Mitsui Bank of Japan.

Steelcrete Vaults in the following buildings:

Baltimore Federal Reserve Bank, Baltimore, Md.
New York Life Insurance Building, New York, N. Y.
Connecticut Mutual Life Insurance Co., Hartford, Conn.
Mutual Benefit Life Insurance Co., Newark, N. J.
Mechanics National Bank, Burlington, N. J.
West Side City National Bank, Battle Creek, Mich.
Central Trust & Savings Bank, Rock Island, Ill.
Virginia Avenue State Bank, Indianapolis, Ind.
Union Indemnity Building, New Orleans, La.
Dollar Title and Trust Co., Sharon, Pa.
North Avenue State Bank, Milwaukee, Wis.
Suburban Trust & Savings Bank, Oak Park, Ill.
Lincoln Trust & Savings Bank, Chicago, Ill.
Wabash County Loan & Trust Co., Wabash, Ind.
Merchantville Trust Co., Merchantville, N. J.
Canal Bank & Trust Co., New Orleans, La.
Chattanooga Savings Bank & Trust Co., Chattanooga, Tenn.
Allegheny Title & Trust Co., Philadelphia, Pa.
City Bank of Kansas City, Kansas City, Mo.
Brooklyn Trust Co., Brooklyn, N. Y.
Glen Cove Trust Co., Glen Cove, N. Y.
Bloomfield Trust Co., Pittsburgh, Pa.
Wabash National Bank, Wabash, Ind.
First National Bank, Aliquippa, Pa.
Federal Land Bank, New Orleans, La.
Peoples Trust Co., Pittsburgh, Pa.
American Union Bank, New York, N. Y.
Federal Land Bank, Louisville, Ky.
South Shore State Bank, Chicago, Ill.
Prince George Bank, Hyattsville, Md.
North Shore Trust Co., Highland Park, Ill.
Aurora National Bank, Aurora, Ill.
Bank of Hawaii, Honolulu, T. H.
First National Bank & Trust Co., Utica, N. Y.
Dime Savings Bank, Waterbury, Conn.
Seaman's Bank for Savings, New York, N. Y.
Mutual National Bank, Chicago, Ill.
Bank of Akron, Akron, N. Y.
Franklin Savings Bank, New York, N. Y.
New American Bank, Oshkosh, Wis.
Dollar State Bank, Scranton, Pa.
Western National Bank, Chicago, Ill.
The State Bank & Trust Co., Elm Grove, W. Va.
West Allis State Bank, West Allis, Wis.
First National Bank, LaGrange, Ill.
Citizens National Bank, Latrobe, Pa.
Savings Bank of Utica, Utica, N. Y.
Beloit Savings Bank, Beloit, Wis.



Section of a "Steelcrete" Armor Mat

THE RIVET-GRIP STEEL CO.

Rivet-Grip System of Bank Vault Reinforcement

MAIN OFFICE

2404 Prospect Avenue, CLEVELAND, OHIO

WAREHOUSES AND FABRICATING PLANTS AT CLEVELAND, OHIO and CANONSBURG, PA.

SALES OFFICES

YORK, PA., Box 418
BOSTON, MASS., 98 Sudbury St.
NEW YORK, N. Y., 55 Maiden Lane
SAN FRANCISCO, CAL., Main and Howard Sts.

PHILADELPHIA, PA., 711 Chestnut St.
BALTIMORE, MD., 7 W. Redwood St.
CHICAGO, ILL., 217 W. Monroe St.

HOUSTON, TEX., 1120 Main St.
SEATTLE, WASH., 112 Third Ave., South
TAMPA, FLA., 604 Madison Street
CHARLOTTE, N. C., 615 Independent Trust Bldg.

SALES REPRESENTATIVES

ATLANTA, GA., HUGH J. BAKER & Co., Candler Bldg.
BUFFALO, N. Y., KENMORE BUILDERS' SUPPLY CO., 2646 Delaware Ave.
CHARLESTON, W. VA., CONCRETE ENGINEERING PRODUCTS CO., 215 Hale St.
CINCINNATI, OHIO, HUGH J. BAKER & Co., 421 Union Trust Bldg.
DENVER, COLO., J. W. BRANNAN SAND & GRAVEL CO., 4800 Gilpin St.
DETROIT, MICH., CAPITOL STEEL CORP., 622 Polk Directory Bldg.
INDIANAPOLIS, IND., HUGH J. BAKER & Co., 602 W. McCarty St.

LANSING, MICH., CAPITOL STEEL CORP., 236 Tussing Bldg.
MINNEAPOLIS, MINN., THE HUSTAD CO., 529 So. 7th St.
OMAHA, NEB., GATE CITY IRON WORKS, 11th and Seward Sts.
PITTSBURGH, PA., J. WILLIS DALZELL CO., 1401 Commonwealth Bldg.
SALT LAKE CITY, UTAH, F. S. PORTER, Kearns Bldg.
SAN FRANCISCO, CAL., J. A. KINKEAD, Call Bldg.
ST. LOUIS, MO., HARRY C. UHLENHAUT, 2144 Railway Exchange Bldg.

Products

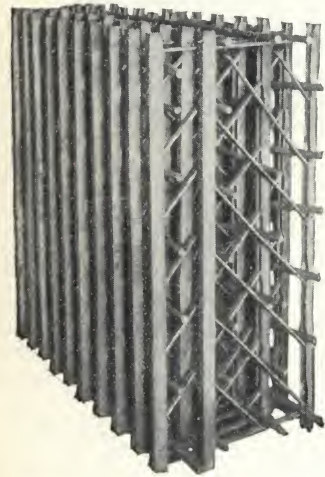
RIVET-GRIP BANK VAULT REINFORCEMENT.

For Rivet-Grip Steel Joists, see pages A576-577.

Also manufacturers of Rivet-Grip rigid, shop-fabricated truss bridge roadway reinforcement. (Description on request.)

Rivet-Grip Vaults

The high regard which bank architects and engineers have for Rivet-Grip vaults, and the prestige which the system has attained, is evidenced by the fact that the Rivet-Grip System has been installed in nearly twice as many Federal Reserve vaults as any other type of vault reinforcement offered on the market since the Federal Reserve vault tests. It is significant, that in every instance where Rivet-Grip was purchased by a Federal Reserve Bank, either an official of the bank, its architect, or vault engineer represented the bank at the Federal Reserve tests, and the sale of Rivet-Grip was due to recommendations carried back by eye witnesses, after seeing the efficient performance of Rivet-Grip in these severe tests.



Rivet-Grip Reinforcement—
Vertical Type

As a result of the Sandy Hook tests, Rivet-Grip System was adopted for nine Federal Reserve bank buildings, including the banks of Cleveland, St. Louis, Minneapolis and San Francisco, and the Federal Reserve branches at Cincinnati, Louisville, Pittsburgh, Little Rock and Salt Lake City. The Rivet-Grip System has also been used in several hundred national and state banks. (See brief list on following page.)

Balanced Protection for Bank Vaults

The first requisite for security in a bank vault is *balanced protection*—equal protective strength throughout. In other words, the walls, floor and roof should be no less secure than the vault door.

In the Rivet-Grip System, this balanced protection is obtained through a new system of steel reinforcement, which is fabricated in various sizes to give the walls and slabs a protective value equivalent to that of any particular door from 4 to 48 in. in thickness.

Why Rivet-Grip Insures Balanced Protection

To penetrate a vault wall reinforced with Rivet-Grip steel frames requires a long period of time, a great variety of equipment and frequent changes in the attacking operations.

Drills must be used to penetrate the concrete, explosives are required to break up the concrete, chipping tools are necessary to separate the concrete from the steel, and torches must be used to cut the heavy Rivet-Grip sections. Moreover, the disposition of steel in a Rivet-Grip wall is such that all these operations must be repeated many times through the thickness of the wall.

There are no weak points in a Rivet-Grip protected vault. The frames interlock at all corners. The door connections are as strong as the vault door itself. The scientific design of Rivet-Grip reinforcement insures balanced protection throughout.

Design

The Rivet-Grip System consists of an interlocking network of heavy shop-fabricated frames and plain round bars, embedded and interlocked through practically the full thickness of the concrete work.

The Rivet-Grip frames are composed of two parallel, heavy Rivet-Grip main sections, joined at close intervals by lighter diagonals, which form the web of the frames. The joint, or Rivet-Grip, is formed under a 30-ton pressure which forces the metal in the main sections around the knobs on the diagonals, joining these members so securely that the diagonals will break in tension before loosening at the Rivet-Grip.

The loose bars are laced through the frames perpendicular to the plane of the web members. They are held in position automatically and need not be wired.

All Rivet-Grip reinforcement is accurately fabricated and comes to the job true to detail. There are two types of installations; *vertical*, for use in walls from 12 to 30 in. thick, and *horizontal type*, for use in walls from 27 to 60 in. in thickness.

Structural and Economic Advantages

In addition to its protective value, many structural and economic advantages help to explain the wide choice of Rivet-Grip System.

Lowest Insurance Ratings—Rivet-Grip walls and slabs receive the lowest insurance ratings.

Flexibility of Arrangement—The spacing and general arrangement of the frames may be varied to give the exact degree of protection desired.

Structural Strength—Rivet-Grip frames form an efficient structural reinforcing, and allow vault walls and slabs to be designed for carrying heavy building columns, or with clear spans up to 40 ft.

Ease of Installation—All material is completely shop-fabricated and ready to place before shipment. To unload the reinforcement from trucks and place it in its proper position in the vault requires only five to eight man hours per ton.

Lower Cost—The Rivet-Grip System of vault reinforcement costs less than any other adequate and effective system, and the ease with which it is installed materially lowers construction cost.

Designing and Estimating Service

The drawings on the following page will prove useful as a guide for selecting the proper type of Rivet-Grip reinforcement to use with any particular vault door. However, if the types shown do not fit your problem, our engineering department will gladly make a study and submit a layout and we will recommend the most economical solution of your problem without incurring any obligation on your part, if plans or dimension sketches of the vault are submitted to us. Whenever available, thickness of doors and linings should also be given.

Lump sum estimates, either for material only or including erection for any vault, gladly furnished to architects upon request.



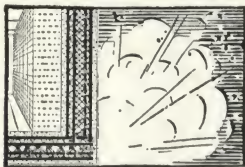
Torch Resisting

The special Rivet-Grip channel sections are hard to burn as concrete adheres firmly to the steel within the channel.



Tool Resisting

Rivet-Grip Reinforcement is not only torch resisting but tool resisting. Its multiplicity of heavy members cannot be pierced with cold cutting tools and drills as is possible with lighter members and fabrics.



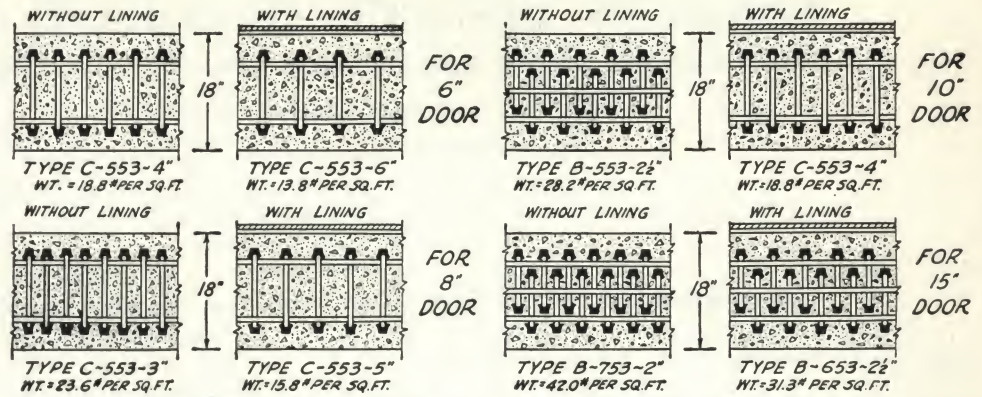
Resists Explosives

The large proportion of heavy steel members and the rigid attachment of ties or stirrups to main bars at close intervals, keeps Rivet-Grip units intact even after severe detonations.



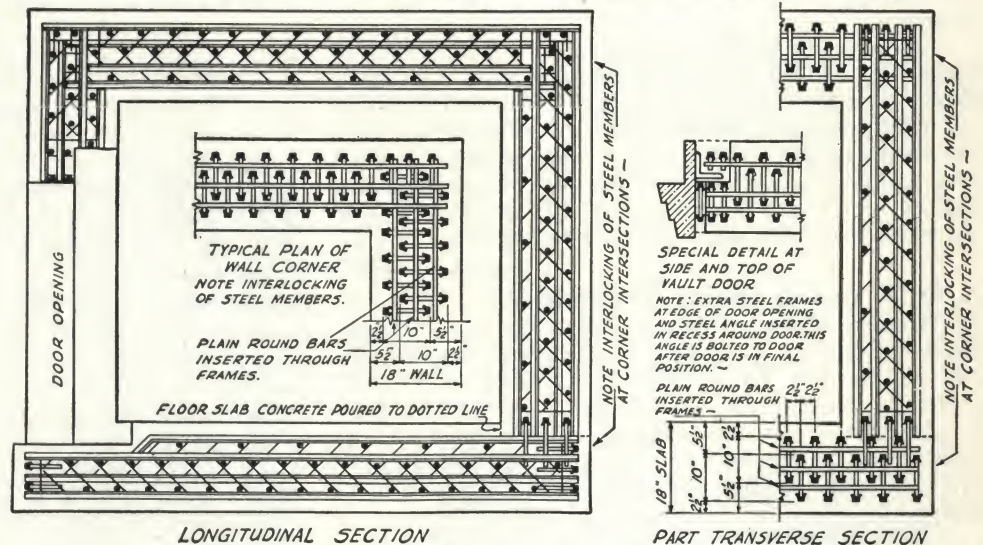
Structurally Strong

Rivet-Grip Bank Vault Reinforcement is not only impregnable to burglarious or riotous attack, but is strong enough structurally to resist breaking or crushing due to a collapse of the building from fire or other causes.



Suggested Types of Rivet-Grip System Reinforcement to Balance Various Thicknesses of Vault Doors

TYPICAL DETAILS OF RIVET-Grip TYPE 'B' VAULT REINFORCEMENT—2½" OC. SPACING OF FRAMES.



Diagrams Above Show the General Method of Detailing Rivet-Grip Reinforcement When the Most Popular Type, Namely Type B-553—2½-in. Spacing of Units, Is Used

Vaults with 18-in. concrete walls and slabs with this type of reinforcement get the best, or No. 10 insurance rating without the use of steel lining in the vaults. Complete typical details and specifications for types of Rivet-Grip other than those illustrated will be furnished upon request.

Specifications

Reinforcement—The reinforcement shall be the "Rivet-Grip System bank vault reinforcement" as produced by THE RIVET-Grip STEEL CO., Cleveland, Ohio.

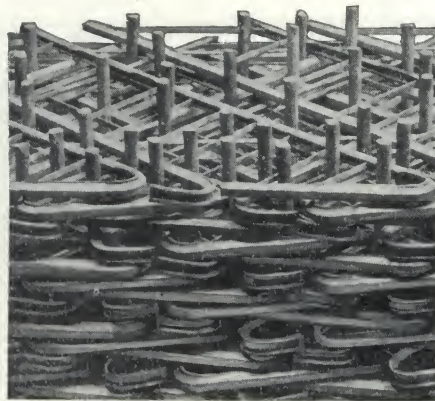
The arrangement of Rivet-Grip frames and plain round bars shall conform to that shown on page A577 of SWEET'S ARCHITECTURAL CATALOGUE, Twenty-second Edition, for Type spacing of frames. The reinforcement shall be detailed for walls in., floor slab in., and roof slab in. thick.

All units shall interlock at all intersections of walls, and of walls and slabs, and special provision shall be made for door openings to strengthen connections between door frames and vestibules and reinforced concrete walls.

All units shall be completely shop-fabricated and shipped ready to place. They shall be tagged with an erection mark corresponding to the marks on the drawings furnished by the manufacturer.

Note: This specification applies only to the vertical type. Specifications covering our horizontal type are especially written for each individual vault.

Drawings—THE RIVET-Grip STEEL CO. shall furnish complete placing drawings showing the exact location of each frame and spacer bar. Two sets of prints of approved placing plans and details shall be furnished for use in placing steel.



Rivet-Grip Reinforcement—Horizontal Type

Concrete—Shall be proportioned of 1 part portland cement, 2 parts clean, siliceous sand, and 3½ parts ¾-in. gravel or ¾-in. crushed stone.

A Few Recent Prominent Rivet-Grip Installations

Union and New Haven Trust Co., New Haven, Conn.
 Travelers Insurance Co., Hartford, Conn.
 Barnett National Bank, Jacksonville, Fla.
 Security Trust Co., Detroit, Mich.
 Fidelity Union Trust Co., Newark, N. J.
 Bank of Manhattan Co. (12 offices), New York, N. Y.
 Corn Exchange Bank (10 offices), New York, N. Y.
 Chase National Bank (2 offices), New York, N. Y.
 Bank of America, New York, N. Y.
 Equitable Trust Co. (also 2 branch offices), New York, N. Y.
 Bank of New York and Trust Co., New York, N. Y.
 Mechanics and Metals Natl. Bank (also 1 branch), New York, N. Y.
 Title Guaranty and Trust Co., New York, N. Y.
 Schenectady Savings Bank, Schenectady, N. Y.
 Union Trust Bank, Cincinnati, Ohio
 Cleveland Trust Co. (3 offices), Cleveland, Ohio
 Guardian Trust Co. (3 offices), Cleveland, Ohio
 Union Trust Co. (2 offices) Cleveland, Ohio
 Third National Bank, Dayton, Ohio
 First National Bank, Youngstown, Ohio
 Erie Trust Co., Erie, Pa.
 Provident Trust Co., Philadelphia, Pa.
 Mellon National Bank, Pittsburgh, Pa.
 National Exchange Bank, Milwaukee, Wis.

AMERICAN DISTRICT TELEGRAPH COMPANY

Central Station Protection Service and Electric Signaling Systems

EXECUTIVE OFFICE

183 Varick Street, NEW YORK, N. Y.

For complete list of A. D. T. Service and Central Offices, see page C3016

For A. D. T. Watchman's Compulsory Tour, Fire Alarm, Sprinkler Supervision and Proprietary Systems, see pages C3016-3017

Phonetalarm—A. D. T. Bank Vault Protection Systems (Approved Grade-A)

The Phonetalarm provides a system of bank vault protection operating on the sound detection principle. Protection is provided by means of microphones or detectors installed on the ceiling of the vault. Any attempt to force an entrance into the vault necessarily results in certain noise. This causes the diaphragms of the detectors to vibrate with a resulting effect upon certain instruments which cause the alarm to operate.

The system is effective against attack by means of hammering, drilling, burning or explosion. A sharp blow on the vault wall or any part of the vault structure will cause the alarm to sound; it will not operate from sounds originating elsewhere on the premises. Vault door and bolts are provided with protection contacts so that an alarm will be given upon any attempt to open the vault prior to the prescribed opening time.

A. D. T. Central Station Phonetalarm

Under Central Station operation the Phonetalarm System is given continuous supervision. All alarms are responded to immediately by men especially trained for this service. A careful check is maintained on the opening and closing of the vault and it cannot be left open or be reopened after the usual closing hour without causing an investigation.

Each Phonetalarm System is connected to the Central Station by means of an individual wire. This is under constant supervision and cannot be opened, shorted or grounded without detection by Central Station operators.

The Phonetalarm detectors are tested periodically during the closed period by means of a sounding device within the vault which is operated from the Central Station. This simulates an alarm condition and the signal received in the Central Station is identical with one originating from an attack on the vault.

Service is an important item in Central Station operation and all systems are carefully inspected and tested periodically in order to assure perfect operation. Skilled repair men are constantly on duty to render service in the event repairs are necessary.

Central Station Phonetalarm may be secured in all cities where A. D. T. Central Stations are maintained.

For complete list, see page C3016.

The simplicity of phonetalarm construction makes it possible to install a system without inconvenience in vault already erected as well as in vaults under construction. The devices are always accessible, so that repairs and adjustments can be made at any time without difficulty. The Phonetalarm is less expensive to install than any other type of system, yet it has an unusual value from a protection standpoint.

The A. D. T. Phonetalarm is the original sound detection system, the first system having been installed by A. D. T. engineers in 1914. Since that date, scores of banks throughout the country have installed the Phonetalarm, including many Federal Reserve Banks and other large banking institutions. This system has the endorsement of the Underwriters Laboratories, Inc., and is listed as Grade "A," thus securing the maximum discount on burglary insurance premiums.

Local Bank Vault Phonetalarm

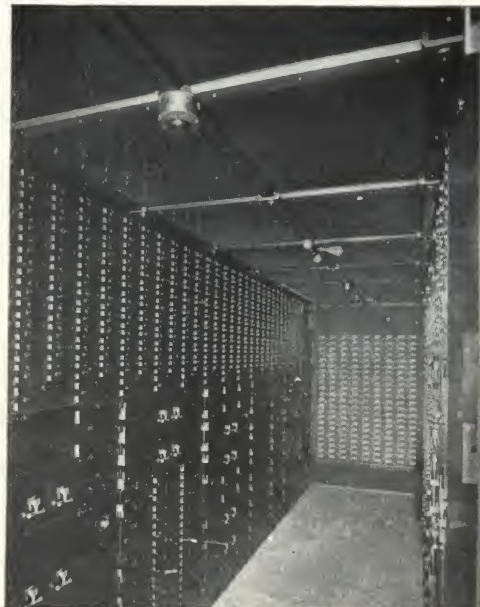
Phonetalarm can be furnished as a local system and installed anywhere without restriction as to location. The equipment includes the Phonetalarm devices together with the necessary apparatus for providing a local alarm. The latter consists of a powerful motor driven siren located in a protected housing on the outside of the building. The protection is under the control of a time clock within the vault which is applied to release the protection at the end of a predetermined period. A visual signaling device is installed outside of the vault to indicate the condition of the alarm at all times. Means are provided for making a sound test after the vault is closed.

The equipment inside the vault occupies a minimum of space, a valuable feature, especially in the case of safe deposit vaults. The system is energized from long-life storage batteries charged automatically. In the event of an alarm the system automatically restores itself.

Local Phonetalarm Systems are serviced through A. D. T. Central Stations located at 117 points in the United States. Periodic inspections are provided and prompt service may be obtained in event it is necessary to make repairs or replacements.

Other Protection Systems for Banks

In addition to the Phonetalarm System described above, the AMERICAN DISTRICT TELEGRAPH COMPANY also furnishes laced systems for both Central Station and local operation. Systems are also supplied for protection against "hold-up."



Typical Phonetalarm Bank Vault Installation

O. B. McCLINTOCK COMPANY

Burglar Alarms, Vault Ventilators, After Hour Depositories and Electrical Chime Clock Systems

GENERAL OFFICES AND FACTORIES
MINNEAPOLIS, MINN.

738 Ceres Avenue
LOS ANGELES

310 California Street
SAN FRANCISCO

604 Chamber of Commerce Building
PITTSBURGH

475 Fifth Avenue
NEW YORK

Products

Complete ELECTRICAL BANK VAULT LOCAL
BURGLAR ALARMS.

VAULT VENTILATORS.

AFTER HOUR DEPOSITORIES.

ELECTRICAL TUBULAR CHIME and CLOCK SYSTEMS.

Organization and Scope of Operation

The officers of this company have been engaged in the business of electrical bank vault protection for more than 25 years and the company has an enviable record for service with thousands of customers throughout the United States and Canada.

Facilities and Service

In addition to the branch office and headquarters staffs, the company maintains a large corp of field experts—so located that any portion of the United States can be reached on a few hours notice.

Approved Grade "A" Burglar Alarm Systems

Installation of a McClintock Grade "A" System secures for the bank a discount of 65% from burglary insurance premiums upon a vault of any classification.

Automatic Control—By virtue of exclusive patented features of automatic control and operation, this system provides the bank with a positive guarantee that the vault which it protects will be properly closed, locked and electrically protected every night.

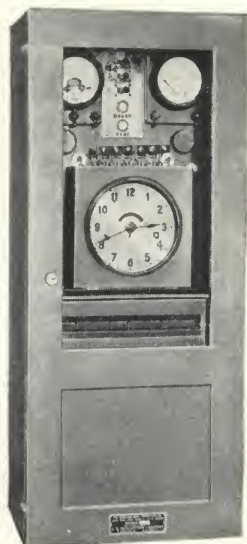
Daylight Holdup Alarm—Holdup alarm stations are provided for cages and other locations as desired.

Inspection and Maintenance—Annual inspection by field experts is provided for in the contract.

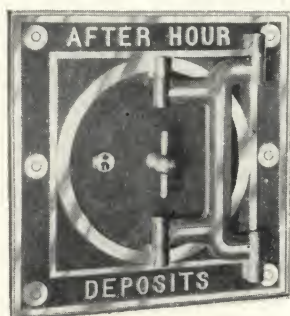
Specifications and Description—Complete specifications, plans and proposals for the protection of a vault of any size will be gladly furnished.

After Hour Depositories

Extending the convenience of a desirable service to bank patrons after regular banking hours.



Control Cabinet of Alarm System



After Hour Depository

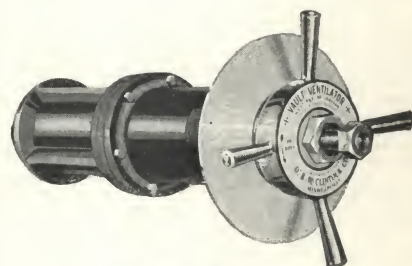
Vault Ventilator (West Patents)

This vault ventilator is designed to be embedded in the walls of a bank vault for the purpose of safeguarding the lives of patrons and employees who may be imprisoned maliciously or by accident.

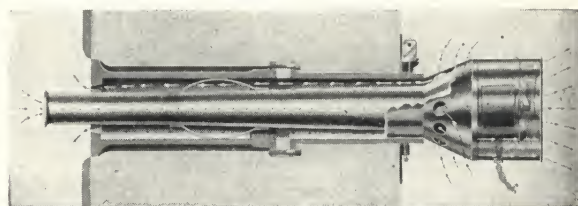
It provides scientifically correct ventilation by forced draft—affording an abundance of air for all who may be locked within a vault.

Draws in fresh air—expels foul air.

It is fireproof and liquidproof; offers greater resistance against burglarious attack than the wall in which it is embedded, and does not affect insurance rates.



Vault Ventilator



Sectional View of Vault Ventilator

Clock and Chime Systems

McClintock Clock and Chime Systems are specified for use where accuracy and long life are desired—particularly outside clocks.

The systems include the master clock, secondary clocks, storage battery and charger.

Tubular chimes are a special feature of our clock system if desired.

Styles of outside clocks include bracket clocks with two, three and four dials, also pedestal style. Regular construction is a steel frame covered by fabricated copper plates, but cast iron, bronze, or wrought iron can be furnished.



Prominent Installation of McClintock Chime Clock

Literature

Printed descriptions in standard A.I.A. file folders furnished architects and vault engineers upon request.



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From the collection of:

Mike Jackson, FAIA

CHICAGO ARCHITECTURAL BRONZE CO.

TELEPHONE
RAVENSWOOD 8945

4740-4742 North Clark Street, CHICAGO, ILL.

Products

Manufacturers of high grade ARCHITECTURAL BRONZE WORK, including:

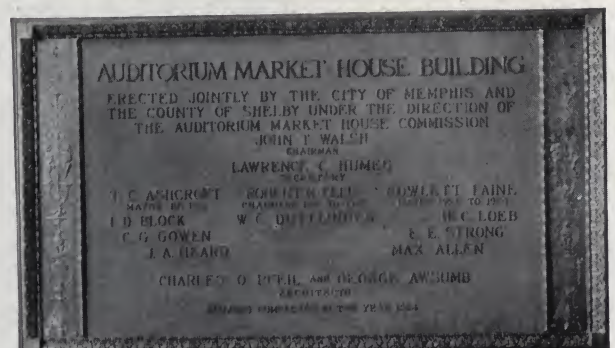
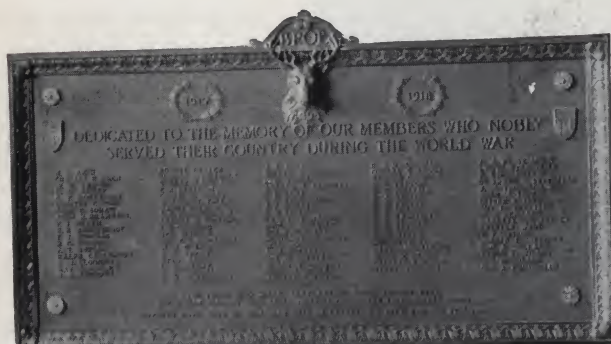
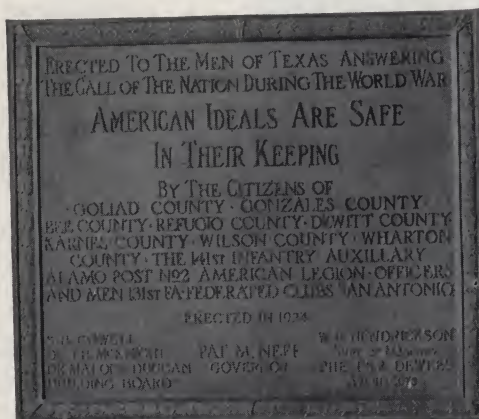
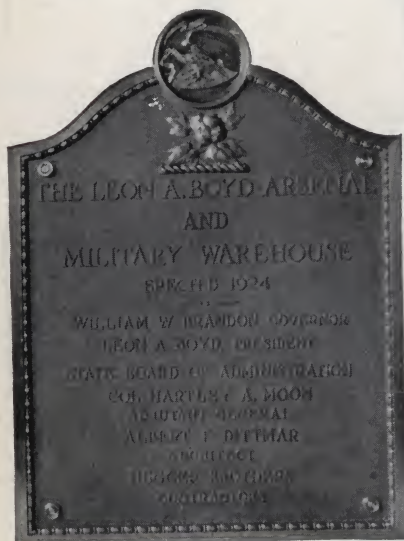
Memorial Bronze Tablets and Honor Rolls.
Bank Counter Screens, Grilles, Wickets and Gates.
Brass and Bronze Railings.
Bronze Lamps.
Cast Bronze Signs and Desk Name Plates.
Mausoleum Doors and Equipment.
Bas-relief and Statuary.
Bronze Entrance Doors and Grilles.
Thresholds and Kick Plates.
Cast Bronze Letters.

Window and Door Grilles. Clock Cases.
Special Bronze Ornaments. Urns and Vases.
Check Desks. Vault Grilles.
Directory Frames. Altar Railings.
Lamp Standards and Bronze Fences and Gates.
Brackets Swimming Pool Ladders.
For Radiator Grilles, see page C2812.

Facilities

The shops of the CHICAGO ARCHITECTURAL BRONZE Co. are equipped for the exclusive manufacturing of high grade bronze work, from the plainest to the most ornate.

Competent designers and sculptors are on the staff. Skilled chasers give exceptional care to finishing.



Examples of Signs and Tablets Made by the Chicago Architectural Bronze Co.



Bronze Wicket



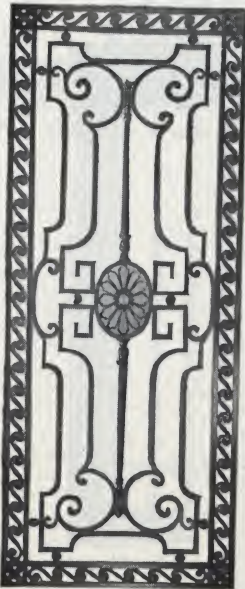
Cast Bronze Standing Lamp



Cast Iron Lamp Standard



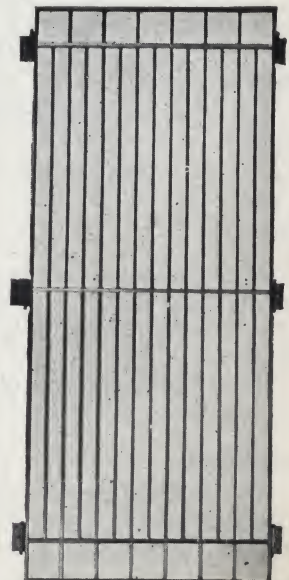
Bronze Safe Deposit Grille



Bronze Grille



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Bronze Doors



Bronze Doors

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High grade ARCHITECTURAL and ORNAMENTAL WORK in BRONZE, BRASS and IRON, including:

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This company, organized in 1844, has had extensive experience in ornamental bronze and iron work. We are in position to handle any proposition in this field regardless of the size or the requirements of speed in delivery.

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Our plant and equipment is entirely modern and complete in every detail. It consists of foundry, machine shop, pattern shop, blacksmith shop, plating and polishing plants, baking and japanning ovens, drafting department, modeling and sculpture department, iron and wire working department, and chasing department.

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This is a big department with us. We can furnish everything in the way of bronze and iron ornamental work that is used in bank construction. Some of the

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Our illustrated bank catalogue No. 50 gladly sent on request.

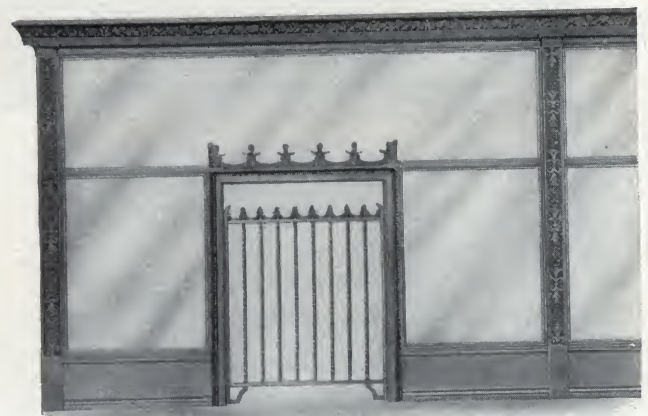


Bronze Wicket, Houston Post-Dispatch, Houston, Tex.
SANGUINETT, STATT & HENDRICK, Architects
Executed by The Cincinnati Mfg. Co.



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Hinged shutters behind wickets act as money guards when open
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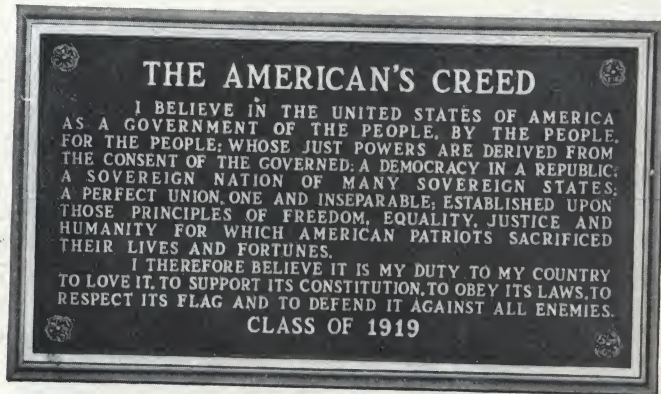


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No. 927. Cast Bronze Tablet
Size 21x12 in.



No. 805. Bronze and Glass Calendar, Check, Pen and Ink Rack
70 in. long

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We are glad at all times to furnish estimates from architects plans and specifications.

We will also submit original or stock designs, plans and suggestions and co-operate in every way to assure the best type of work for the particular job. Be free to call on us at any time.



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Made of wrought and cast iron. Roof panels filled with $\frac{1}{4}$ -in. rough wired glass



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Bronze Palm Leaves with Wreath

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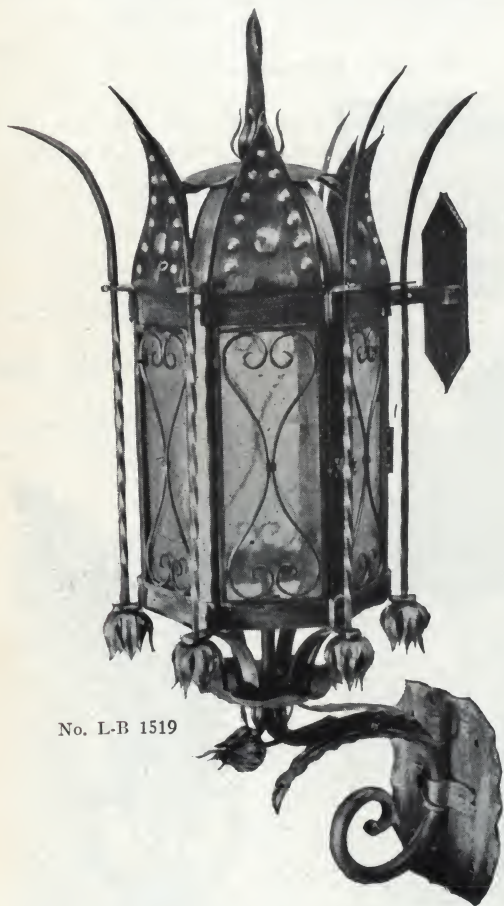
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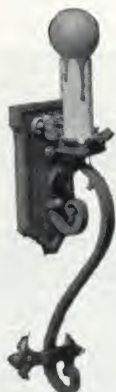
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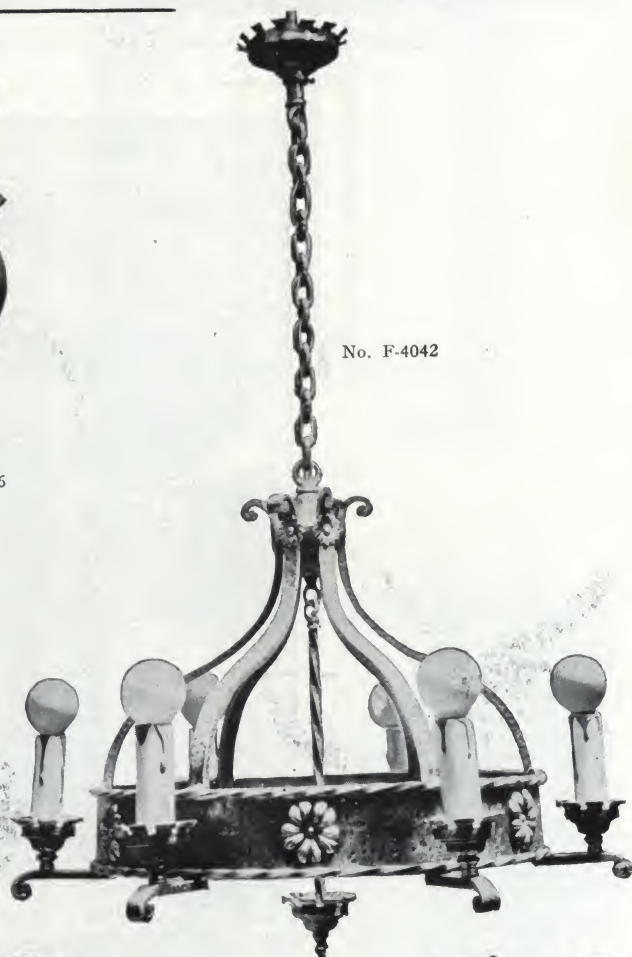
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Brass and bronze are the standard metals for ornamental uses. They can be finished in various colors and require no painting or maintenance.

Literature

"Ornamental Bronze—Store Fronts and Entrances"—Thirty-two plates of contemporary work in

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ornamental bronze for commercial buildings. Sent to architects without cost. 8½x11 in.

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Ornamental Bronze Bracket

Firenze—Palazzo Vecchio, Quartiere degli Elementi. Il Diavolino.
(Gior. Bologna—1530-1608)



Bronze Chandelier

Versailles—Château. Aile du Nord. Chapelle.
(Mansart et Robert Cotte; construit 1699-1710)

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We are prepared to furnish and erect our work in the United States and Canada.

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Forty-eight years of successful business experience are back of us and we have done satisfactory work for nearly every architect in this territory and for many of the leading architects in the east.

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Mines Building, Music Building, Engineering Building, Millard Hall, Anatomy Building, Library Building, and Administration Building, University of Minnesota, C. H. Johnston, Architect

Woodbury County Courthouse, Sioux City, Iowa, William L. Steele and Purcell and Elmslie, Associated Architects

World-Herald Building, Omaha, Neb., Thos. R. Kimball, Architect

Liberty Building, Des Moines, Iowa, Proudfoot, Bird & Rawson, Architects

Maccabees Building, Detroit, Mich., Albert Kahn, Inc., Architect

Marygrove College, Detroit, Mich.; Liberal Arts Building, Residence Hall, D. A. Bohlen and Son, Architects and Engineers, Indianapolis, Ind.

Detroit Trust Company Addition, Albert Kahn, Inc., Architects

Hotel Pere Marquette, Peoria, Ill., Horace Trumbauer and Hewitt and Emerson, Associated Architects

Bismarck Hotel, Chicago, Ill. (Cast Bronze Elevator Doors), C. W. and Geo. L. Rapp, Architects

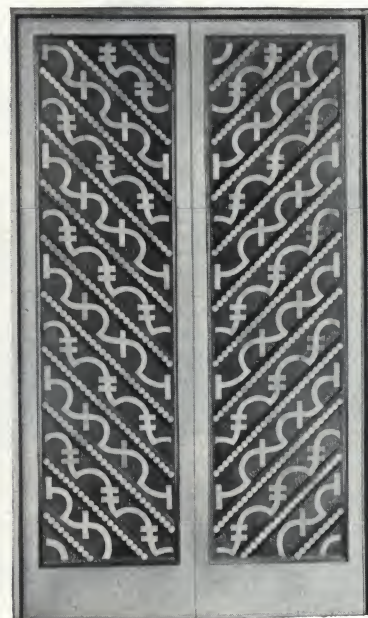
Francis Palms Building and State Theater, Detroit, Mich., C. Howard Crane, Architect



Bronze Lamp Standard for
U. of M. Buildings,
Minneapolis, Minn.
C. H. JOHNSTON, Architect



Cast Iron Spandrel, Size 4 ft. 6 in. x 9 ft. 4 in., for Francis Palms
Building, Detroit, Mich.
C. HOWARD CRANE, Architect



Bronze Elevator Doors for Bis-
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C. W. and GEORGE L. RAPP, Architects

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Dun or Bradstreet Mercantile Agency,
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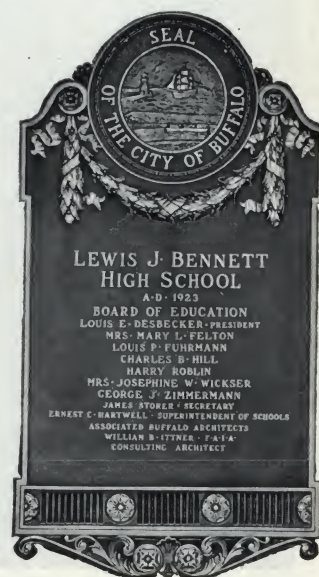
Literature

Gladly mailed on application.



Cast Bronze Urn

Diameter, 16 in.; height, 36 in.



Cast Bronze Tablet

22 in. wide, 41 in. high

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Bronze Mausoleum Doors

Construction—Doors are all of the "built-up" type construction. Standard thickness is 1 in., although they can also be made $1\frac{1}{8}$, $1\frac{1}{4}$ and $1\frac{3}{8}$ in., or thicker.

Bronze sheets not lighter than No. 14 gauge are riveted with $\frac{3}{16}$ -in. bronze rivets placed 3 in. on centers to each side of a substantial core or framing of *solid bronze*. Rivet heads are perfectly countersunk on both sides and hand finished smooth with door surface.

Equipment—Cast bronze door frames or jambs are used occasionally, but doors are usually hung direct to granite jambs. Arranged to swing inward or outward as may be required. Hinges are of heavy cast bronze of the pivotal type.

Cast bronze threshold at bottom. Slam bar over center joint. Slide bolts at top and bottom of left-hand door. Heavy handle on each door.

Rear of grille openings is fitted with plate glass shutters fitted with hinges and turn button lockers. A

device at bottom of shutters holds them securely at any angle when opened for ventilation.

Lock is of special heavy type, all-bronze, four tumblers, operating with flat german silver keys. Three keys are furnished.

All screws, bolts and expansion jackets are furnished by us.

Finish—Doors are usually finished in a light statuary bronze finish. The door stiles and all flat parts are hand rubbed with fine emery and pumice to a soft satin finish. The cast ornate parts are given a sanded finish with crevices and recessed portions in a darker tone. All outlines are hand tooled clean and sharp.

Workmanship—Doors are constructed by carefully trained skilled mechanics in a thorough, painstaking manner. Miters, joints, and all connections are neat and accurate. Applied ornaments are all secured from rear of door or "blind screwed."

Guarantee—These doors are constructed of best U. S. Standard Bronze. They are absolutely rigid, level and true, and beautifully finished. They are guaranteed to endure practically for all time.

All work is carefully boxed to insure safe delivery.

Service—All work is made to order, in any size or shape. Architects' special designs and ideas will be carefully followed. The usual time required for execution is 4 to 6 weeks.

Our many years' experience in this field is at your service.

Catalogue—On application.



Illustration No. SW1348



Illustration No. SW1349



Illustration No. SW1327

U. S. Standard Bronze Doors for Mausoleums

Cast Bronze Letters

The style letter illustrated is most generally used and we have adopted it as our standard.

When writing for prices send a scaled sketch showing size of letters desired and length of space where the letters are to be set.



Letters can be made flat face, rounded face, incised face, convex or with any other section.

Usually bronze letters are

fitted with bronze washers on the rear, so the backs of letters set $\frac{1}{2}$ to 1 in. from surface of wall.

Architects' details for special designs and shapes will be carefully followed.

General Specifications for Architects—Letters to be cast of best U. S. Standard Bronze of size indicated on plans. To be finished in fine sanded statuary bronze and fitted with substantial bronze anchors on rear for cementing to brick, stone, tile, etc. Special cement and liquid to be furnished for setting.

Spacing of letters to be approved by architect before setting.

BRONZE LETTERS

Illustration No. SW1292

Individual Cast Bronze Letters for Buildings
Standard Roman architectural style. Pyramid section

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We make a specialty of bronze memorial tablets. These are furnished in stock patterns or are made from architects' details.

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Design No. SW1215

Typical Design for Bronze Tablet

Made in any shape or size desired. This tablet is 24x15 in.

Rubbing or full size detail to be furnished for architect's approval.

Face and edge of border and face of lettering to be finished in a fine satin hand finish. Background or lettering field to have a finely pebbled surface, finished in dark statuary bronze. The outlines of all lettering and borders to be carefully hand tooled clean and sharp. Furnish bronze expansion screws with non-corroding lead expansion jackets for attaching tablet to wall. Heads of screws to be covered with neat rosette with threaded stem entering head of screw.

Note: If tablet is placed indoors, specify "To be heavily lacquered with best quality lacquer." If placed outdoors, specify "To be waxed or oiled."

Note: Background of tablet can be finished in a "Hand Hammered" surface at slightly additional cost.

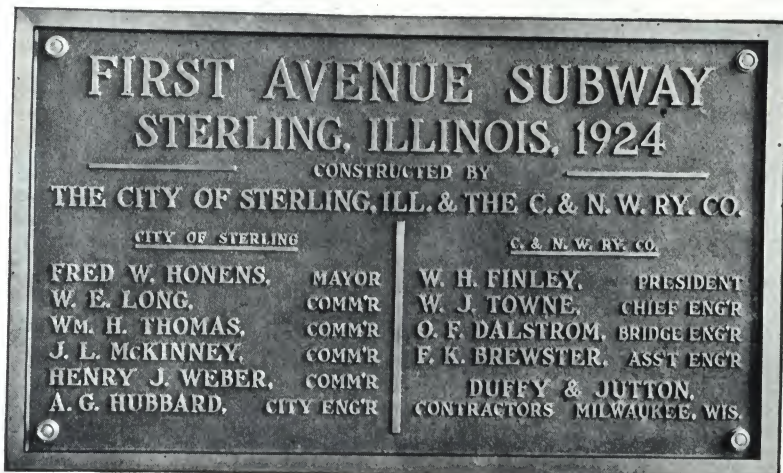


Illustration No. SW1211

Typical Design of Bronze Tablet for Subway

Moulded border and Roman stock style raised lettering. Made in any shape or size desired. This tablet is 30x18 in.

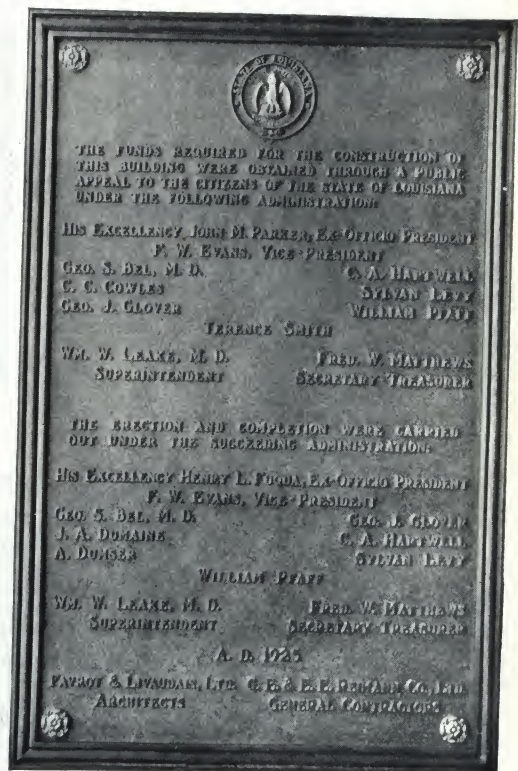


Illustration No. SW1261

Typical Design of Bronze Tablet for Public Building

Ornate leaf design, Roman stock style raised lettering. Made in any shape or size desired. This tablet is about 21x32 in.

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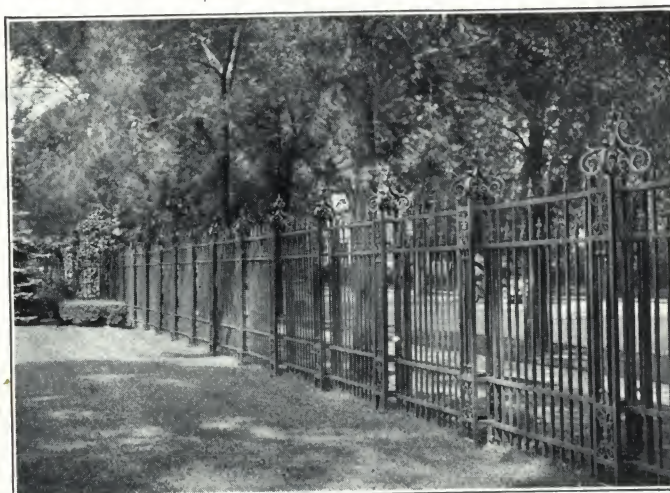
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Entrance Door, August Feine Residence, Buffalo

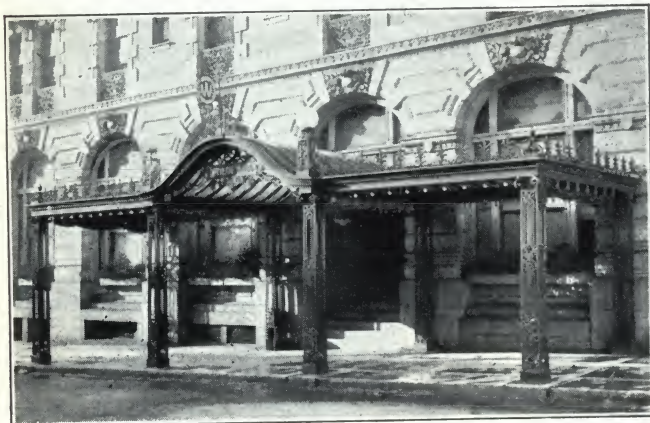
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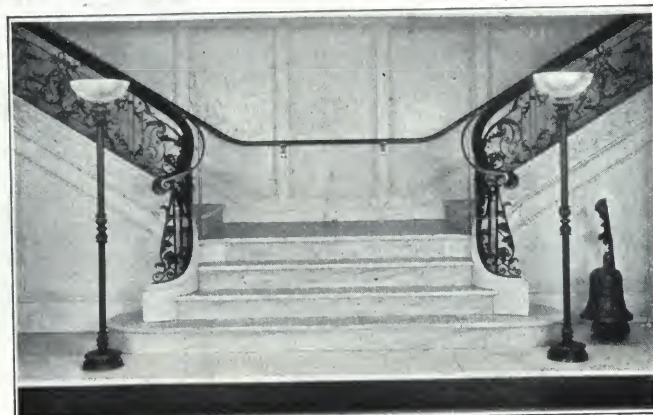
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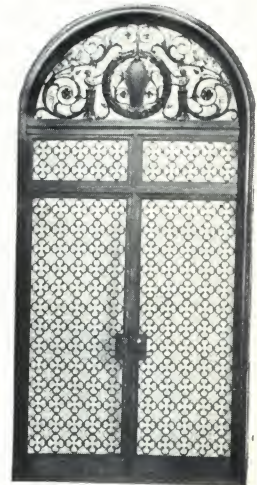
Holabird & Roche

Richard H. Marr



Wrought Iron Entrance, Mrs. J. Stuart White, Hotel Waldorf-Astoria

Designed by FREDERICK W. BERGMUELLER

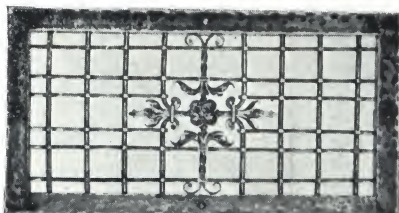


Wrought Iron Entrance, Andrew Freedman Home

JOSEPH H. FREEDLANDER, Architect



Wrought Iron Chapel Screen
EDWARD F. FANNING, Architect



Wrought Iron Ventilating Grille, Fred W. Green Residence, Ionia, Mich.

HARRY L. MEAD, Architect



Wrought Iron Emblem, Cardinal's Residence, New York, N. Y.

ROBERT J. REILEY, Architect



Wrought Iron Main Stair Railing, Shelton Hotel, New York, N. Y.

ARTHUR LOOMIS HARMON, Architect

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Federal Reserve Bank, St. Louis, Mo.	Mauran, Russell & Crowell
Southwestern Bell Telephone Building, St. Louis, Mo.	Smith, Hinchman & Grylls
Buhl Building, Detroit, Mich.	Howells & Hood
Tribune Tower, Chicago, Ill.	C. Howard Crane
American Insurance Union, Columbus, Ohio	Maginnis & Walsh
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Ridgely Farmers' Bank, Springfield, Ill.	Helmle & Helmle
Marine Bank, Springfield, Ill.	Mauran, Russell & Crowell
First National Bank, East St. Louis, Mo.	Mills, Rhines, Bellman & Nordhoff
Commodore Perry Hotel, Toledo, Ohio	Mills, Rhines, Bellman & Nordhoff
Ohio Bell Telephone Building, Toledo, Ohio	Hubbell & Benes
Ohio Bell Telephone Building, Cleveland, Ohio	Weary & Alford
Merchants Bank, Cedar Rapids, Iowa	



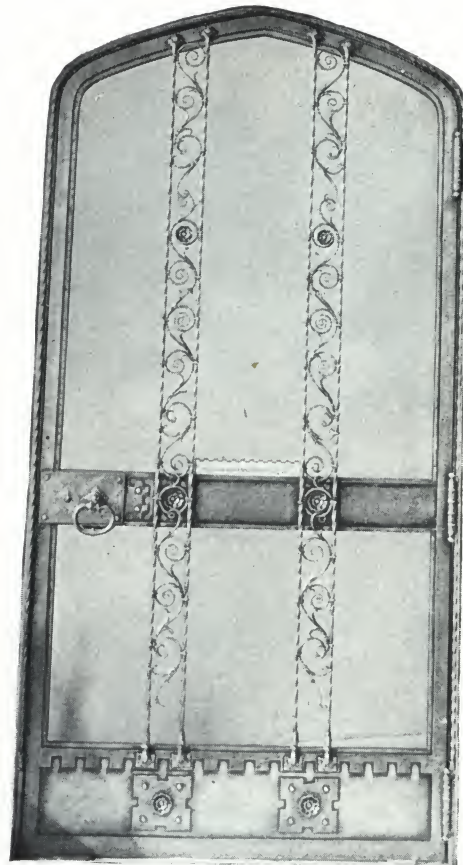
Bronze Floor Insert with Horoscope of the Insurance Company at the Time of Its Organization—the American Insurance Union, Columbus, Ohio
C. HOWARD CRANE, Architect, Detroit, Mich.



Bronze Grille, Southwestern Bell Telephone Building, St. Louis, Mo.
MAURAN, RUSSELL & CROWELL, Architects



Wrought Iron Lantern, Lima Trust Co., Lima, Ohio
WEARY & ALFORD, Architects



Hand Forged Iron Door, A. J. Fisher Residence, Detroit, Mich.
RICHARD H. MARR, Architect

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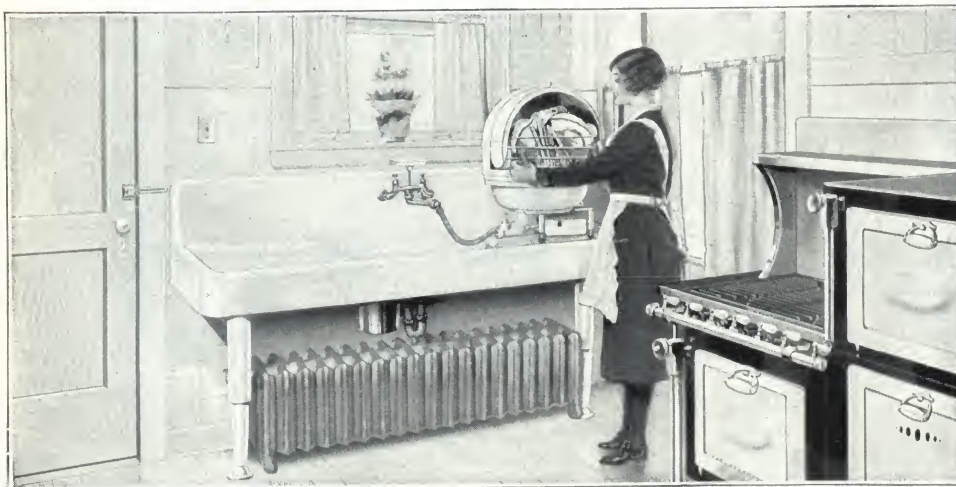
Architectural ornaments—mouldings, capitals, cartouches, garlands, rosettes, modillions, scrolls, enrichment, wreaths, etc.—are made from sheet zinc, copper or lead.

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Inquiries and plans are solicited from architects,



No. 2463 Marquise



Kleen Kwik Electric Dish Washer

Commercial, size of base and pump.....	8¼ x 21 in.
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Weight—container, motor and base, 59 lb.	

and estimates, either on special work from their detail or on stock designs, will be given.

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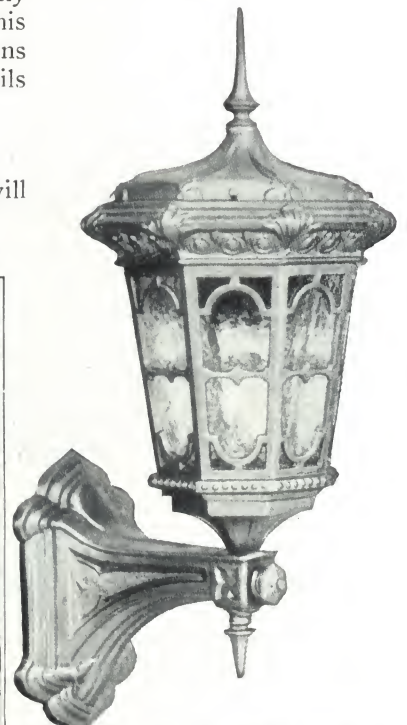
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Lamp, 6x6 in.
Back, 10 in. high, 5 in. wide
Projection, 11 in.
Height over all, 29 in.

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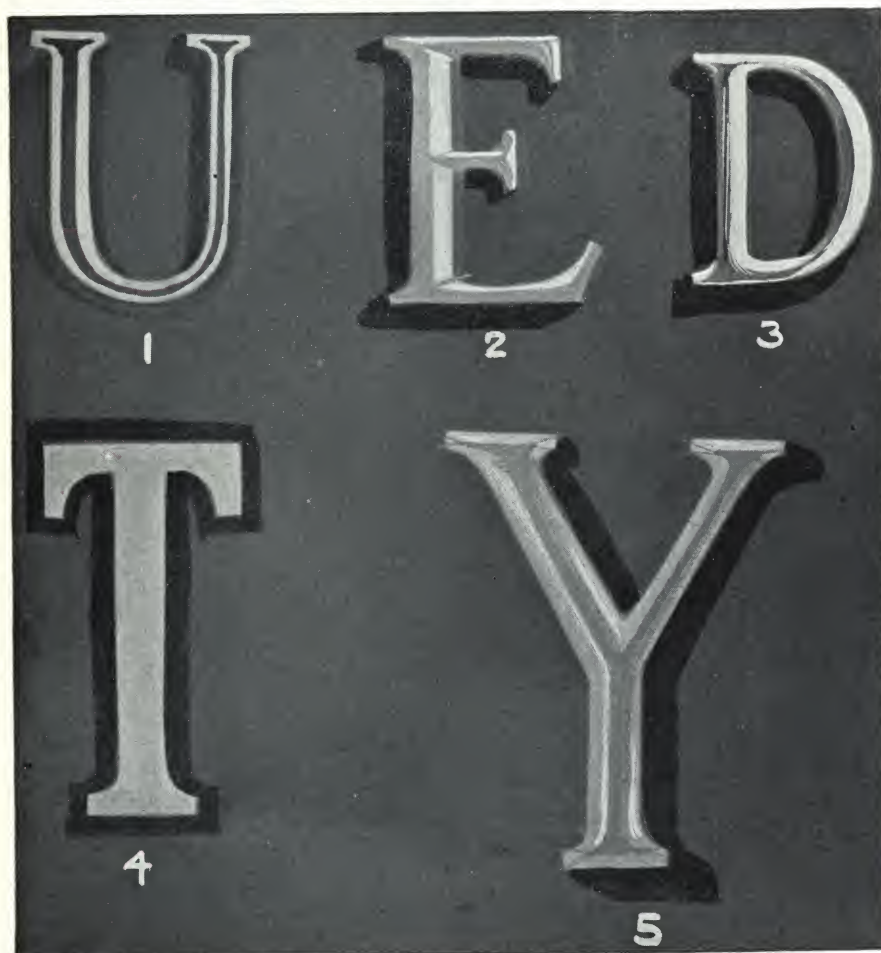
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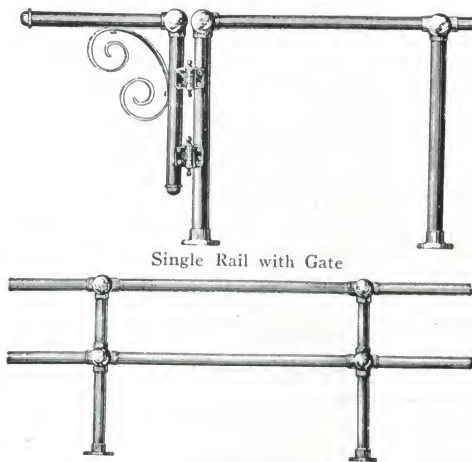
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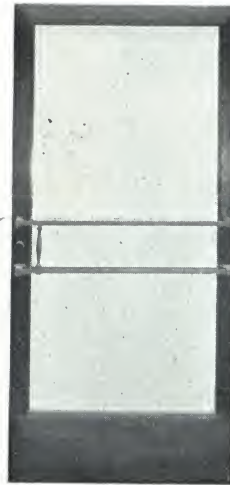
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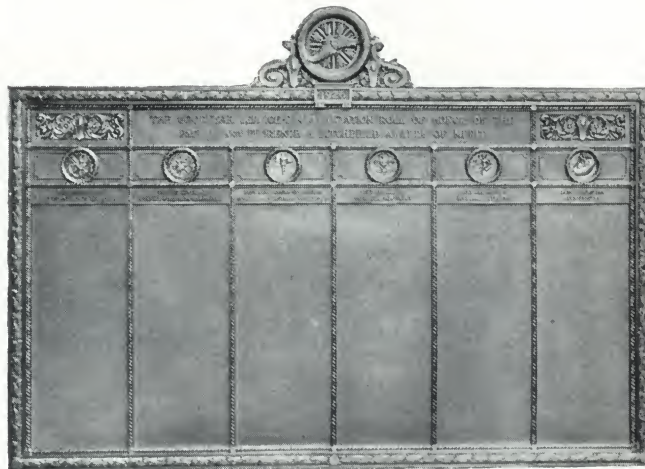
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BUILDING AND LOCATION	ARCHITECT
Strouss-Hirschberg Dept. Store, Youngstown, Ohio	Starrett & Van Vleck
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United Banking & Trust Co., Cleveland, Ohio	Walker & Weeks
Pittsburgh Press, Pittsburgh, Pa.	Howell & Thomas
L. K. Liggett Building, Dayton, Ohio	Schenck & Williams
Public Auditorium Building, Cleveland, Ohio	Herman Kregelius
Citizens National Bank, Mansfield, Ohio	Althouse & Jones
Traffic Tower, Cleveland, Ohio	City of Cleveland
First National Bank, McKee's Rocks, Pa.	C. M. Husband
Allen Memorial Medical Library, Cleveland, Ohio	Walker & Weeks
Cleveland Trust Co., Lorain, Ohio	Alfred G. Hall
First National Bank, New Kensington, Pa.	W. E. Snaman



Cast Bronze Door

Size, 2 ft. 10 in. x 9 ft.
J. MILTON DYER,
Architect



Bronze Tablet Erected at Goodyear Tire & Rubber Co., Akron, Ohio

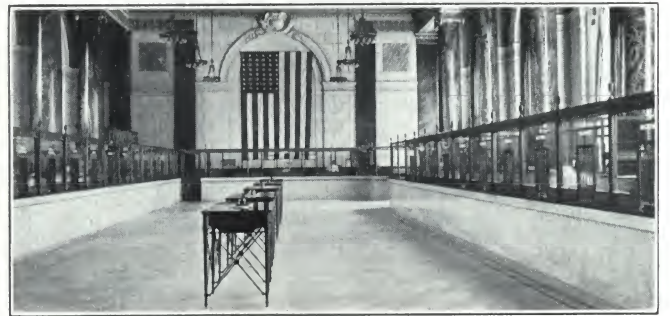
Size, 7 ft. 6 in. x 5 ft.



Cast Bronze Tablet



Banking Room, Union Trust Co., Cleveland, Ohio
L. KENT MOATZ, Architect, Cleveland, Ohio



Bank Screen, United Bank, Cleveland, Ohio
WALKER & WEEKS, Architects, Cleveland, Ohio



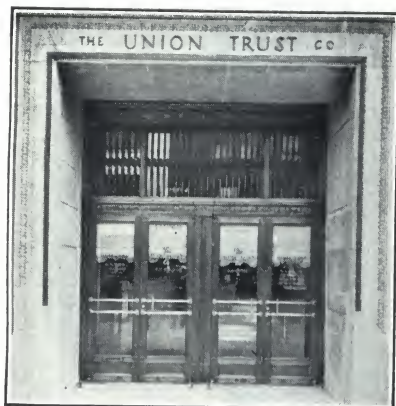
Bronze Entrance Doors, United Bank, Cleveland, Ohio
Size, 8 ft. 6 in. x 15 ft.
WALKER & WEEKS, Architects



Calendar Stand



Bronze Traffic Tower, Cleveland, Ohio
Over-all height, 27 ft.



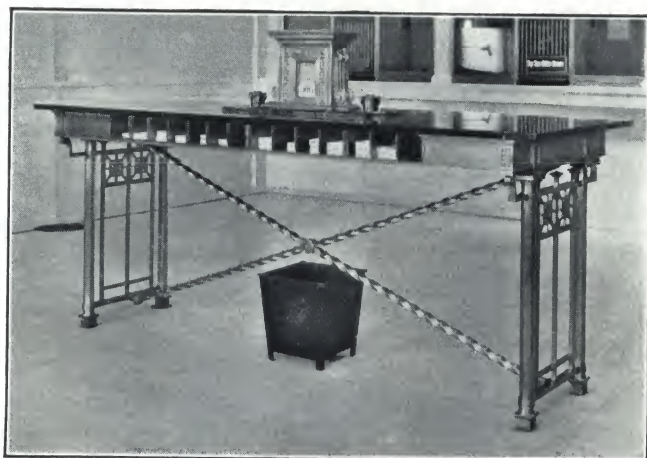
Entrance, Union Trust Co., Cleveland, Ohio
L. KENT MOATZ, Architect



Bronze Entrance, Allen Memorial Medical Library, Cleveland, Ohio
WALKER & WEEKS, Architects



Bronze Store Front



Bronze Check Desk



Bronze Store Front, Sweetland Building, Cleveland, Ohio
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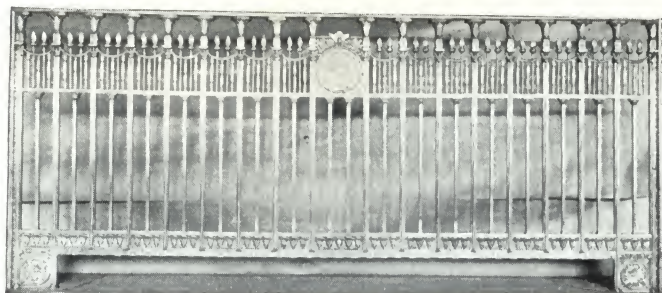
Cast Bronze Mausoleum Doors



Bronze Mausoleum Gate



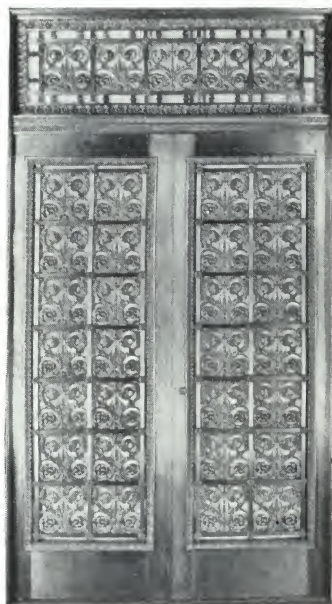
Bronze Mausoleum Gates



Cashiers Grille, Illinois Athletic Club, Chicago, Ill.
W. GIBBINS UFFENDELL, Inc., Architect



Cast Bronze Vault Grilles, Stock Yards National Bank, Chicago, Ill.



Entrance to Private Room,
Rosehill Mausoleum,
Chicago, Ill.
SIDNEY & McDONALD LOVELL,
Architects



Bronze Flagpole
Base, Scottish
Rite Temple,
Nashville, Tenn.
ASMUS & CLARK,
Architects



Cast Bronze Elevator Doors, Reynolds Building, Jackson, Mich.
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Cast Bronze Honor Roll and Memorial Tablet



Cast Bronze Exterior Tablet



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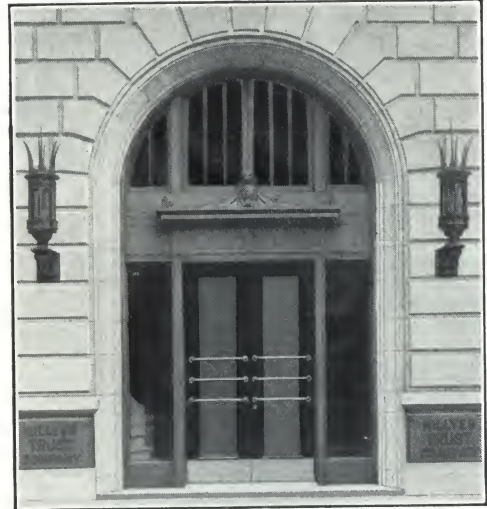
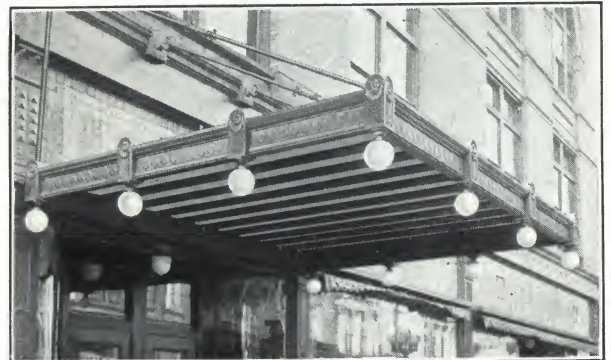
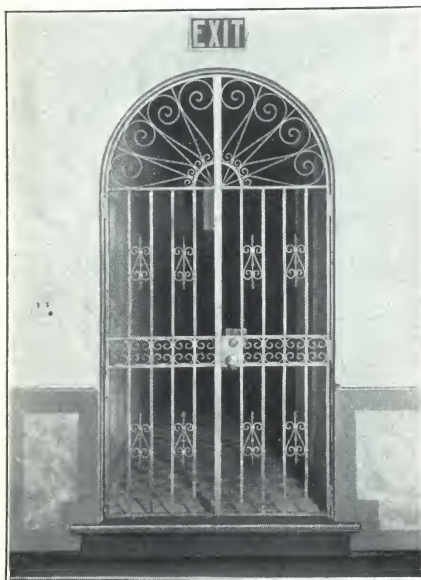
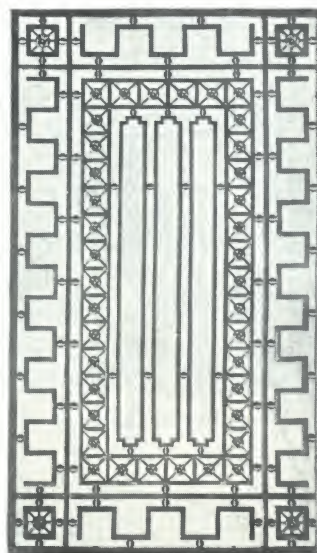
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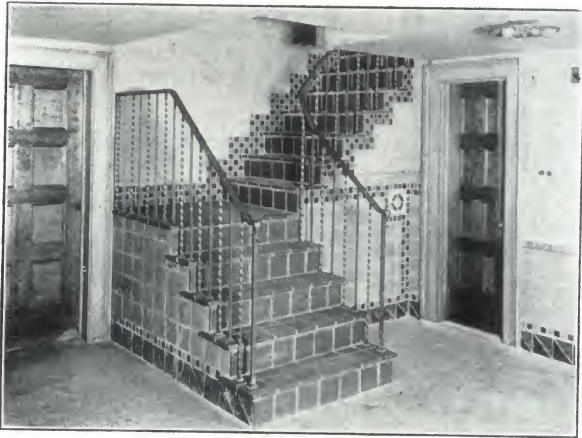
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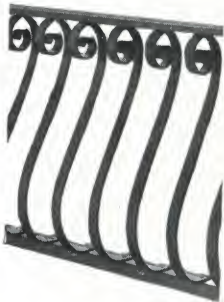
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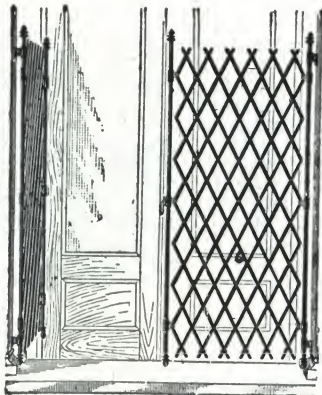
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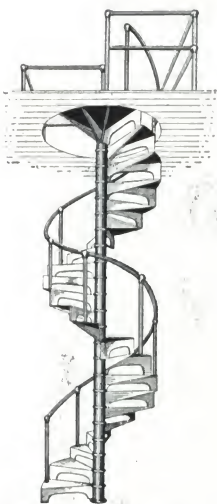
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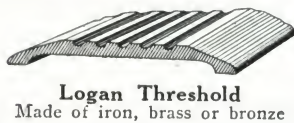
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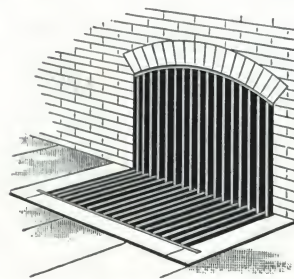
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The cylinder shall be of No. 12 U. S. Standard gauge sheet steel, for the first 18 in.; the next 6 ft. of No. 14 gauge, and the remainder of No. 16. The spiral slide shall be of No. 16 gauge galvanized sheet securely attached to a center core of 3-in. inside diameter standard black pipe.

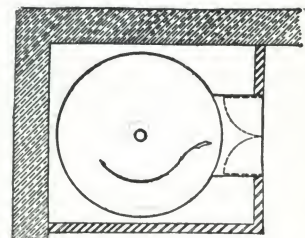
An enclosed vestibule shall be provided at each entrance with entrance doors in two leaves each, arranged to swing in, and provided with torsion springs of phosphor bronze. Doors shall be set away from cylinder far enough to clear same when swung open.

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For Bronze Windows, see page A942; for Stone

Mantels, see page B1369; for Tile and Swimming Pools, see page B1481.

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STARRETT & VAN VLECK, Architects



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C. E. BIRGE, Architect



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CROSS & CROSS, Architects



Interior of Banking Room, Bank of Hawaii,
Honolulu, T. H.
B. G. GOODHUE ASSOCIATES, Architects

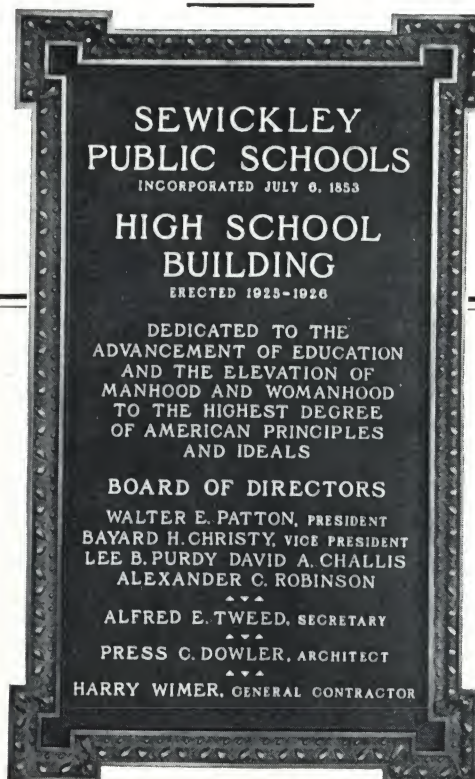
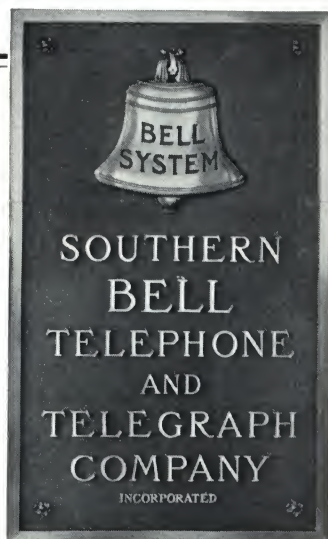
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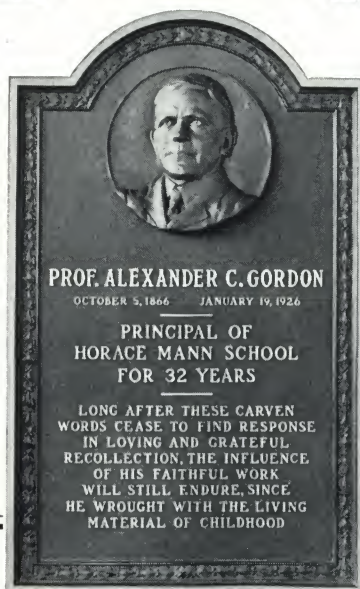
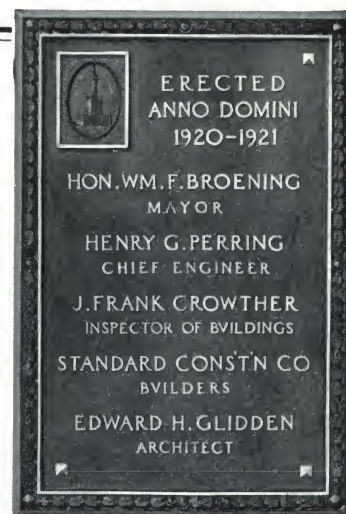
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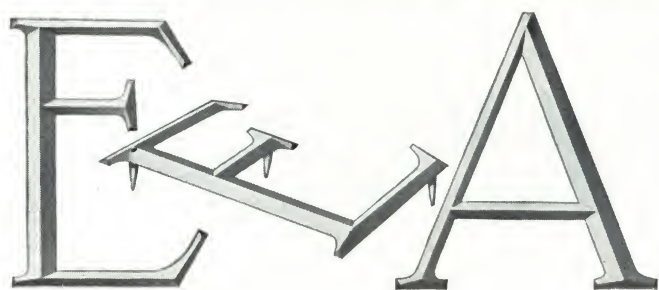


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HOWARD A. STOUT, Architect



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14 ft. long by 7 ft. 6 in. high
PAUL CRET, Architect



Bronze Tablet Placed at New Bedford, Mass.

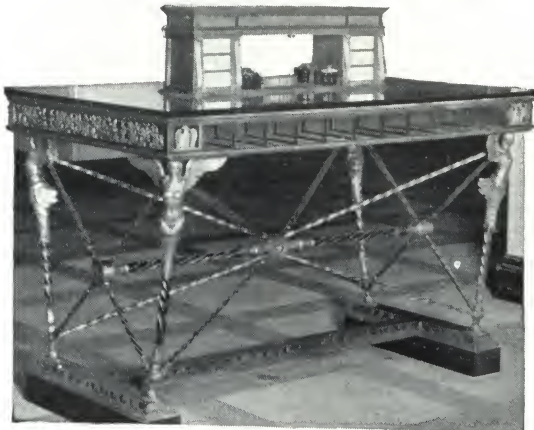


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 Third National Bank, Dayton, Ohio
 Cleveland Public Auditorium, Cleveland, Ohio
 Home Bank & Trust Co., Chicago, Ill.
 Bronze Groups on Pylons, 16th St. Bridge, Pittsburgh, Pa.
 Frost National Bank, San Antonio, Tex.
 Erie Trust Co., Erie, Pa.
 Wayne National Bank, Goldsboro, N. C.
 Mutual Trust Co., Philadelphia, Pa.
 First Trust & Savings Bank, Chicago, Ill.
 Trenton Trust Co., Trenton, N. J.
 Masonic Temple, Dayton, Ohio
 Illinois Bldg., Indianapolis, Ind.
 Federal Reserve Bank, Louisville, Ky.
 Dayton Savings & Trust Co., Dayton, Ohio
 First National Bank, Fort Worth, Tex.

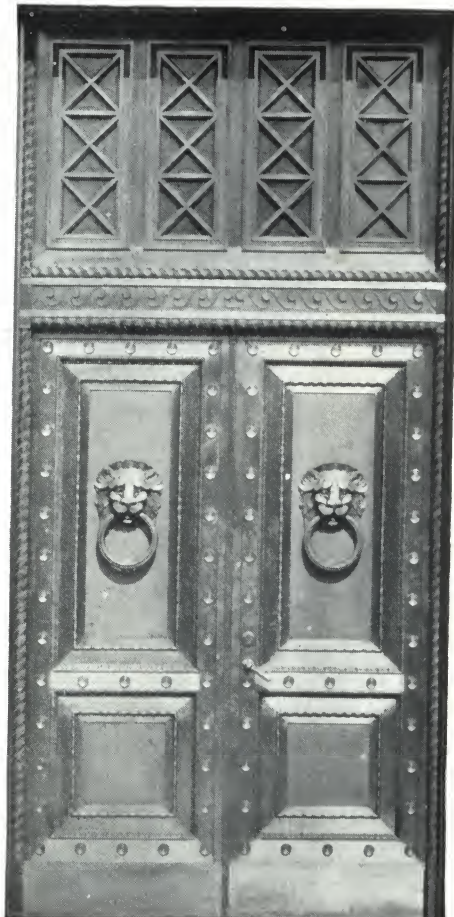
ARCHITECT
 Schenck & Williams
 Geo. McDowell
 Vitzthum & Burns
 Warren & Wetmore
 Hedrick & Gottlieb
 Dennison & Hiron
 Alfred C. Bossom
 Heacock & Hokanson
 Leonard Construction Co.
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 Rubush & Hunter
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Swedish Iron Check Desk



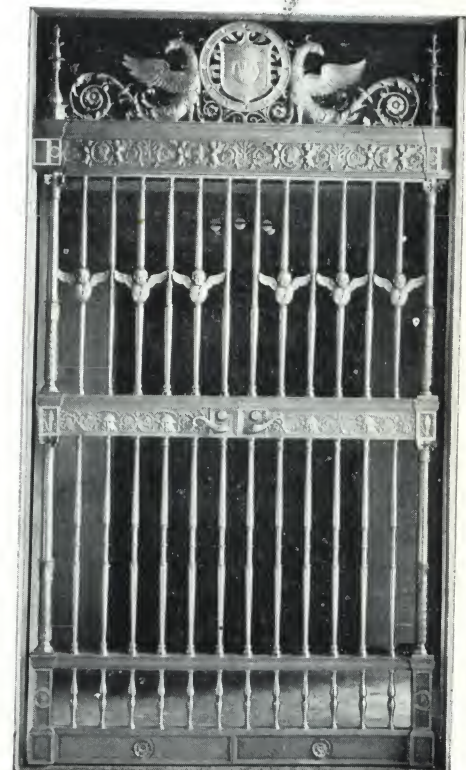
Touro Infirmary, New Orleans, La.



Bronze Doors
 Indiana War Memorial, Indianapolis, Ind.
 WALKER & WEEKS, Architects, Cleveland, Ohio



Bronze Lamp
 Sciota County Courthouse, Portsmouth, Ohio
 J. S. ADKINS, Architect, Cincinnati, Ohio



Bronze Safe Deposit Door
 Wayne National Bank, Goldsboro, N. C.
 ALFRED C. BOSSOM, Architect, New York

JAMES McKINNEY & SON

Makers of Fine Architectural Cast Iron

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Architectural Gray Iron Castings; Front Work, Entrance and Window Frames; Spandrels; Fascias; Cornices; Marquises, Frames and Pendants; Stairwork; Balusters, Newels, ornamental and plain, Risers and Treads; Columns; Pilasters; Panels; Saddles, Door and Elevator; Cast Iron Grille Work.

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Also Ornamental Wrought Iron required in architectural treatment of building as well as in connection with cast iron work.

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Fully equipped plant including drafting, engineering and designing department. Pattern department and foundry familiar with all kinds of carved pattern work, intricate cored work for all architectural purposes. Complete fabricating plant for fitting cast iron work with all necessary steel and iron work for shipping work ready for erection if required.

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Large pattern stock of ornamental details effects economies in design. Ability to furnish plain and carved patterns, fitted as well as unfinished castings make for completeness of service.

Estimates from adequate blue prints quickly furnished and solicited.

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Seventy years of experience, and pattern makers, moulders and fitters trained for this special work, have made our products well known for the quality of their ornamentation and finish.



Three Examples Where Architectural Cast Iron Combines Beauty, Character and Permanence

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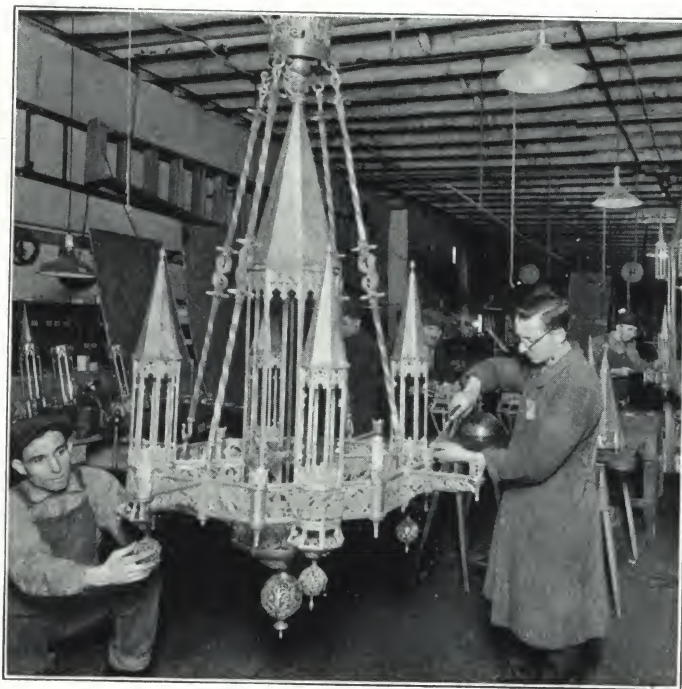
We maintain a designing department, bronze and brass foundry, modeling department, pattern shops, plating rooms, blacksmiths' forges, assembly shops, decorating rooms, etc., all operated by skillful, competent craftsmen.

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Booklets of our recent installations and references from architects will be sent on request.



Grille of Wrought Iron and Bronze



View of Our Bronze Lighting Fixture Shops



Bronze Plaque or Tablet



Exterior in Wrought Iron and Bronze



Hand Wrought Iron Gate



Hand Wrought Chandelier

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Ornamental and Architectural Metal Products

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Manufacturers of ORNAMENTAL and ARCHITECTURAL BRONZE, BRASS, IRON, STEEL and WIRE PRODUCTS, including:

Bank Counter Screens and Cages, Balconies and Balcony Rails, Entrance Doors, Marquises, Mausoleum Doors and Equipment, Grilles, Memorial and Commer-

cial Tablets, Ornamental Gates and Fences, Stairs and Stair Rails, Tubular Railings, Window and Door Guards.

Service

Our designing, engineering and estimating departments are available for service at all times.



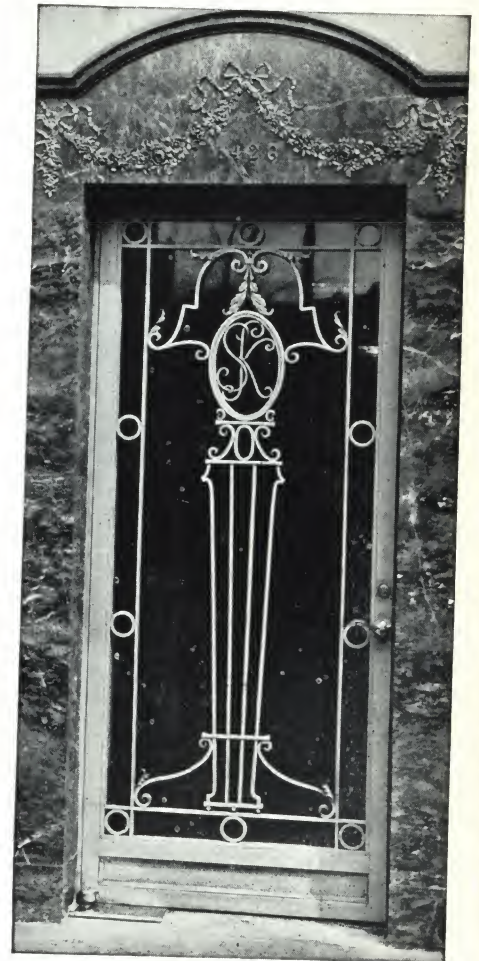
Detail of Bronze Counter Screen

Period and Modern Work

We are prepared to do ornamental metal work in all metals, either in period or modern designs.



Stair Rail



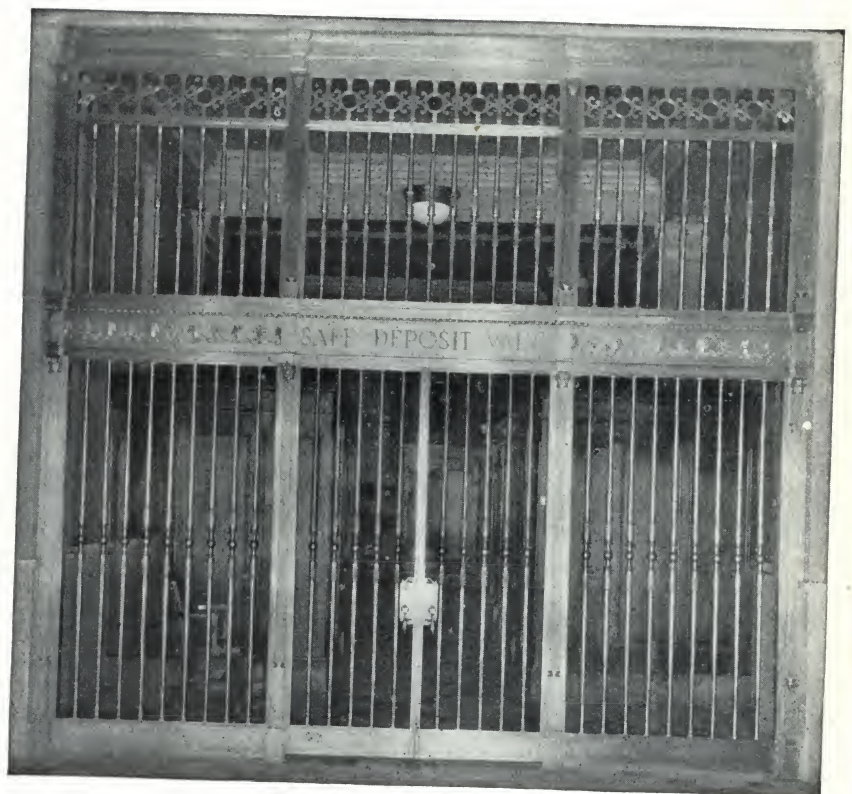
Entrance Door



Memorial Tablet



Commercial Tablet



Safe Deposit Vault Grille

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Altar Railings	Marquise
Balconies	Mausoleum Doors, Gates
Balustrades	and Grilles
Bank Partitions	Memorial Plates
Bank Screens	Mouldings
Brackets	Nameplates
Building Directories	Newels
Bulletin Boards	Nosings and Edgings
Cabs (elevator)	Office Rails and Parti-
Cages (woven)	tions
Cafeteria Fixtures	Pilasters
Canopies	Plates (brass, bronze)
Check Desks	Pool Stairs
Collapsible Gates	Posts (brass, bronze)
Cornices	Push and Pull Plates
Counter Screens	Railings (all kinds)
Desks (check)	Registers
Directories	Rope Rails
Doors (solid, hollow and	Safety Treads
kalamein)	Sills
Door and Window Guards	Slide Poles
Door Pulls	Stair Rails
Elevator Enclosures	Standards (cast)
Entrances	Tablets (bronze)
Fittings (all kinds)	Ticket Booths
Foot Rails	Treads (stair)
Frames (lobby)	Tubing (all kinds)
Gates (all kinds)	Turnstiles
Guards	Velour Ropes
Hand Rails	Ventilators
Kick Plates	Wickets (all kinds)
Ladders (brass)	Wire Guards and Cages
Lamp Standards	Woven Wire Work
Letters (cast)	

For Cast, Extruded, Kalamein and Hollow Bronze and Steel Doors, see page A836.

Manufacturing Facilities

This company operates its own foundry and has one of the finest corps of skilled artisans in the United States. Enormous stocks of tubing, sheets, channels, etc., are carried.

Specialists in bronze tablets, brass railings, doors and grille work. Contracts for made-to-order fixtures solicited.

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Prompt service on all estimates. Special attention

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|--------------------------|--------------------------------|
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| Thresholds | (6) Marquise and Canopies |
| (2) Building Directories | (7) Bronze Tablets and Letters |
| (3) Theater Fixtures | (8) Railings |
| (4) Grilles and Wickets | (9) Bronze Check Desks |

Partial List of Installations

Banks

Commonwealth Bank, Baltimore, Md.
Federal Reserve Bank, Oklahoma City, Okla.
Richmond Trust Co., Richmond, Va.
Jefferson Bank, St. Louis, Mo.
Canton National Bank, Baltimore, Md.
Stockgrowers & Ranchers Bank, Reno, Nev.
Pearl-Market Bank, Cincinnati, Ohio
Bank of California, Seattle, Wash.
Citizens Trust Co., Canonsburg, Pa.
Security National Bank, Tulsa, Okla.
Bank of Perkassie, Perkassie, Pa.
Community State Bank, Chicago, Ill.
First National Bank, Darby, Pa.
Eagle Savings & Loan Co., Cincinnati, Ohio
First National Bank, Latrobe, Pa.
Fruitgrowers National Bank, Smyrna, Del.
Federal Land Bank, New Orleans, La.
Commercial National Bank, San Antonio, Tex.
First National Bank, Tulsa, Okla.
First National Bank, Robinson, Ill.

Theaters

Palace Theater, Youngstown, Ohio
New Stanley Theater, Philadelphia, Pa.
Fountain Theater, Cincinnati, Ohio
Rialto Theater, Omaha, Neb.
Grand Victory Theater, Detroit, Mich.
Loew's Theaters, New York, N. Y.; Washington, D. C.;
Memphis, Tenn.; Indianapolis, Ind.; St. Louis, Mo.
Ascher Bros. Circuit (15 theaters)
Lubliner & Trinz Circuit (10 theaters)
Balaban & Katz Circuit (4 theaters)
Jones, Linick & Schaefer Circuit (6 theaters)

Miscellaneous

Hotel Sinton, Cincinnati, Ohio
Hotel Cleveland, Cleveland, Ohio
Courthouse, Newkirk, Okla.
Harrington Building, Columbus, Ohio
Crane Co. Exhibition Building, Atlantic City, N. J.
Wyoming Consistory Temple, Cheyenne, Wyo.
Traffic Tower, Newark, N. J.
Mesa County Courthouse, Grand Junction, Colo.
American Insurance Co., Newark, N. J.
Community Mausoleum, Tiffin, Ohio
Atlas Life Insurance Building, Tulsa, Okla.
St. Coleman's Church, Cleveland, Ohio

Continued on next page



Store Front, Columbus, Ohio

Bronze Booth, Palace Theater,
Youngstown, Ohio

Doors and Entrances

THE NEWMAN MANUFACTURING Co. specializes in solid, kalamein and hollow bronze and steel doors and complete entrances for mausoleums, banks, public buildings, theaters, office buildings, etc. They gladly will send blue prints of stock designs, estimates of cost and complete suggested specifications, free of obligation.

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Also they feature a fine line of extruded brass and bronze thresholds, including interlocking and carborundum-filled types. These are carried in stock for immediate shipment. Ask for Blue Print No. 90.

They issue a separate sheet devoted to brass and bronze kick plates, push and pull plates, and door bars.

Brass and Bronze Railings

For 45 years the House of Newman has participated in railings of every description. They manufacture complete rails and gates of seamless brass tubing, extruded bronze and brass stair rails and balustrades, ornamental bronze altar gates, bronze balconies, and special rails such as velour ropes, tray slides, pool ladders, slide poles, etc.

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Newmanco building directories and bulletin boards are made in a wide range of designs, with kalamein brass, extruded bronze, cast bronze and mahogany frames. These are fitted with grooved boards to receive six different kinds of interchangeable characters.

Write for the Newman Building Directory Catalog.



Eagle Savings & Loan Association, Cincinnati, Ohio

Bank Installations

Newmanco bank fixtures of brass, bronze and electro-plated steel are famous for quality the world over.

Upon request THE NEWMAN MANUFACTURING Co. will send blue prints of stock design counter screens, with suggestions and estimates of cost. Or they will quote in accordance with specifications, on such separate items as grilles, wickets, rails and gates, check desks, doors, safety deposit vault enclosures, cages and signs.

Send for General Catalog No. 2, and their Grille and Wicket Bulletin, Check Desk Bulletin, and Marquise Bulletins, all of which contain a wealth of ideas for architects and general contractors.

Ask about their new white bronze tablets and bank fixtures.

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Write for Newman's Bronze Tablet Catalog, illustrating and pricing cast bronze memorial tablets, bank signs, school tablets, letters, nameplates, etc. A gold mine of suggestions and data for your files. As specialists the House of Newman is prepared to work to splendid advantage with architects who specify bronze tablets and letters.

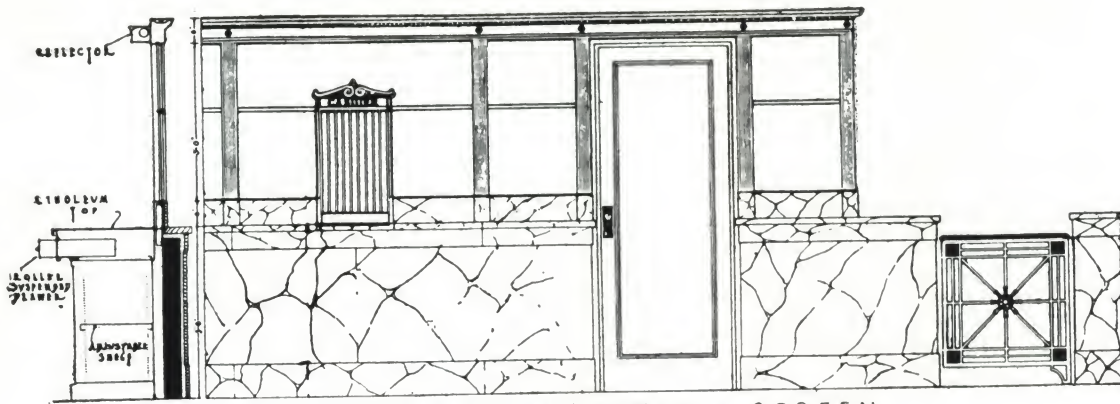
Theater Fixtures

Brass rails, plush covered rails, velour ropes with brass posts, ornamental bronze ticket offices, extruded bronze and kalamein brass lobby frames, vent grilles, marquise of copper and galvanized steel.

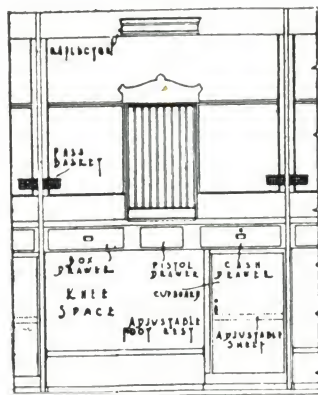
In the manufacture of these stock and special fixtures Newman has specialized for nearly half a century.



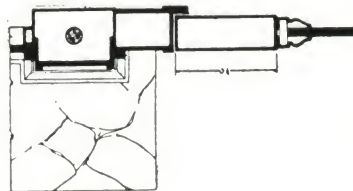
Bank of California, Seattle, Wash.



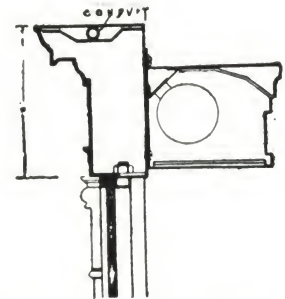
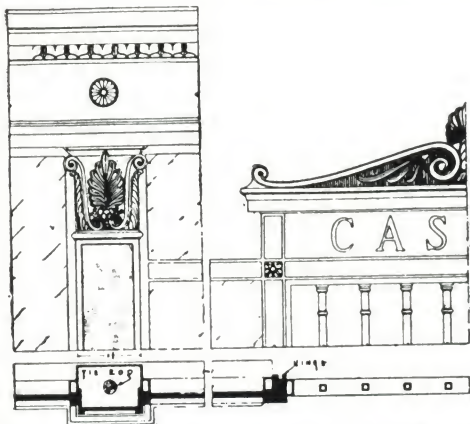
ELEVATION • OF • COUNTER • SCREEN



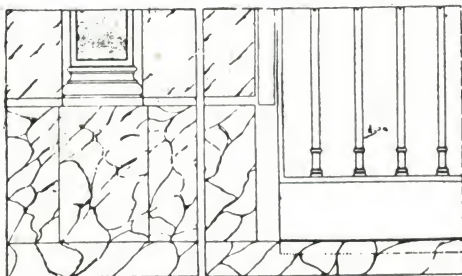
REAR • ELEVATION • OF • COUNTER



SECTION • THRU • DOOR • JAMB

TYPICAL SECTION
THRU CORNICE

HALF DETAIL PLAN THRU COUNTER SCREEN



HALF DETAIL ELEVATION OF COUNTER SCREEN

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Fitted with screws (for wood) or with sharpened pins, invisible from the front. Also come with brass or bronze screws, complete with expansion shields, for stone.

Please specify by *type letter* and *design number*. Special architectural styles made to order in any size.

DESIGN
No B-32**BANKING SCREEN**THE NEWMAN
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Also Stairs, Railings, Fences, Entrance Doors, Sidewalk Doors, Access Doors, Store Fronts, Marquises, Art Smithing, Lamp Posts, Flag and Radio Antennae Poles, Coal Doors and Chutes, Fountains, Stable and Barn Equipment, Garden and Park Furniture, Tree Guards, Pipe Railings, Racks, special Pipe Bends, Steel Partitions and Radiator Inclosures.

N.A.I.W. Elevator Doors

These doors are made of substantial material to resist heavy duty, are of good architectural design and are sold at a price conforming with the purpose for which they are to be used.

N.A.I.W. Doors are manufactured by a special process from a single plate of steel $\frac{1}{8}$ in. thick, formed with stiles, rails and panels to conform with architect's designs.

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N.A.I.W. Doors are made in one basic section as shown in Section W, and in 3 basic styles.

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These styles can be varied in section to suit architect's designs:

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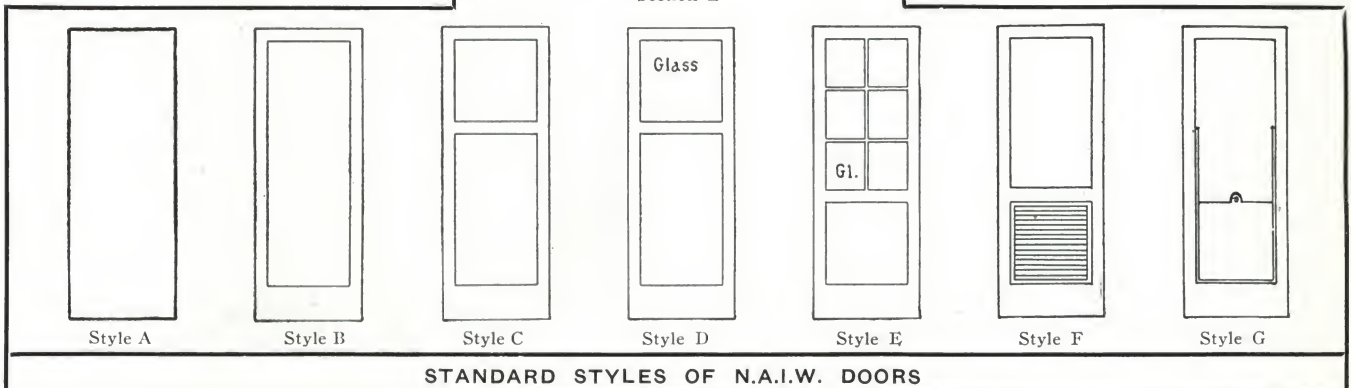
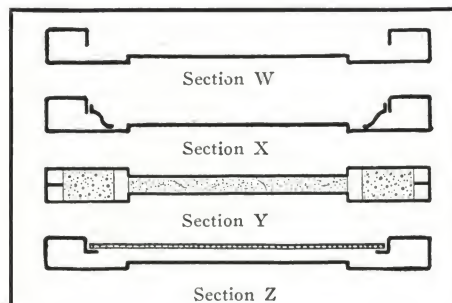
N.A.I.W.



TRADE-MARK



N.A.I.W. Elevator Doors
Warwick Hotel, New York, N. Y.
A 36-story building



STANDARD STYLES OF N.A.I.W. DOORS

Features of the N.A.I.W. Doors

No parts to separate.
No screws to loosen.
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No warping or blistering.
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No wooden cores.
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They are arranged to receive standard hardware applied so that no screws show on the outside face.

Arrangement—Single sliding doors, slide and swing doors, two-speed or three-speed doors or any other arrangement required.

They can be made to any size or thickness.

Suitable for Heavy Service

N.A.I.W. Doors are recommended for passenger, service or freight elevators for hotels, apartment, club, office, loft and industrial buildings, warehouses, schools and hospitals.

N.A.I.W. Doors can also be used for all purposes where ordinary doors are used and where heavy duty is required.

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Our engineering department will gladly assist architects by making a study of special conditions and submitting sketches for elevator fronts and other doors.

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Prompt and helpful estimates on any actual or contemplated work cheerfully made without obligation.



Bronze and Silver Statuette—The Greek Dance
By C. PAUL JENNEW EIN



Memorial to the 7th Regiment, N. Y., 107th United States Infantry

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Manufacturers of Architectural Brass and Bronze Work

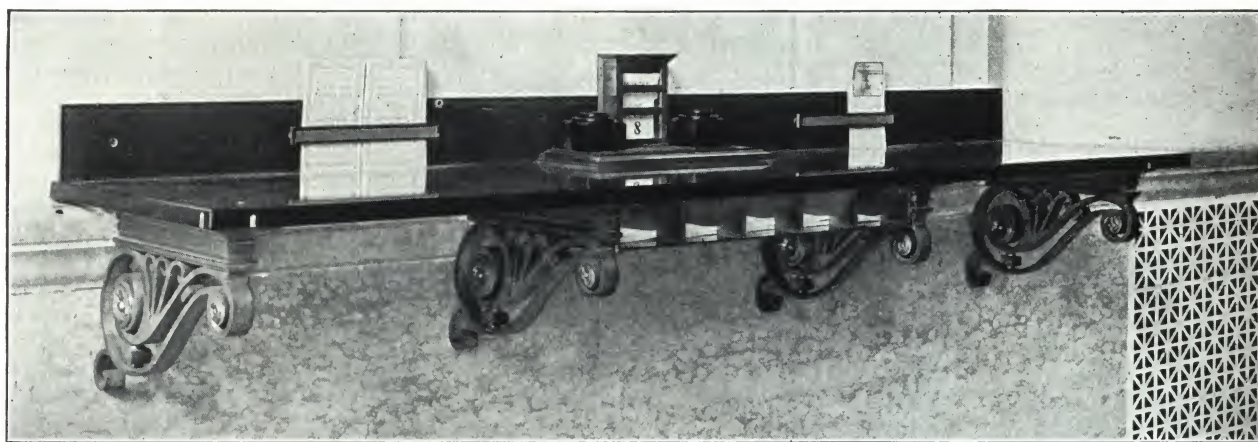
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ORNAMENTAL BRONZE and BRASS WORK of every description, for private and public buildings:

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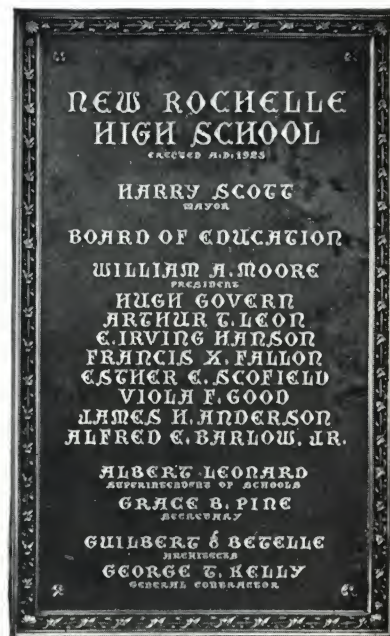
Folding Gates, Marquises, Mausoleum Doors and Supplies, Bank Enclosures, Counter Screens, Check Desks, Elevator Enclosures, Fences, Balconies, Lamp Standards, Brackets, Tablets, Push Plates, Kick Plates, Brass and Bronze Saddles, Door and Window Guards, Special Hardware, Special Castings (all Alloys), etc.



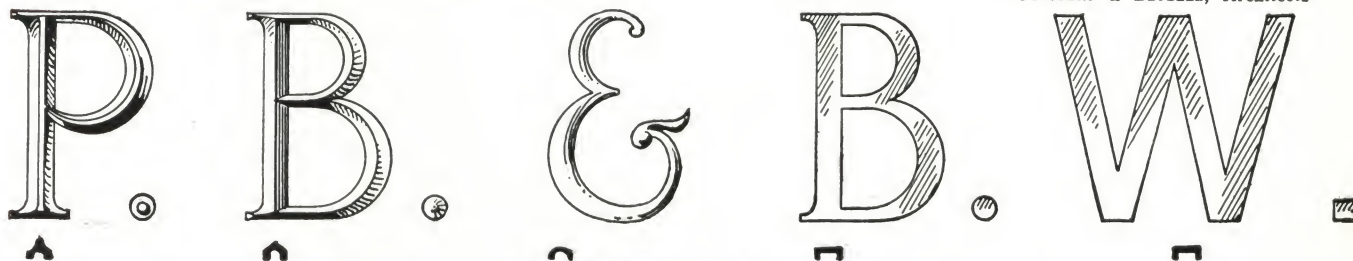
Check Desk, North Side Savings Bank, New York, N. Y.
HOLMES & WINSLOW, Architects



Portion of Screen, North Side Savings Bank
HOLMES & WINSLOW, Architects



Tablet, New Rochelle, N. Y.
High School
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All sizes; made from architects' details and also from stock patterns. Cast bronze name plates, signs and tablets

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Location in the heart of the industrial South, with raw materials at hand and excellent railroad facilities, enables us to give quick and competent service throughout the Southern States.

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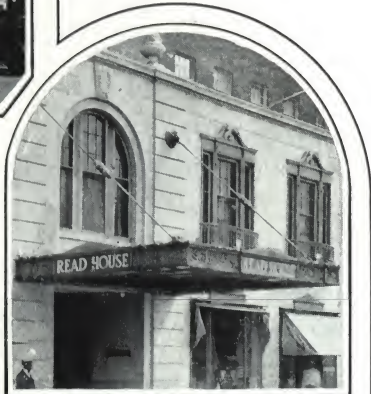
Plant consists of modeling and pattern shops, foundry, machine and fitting shops and forge shop, all conveniently arranged and modernly equipped for the manufacture of building iron work and devoted exclusively to this product.



NEW READ HOUSE-CHATTANOOGA, TENN.



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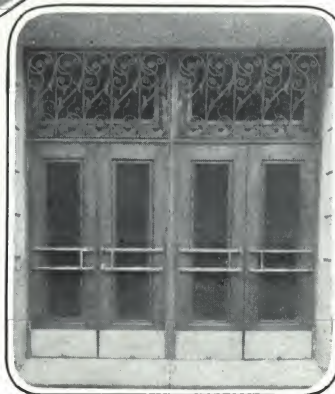
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Are made up on subcontract work from architects' complete plans and specifications.

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Specialties

The following articles are carried in stock or made up quickly from standard details and patterns.

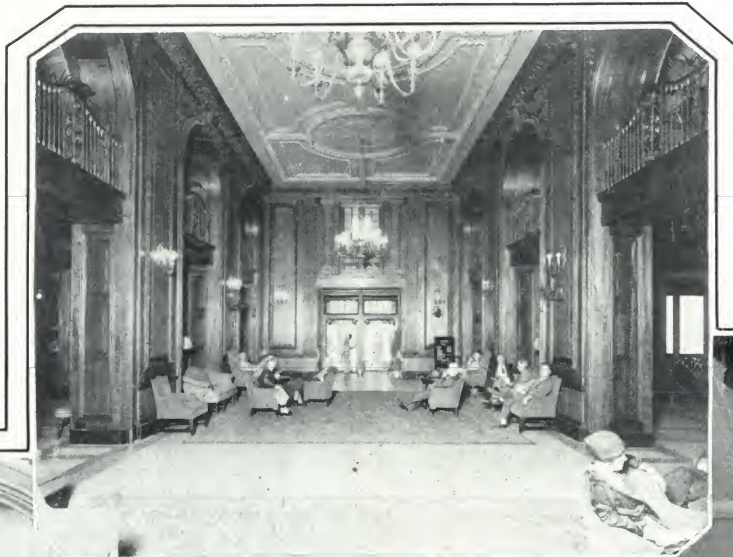
Descriptive circulars furnished upon request.

Anchors
Area gratings
Ash hoist
Ash pit doors and dumps
Balcony railings and brackets
Balustrades
Coal chutes
Cast iron columns
Conductor pipe boots
Door sills

Driveway gates
Fire escapes
Joist hangers
Manhole rings and covers
Marquises

Newel posts
Post caps and bases
Pressed steel stairs
Pipe railings
Radiator grilles

Rosettes
Sash weights
Store fronts
Spiral stairs
Thresholds
Ventilator gratings
Wheel guards
Window guards
Washers
Wood truss iron work



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MEZZANINE RAILING



OFFICE GRILLE



STAIR RAILING

References

BUILDING
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Tennessee War Memorial
Marx & Bendsdorf Building
First Baptist Church
Markham Hotel
New Orleans Public Service
Raymond Telephone Building
Mobile Public Library
Alabama Power Co.
Rich Bros. Department Store
State Office Building
First National Bank
St. Vincent's Hospital
Lynch Office Building
First National Bank
King Cotton Hotel

LOCATION
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Nashville, Tenn.
Memphis, Tenn.
Jackson, Miss.
Gulfport, Miss.
New Orleans, La.
New Orleans, La.
Mobile, Ala.
Birmingham, Ala.
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Enclosures and Cabs, Interior Doors, Grilles, Windows,
Store Fronts, Directory Boards, Marquises, Lamp Stand-
ards, Tablets, Signs, Letters, Honor Rolls, Memorials,
Mausoleum Work.

Bronze Windows

Over 2200 "Polachek" patented two-point contact
double hung bronze windows were selected for installa-
tion in the New York Life Insurance Company's new
building, New York, N. Y., by the architect, Cass
Gilbert, the owners, and the general contractor, Starrett
Bros.

Our bronze windows have also been installed on:

Prudential Insurance Co., Newark, N. J., Cass Gilbert, Archi-
tect
New York County Courthouse, New York, N. Y., Guy Lowell,
Architect
Mutual Benefit Life Insurance Co., Newark, N. J., J. H. &
W. C. Ely, Architects
Clark Building, Los Angeles, Cal., Robert D. Farquhar, Archi-
tect
Packard Bldg., Philadelphia, Pa., Ritter & Shay, Architects
Barnett National Bank, Jacksonville, Fla., Mowbray & Uffinger,
Architects
Rochester Savings Bank, Rochester, N. Y., McKim, Mead &
White, Architects
and many other buildings.

Details and specifications will be furnished to those
interested upon application.



Bronze Foyer Entrance Doors
Paramount Theatre, New York, N. Y.
C. W. & G. L. RAPP, Architects

A Few Representative Installations of Our Distinctive Metal Work

During the past two years, we have contracted for
over 800 jobs, the following of which aggregate approxi-
mately five million dollars.

New York Life Insurance Co. Building, New York, N. Y.;
Prudential Insurance Co. Building, Newark, N. J.
Cass Gilbert, Architect
First Trust & Savings Bank, Chicago, Ill.
Leonard Construction Co., Architects
Cleveland Terminal Tower, Cleveland, Ohio
Graham, Anderson, Probst & White, Architects
Fred F. French Building, New York, N. Y.
Fred F. French Co., Architects
Mutual Benefit Life Insurance Building, Newark, N. J.
J. H. & W. C. Ely, Architects
Convention Hall, Atlantic City, N. J.; Cincinnati Inquirer, Cin-
cinnati, Ohio; First National Bank, Charlotte, N. C.
Lockwood, Greene & Co., Inc., Architects
City Hall Annex, Philadelphia, Pa.
Phillip H. Johnson, Architect
Seaman's Bank for Savings, New York, N. Y.
B. W. Morris, Architect
Fidelity-Philadelphia Trust Co., Philadelphia, Pa.
Simon & Simon, Architects
New York Academy of Medicine, New York, N. Y.
York & Sawyer, Architects
Barclay Vesey Building, New York, N. Y.
McKenzie, Voorhees & Gmelin, Architects
Paramount Theatre, New York, N. Y.
C. W. & Geo. L. Rapp, Architects
Barnett National Bank, Jacksonville, Fla.; First National Bank,
Marquette, Mich.; Globe Exchange Bank, Brooklyn, N. Y.
Mowbray & Uffinger, Inc., Architects

Aeolian Company, New York, N. Y.
Warren & Wetmore, Architects
Farmers Loan & Trust Co., New York, N. Y.; Real Estate
Board Building, New York, N. Y.
Starrett & Van Vleck, Architects
Federal American National Bank, Washington, D. C.
A. C. Bossom, Architect
Bank of America, New York, N. Y.
Trowbridge & Livingston, Architects
Boston 5¢ Savings Bank, Boston, Mass.
Parker, Thomas & Rice, Architects
Harriman National Bank, New York, N. Y.
G. A. & H. A. Boehm, Architects
First National Bank, Hammond, Ind.
Weary & Alford Co., Architects
Best & Co. Store, New York, N. Y.
Necarsulmer & Lehlback, Architects
Keith Theatre, New York, N. Y.
Thomas W. Lamb, Architect
Wadsworth Building, New York, N. Y.
Sloane & Robertson, Architects
Rochester Savings Bank, Rochester, N. Y.
McKim, Mead & White, Architects
Parker House, Boston, Mass.
Desmond & Lord, Architects
Fairview Mausoleum, Newark, N. J.
Webb & Sohn, Architects
Dade County Courthouse, Miami, Fla.
A. Ten Eyck Brown, Architect
Westchester Lighting Co., Mt. Vernon, N. Y.
Beverly S. King, Architect
First National Bank, Youngstown, Ohio
Walker & Weeks, Architects

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Guards.
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Colton Manor Hotel, Atlantic City, N. J.
Lafayette Hotel, Atlantic City, N. J.
Viking Hotel, Newport, R. I.
Altamont Hotel, Hazleton, Pa.
Bankers Trust Building, Atlantic City, N. J.
Hazleton National Bank, Hazleton, Pa.

Girard Trust Building, Philadelphia, Pa.
Cunard Building, Philadelphia, Pa.
Eastman School of Music, Rochester, N. Y.
Horn & Hardart Broad Street Building, Philadelphia, Pa.
Lewis Office Building, Philadelphia, Pa.
Levin Apartment Building, Atlantic City, N. J.
Liberty Apartment, Atlantic City, N. J.
Central Junior High School, Allentown, Pa.
Oliver High School, Pittsburgh, Pa.
Bangor High School, Bangor, Pa.
Masonic Temple, Philadelphia, Pa.
Lankenau Hospital, Philadelphia, Pa.
City Hall, Philadelphia, Pa.
Masonic Temple, Pittsburgh, Pa.
Rajah Temple, Mystic Shrine, Reading, Pa.
Raquet Club, Philadelphia, Pa.
Pennsylvania State Capitol, Harrisburg, Pa.
and others.

Gates and Fencing

Hazleton Cemetery, Hazleton, Pa.
St. Gabrile Cemetery, Hazleton, Pa.
P. A. Widener, Estate, Philadelphia, Pa.
Colonel Elkins, Estate, Philadelphia, Pa.
John Wanamaker, Estate, Philadelphia, Pa.
W. Stone, Banker, Merion, Mass.
Fred Yuengling, Pottsville, Pa.
and many others.



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STARRETT & VAN VLECK,
Architects



Bronze Grille

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New York, N. Y.



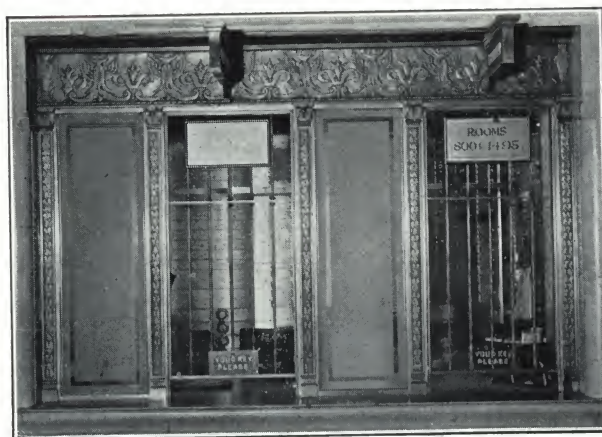
Bronze Stair Railing

Hotel Manger, New York, N. Y.



Bronze Elevator Door

70 Trinity Place, New York, N. Y.
H. I. OSER, Architect



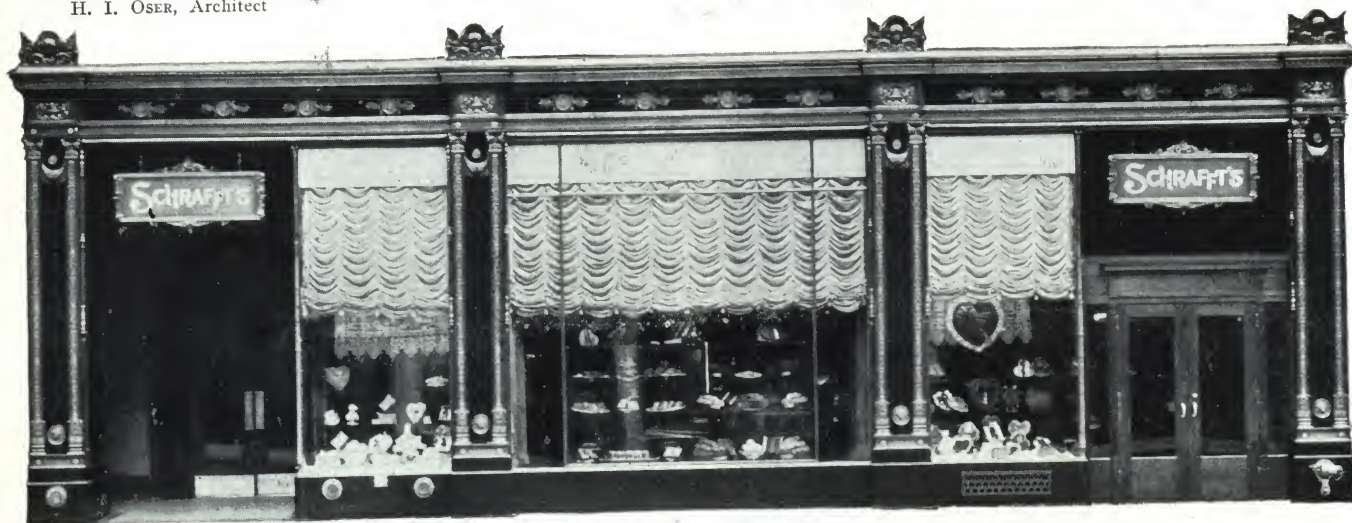
Bronze Office Screen

Hotel Manger, New York, N. Y.
H. CRAIG SEVERANCE, Architect



Bronze Gate

First State Bank,
Detroit, Mich.
ALBERT KAHN, Architect



Bronze Store Front

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CHARLES E. BIRGE, Architect

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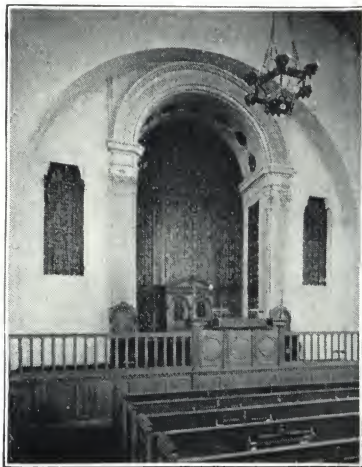
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Spiral Stairs which will be sent on request.

References

A few of the many large buildings for which we have furnished the ornamental iron work:

BUILDING AND LOCATION	ARCHITECT
Delaware River Bridge, Philadelphia, Pa.	Paul P. Cret
Elverson Building, Philadelphia, Pa.	Rankin, Kellogg & Crane
John Hancock Building, Boston, Mass.	Parker, Thomas & Rice
Public Ledger Building, Philadelphia, Pa.	Frank C. Roberts
State Penitentiary, Rockview, Pa.	John T. Windrim
Integrity Trust Co., Philadelphia, Pa.	Paul P. Cret
Fidelity Mutual Life Insurance Building, Philadelphia, Pa.	Zantzing, Borie & Medary
Second Church of Christ, Scientist, Germantown, Pa.	Day & Klauder



Wrought Iron Organ Screen,
Second Church of Christ,
Scientist, Philadelphia, Pa.
DAY & KLAUDER, Architects



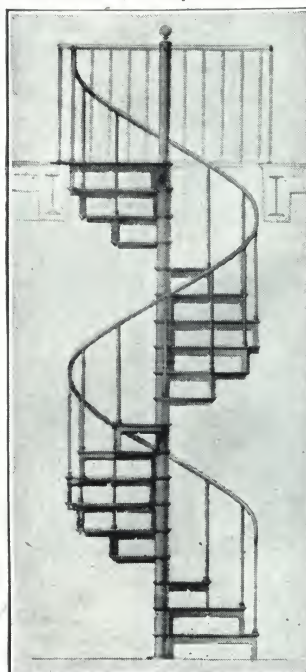
Cast Iron Main Stairs, Bennett Hall, University of Pennsylvania, Philadelphia
STEWARTSON & PAGE, Architects



Cast Iron Main Entrance, Independence Indemnity Insurance Co., Philadelphia, Pa.
RITTER & SHAY, Architects



Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
RANKIN, KELLOGG & CRANE, Architects



Smyser-Royer No. 300 Stock
Spiral Stairs



Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
RANKIN, KELLOGG & CRANE, Architects

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APOLLO STEEL CO., Apollo, Pa.	REEVES MANUFACTURING CO., Dover, Ohio
ASHTABULA STEEL SHEET CO., Ashtabula, Ohio	REPUBLIC IRON & STEEL CO., Youngstown, Ohio
CENTRAL ALLOY STEEL CORP., Massillon, Ohio	SENECA IRON & STEEL CO., Buffalo, N. Y.
CHAPMAN PRICE STEEL CO., Indianapolis, Ind.	SHARON STEEL HOOP CO., Sharon, Pa.
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NATIONAL ENAMELING & STAMPING CO., Granite City, Ill.	WHEELING STEEL CORP., Wheeling, W. Va.
	YOUNGSTOWN SHEET & TUBE CO., Youngstown, Ohio

For Sheet Steel Roofs, see page A440
For Sheet Steel Cornices, see page A558

Advantages

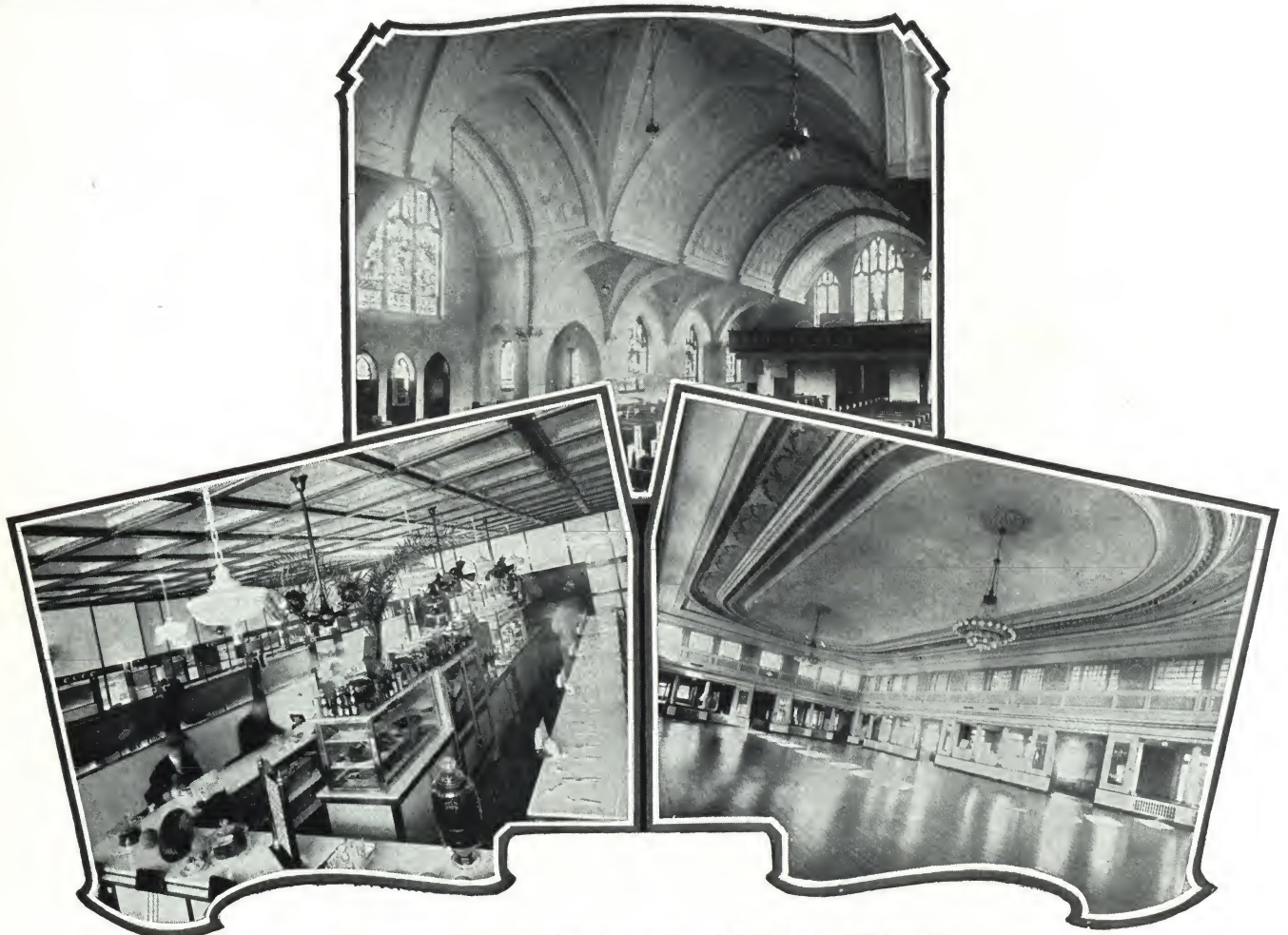
The following characteristics of sheet steel for interior uses are of particular appeal to the architect:

Its toughness and strength permit of joints of everlasting tightness impossible to brittle and thick materials.

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Sheet Steel can be obtained in a wide variety of designs, greatly enhancing interior attractiveness. Where sanitation and cleanliness is an item of great importance, porcelain enameled sheets can be applied

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The following articles in which the architect frequently is interested are only a partial list covering the more important items:

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Bins	Doors	Folding
Bookstacks	Elevator	Full height
Booths	Entrance	Toilet
Picture	Fire	Pilasters
Ticket	Hollow	Placques and ornaments
Cabinets	Kalamein	Radiator covers
Broom	Revolving	Refrigerators
Clothes	Dryers	Safes
Display	Laundry	Sash
Filing	Ducts	Casement
Fruit	Blower	Sliding
Food	Ventilator	Ventilating
Ironing	Warm air	Screens
Kitchen	Elevator Enclosures	Seating
Medicine	Grills	Shelving
Storage	Heaters	Stair
Ceilings	Warm air	Risers
Chair rails	Humidifiers	Treads
Chutes	Lath	Stairs complete
Clothes	Metal	Tanks
Delivery	Expanded metal	Tiling
Columns	Mail boxes	Wall
Corner beads	Mail chutes	Ceiling
Cornices	Moulding	Transoms
Counters	Picture	Wainscoting
		Window trim



Sheet Steel Doors in the Orpheum Theater, Kansas City, Mo.
C. A. LANSBAUGH, Architect



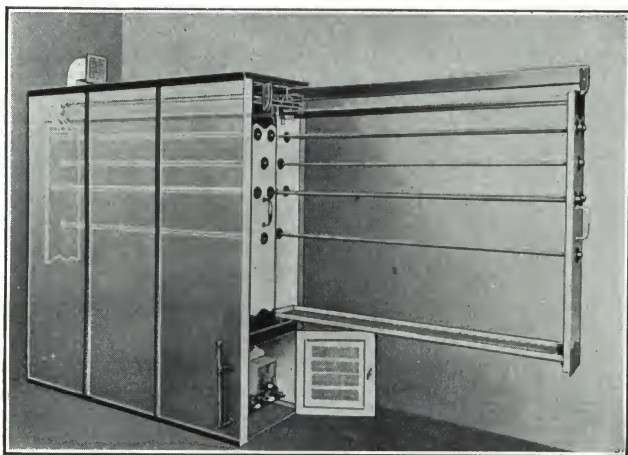
Sheet Steel Partitions in the Brooklyn Municipal Building,
Brooklyn, N. Y.



Sheet Steel Toilet Partitions, Oakland Savings Bank,
Oakland, Calif.



Sheet Steel Doors, Wainscoting, and Interior Trim in the New
Federal Reserve Bank Building, New York, N. Y.



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Coalhole Covers

Doors: Entrance, Sidewalk
Elevator Enclosures, Cabs, Gates, Doors

Entrances: Iron and Bronze
Fences: Iron, Wire, Wire Netting

Fire Escapes

Flagpoles: Steel



Fronts: Store, Building

Gates: Iron, Wire and Folding

Grille Work

Guards: Iron and Wire—Window, Stall, Wheel, Machinery, Skylight

Hangers: Joist, Wall, I-beam

Hitching Posts

Jail Work

Lamp Brackets

Lamps: Iron

Lawn Furniture, Settees,

Chairs, etc.

Lockers: Wire, Iron

Marquises

Metal Ladders

Partitions, Wire

Pipe Railing

Porte-cochères

Post Caps

Railings: Bank, Theater,

Iron, Brass, Wire, Pipe

Roof Crestings

Shutters

Stable Fixtures: Hay

Racks, Feed Boxes, Water

Troughs, Stall Posts,

Gutters, Cesspools, Har-

nass Brackets, Box Stall

Hinges and Latches,

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Cleaners

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Stairs, Pre-Cast Concrete

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censed under Babcock-

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Fence, Gates and Lamps, John R. Thompson Residence, Chicago, Ill.
H. R. WILSON, Architect

References

Following is a partial list of buildings in which representative installations of our work have been made:

BUILDING, LOCATION AND ARCHITECT

Monroe Building, Chicago, Ill., Holabird & Roche
 National Life Insurance Co., Chicago, Ill., Jenney, Mundie & Jensen
 "Chicago" Building, Chicago, Ill., Holabird & Roche
 Advertising Building, Chicago, Ill., W. C. Zimmerman
 Borland Building, Chicago, Ill., Charles S. Frost
 Webster Building, Chicago, Ill., A. S. Alschuler
 Farmers' Security Bank Building, South Bend, Ind., Perkins, Fellows & Hamilton
 McKay Building, Chicago, Ill., Huehl, Schmidt & Holmes
 Sharpe Building, Kansas City, Mo., H. R. Wilson
 Overland Stores Building, Kansas City, Mo., Mills, Rhines, Bellman & Nordhoff
 Stewart Building, Houston, Tex., Jonas & Rue
 Cosden Building, Tulsa, Okla., Henry F. Hoit
 Rand-McNally Co. Building, Chicago, Ill., Holabird & Roche
 Harper Memorial Building, University of Chicago, Chicago, Ill., Shepley, Rutan & Coolidge
 Sisters of Providence, College and Music Building, St. Mary's, Ind., D. A. Bohlen & Son
 Seminary Building, Archdiocese of Chicago, Z. T. Davis
 U. S. Post Office Buildings (over 45), James Knox Taylor
 U. S. Naval Training Station (15 buildings), Lake Bluff, Ill., Jarvis Hunt
 City of Chicago Police Stations, Fire Engine Houses, Chicago, Ill., Chas. W. Kallal
 School Buildings—A large number for Board of Education, Chicago, Ill., D. H. Perkins, A. F. Hussander and John C. Christensen
 Iowa State College, Central Building, Ames, Iowa, Proudfoot & Bird
 Y. W. C. A. and Y. M. C. A., Nashville, Tenn., Shattuck & Hussey
 Y. M. C. A. College Building, Chicago, Ill., Emery S. Hall
 Henry Ford Hospital, Detroit, Mich., Albert Wood
 Chicago Memorial Hospital, Chicago, Ill., Frank D. Chase Co.
 Commonwealth-Edison Co. (5 buildings), Chicago, Ill., Shepley, Rutan & Coolidge
 Commonwealth-Edison Co., N. W. Station, Chicago, Ill., Holabird & Roche
 Montgomery Ward & Co., Chicago, Ill., Richard E. Schmidt, Garden & Martin
 Popular Mechanics Company Building, Chicago, Ill., Marshall & Fox
 Masonic Temple, Davenport, Iowa, Clausen & Kruse
 Kahl Building, Davenport, Iowa, Rapp & Rapp
 Chas. Lange Building, Chicago, Ill., Clarence Hatzfeld
 Hotel Sherman, Chicago, Ill., Holabird & Roche
 Severin Hotel, Indianapolis, Ind., Vonnegut & Bohne
 Blackhawk Hotel, Davenport, Iowa, Temple & Burrows
 Mayflower Hotel Building, Washington, D. C., Warren & Wetmore
 Milwaukee Journal Building, Milwaukee, Wis., Frank D. Chase Co.
 United Light & Power Building, Davenport, Iowa, Temple & Burrows
 Chicago Produce Mart, Chicago, Ill., Fugard & Knapp
 Crane Co. Building, Chicago, Ill., Graham, Anderson, Probst & White
 Margarita Club, Evanston, Ill., Morrison & Wallace
 Blackstone Hotel and Theater, Chicago, Ill., Marshall & Fox
 Illinois Theater, Chicago, Ill., Wilson & Marshall
 Shubert Theater, St. Paul, Minn., Marshall & Fox
 Hippodrome Building, Cleveland, Ohio, Knox & Elliott
 Woods Theater and Office Building, Chicago, Ill., Marshall & Fox
 State & Lake Theater, Chicago, Ill., C. W. & Geo. L. Rapp
 Chicago National League Ball Park, Chicago, Ill., Davis & Davis
 James Theater and Office Building, Columbus, Ohio, C. Howard Crane
 Keith's Theater, Cleveland, Ohio, C. W. & Geo. L. Rapp
 Selwyn-Harris Theater Buildings, Chicago, Ill., C. Howard Crane and Kenneth Franzheim
 Schueneman's Recreation Building, Chicago, Ill., Michaelson & Rognstad
 Shea's Theater, Buffalo, N. Y., C. W. and Geo. L. Rapp
 National Theaters Corp., Paradise Theater, Chicago, Ill., John Ebersson
 Marks Bros., Granada Theater, Chicago, Ill., Levy & Klein
 Marks Bros., Marbro Theater, Chicago, Ill., Levy & Klein
 American Insurance Union Building, Columbus, Ohio, C. Howard Crane



Marquise and Vestibule for Colonial Theater, Chicago, Ill.

MARSHALL & FOX, Architects



Main Stairs, 3rd to 15th Floors, "Chicago" Building, Chicago, Ill.

HOLABIRD & ROCHE, Architects

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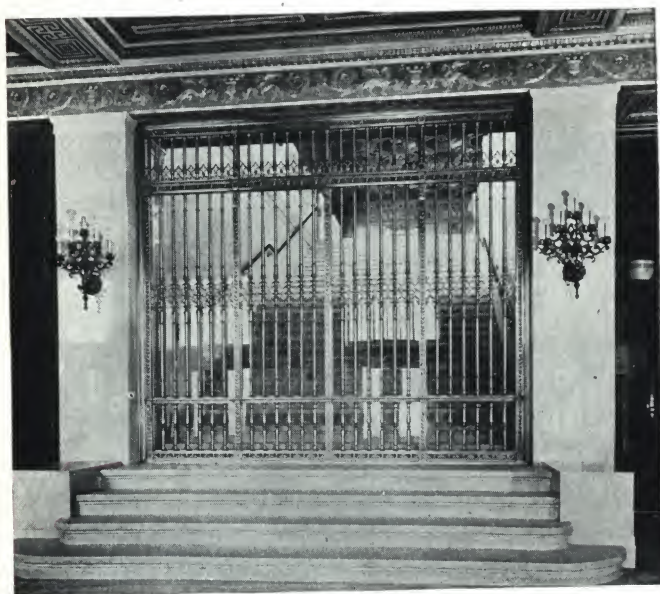


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ALBERT KAHN, Architect
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Typical Tyler Car



Transom Treatment



Typical Tyler Car

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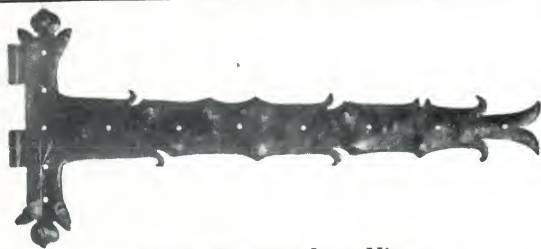
Wrought Iron and Brass
Tabernacle, Gold Plate
Finish



Office Display Room



Wrought Iron and Brass
Tabernacle, Gold Plate
Finish



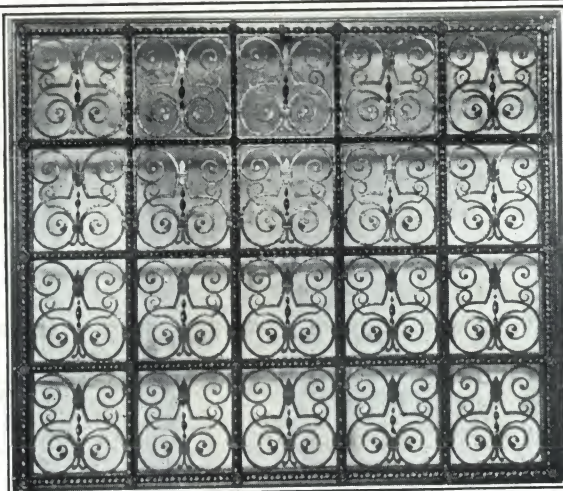
Hand Wrought Iron Hinge



Hand Wrought Iron Hinge



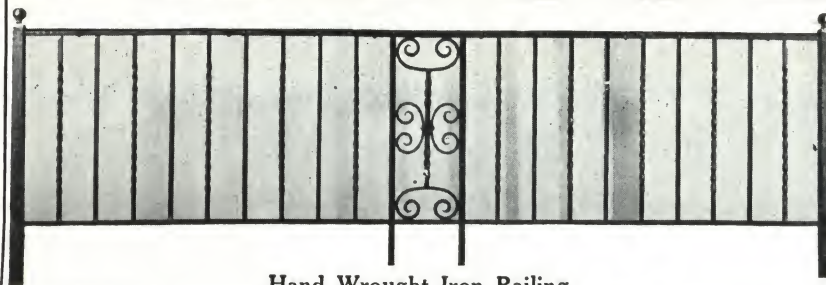
Stairway with Ornamental Balustrade



Hand Wrought Ornamental Grille



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Decorative
Ornament



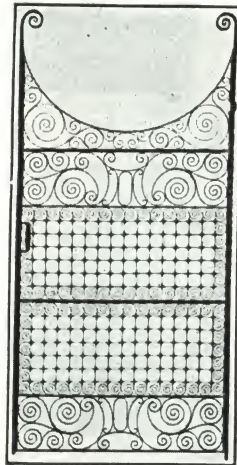
Hand Wrought Iron Railing



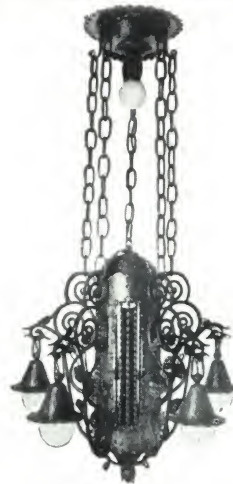
Wrought Iron
Ornamental Light-
ing Fixture



Alms Box



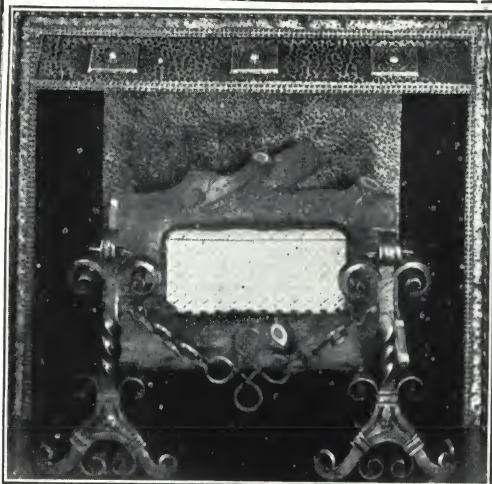
Ornamental Gate



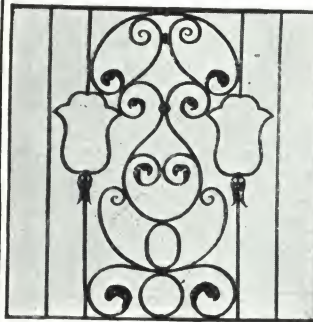
Hand Wrought
Chandelier



Fireplace
Accessories



Hand Wrought Fireplace Facing and
Accessories



Hand Wrought
Ornamental Grille



Hand Wrought Ornamental Gates



Hand Wrought Table with Marble Top

Partial List of Installations

East End Savings & Trust Co.
Logan Trust Co.
Dollar Savings & Trust Co.
Press Publishing Co.
Pittsburgh Asylum for the Insane
Cambria Steel Co.
Citizens General Hospital
Etna High School
Theatre for Spang Chalfant
Stanley Theatre
Sacred Heart Church
W. W. Willock Residence
Mother House, Sisters of Divine Providence
Kingsley House Association
Mother House, Benedictine Sisters
Braddock Theatre
St. Paul's Presbytery Building
Martin Building
Swissvale High School
St. Margaret's Hospital

Pittsburgh, Pa.
New Kensington, Pa.
Pittsburgh, Pa.
Pittsburgh, Pa.
Mayview, Pa.
Johnstown, Pa.
New Kensington, Pa.
Etna, Pa.
Etna, Pa.
Pittsburgh, Pa.
Pittsburgh, Pa.
Sewickley, Pa.

Pittsburgh, Pa.
Pittsburgh, Pa.
N. S. Pittsburgh, Pa.
Braddock, Pa.
Pittsburgh, Pa.
N. S. Pittsburgh, Pa.
Swissvale, Pa.
Pittsburgh, Pa.

JNO. WILLIAMS, INC.

Manufacturers of Ornamental Bronze and Iron Work for Buildings

TELEPHONE
CHICKERING 10300

556 West 27th Street, NEW YORK, N. Y.

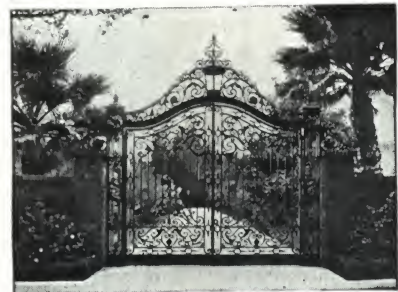
Products

ORNAMENTAL BRONZE, IRON and WIRE WORK, including:

Bronze and Iron Entrance Doors; Door and Window Grilles; Stair and Tube Railings; Lamp Standards; Bank Fittings, Screens and Enclosures; Wire Mesh Work; Elevator Enclosures; Mausoleum Doors and Fittings; Memorial Tablets; Honor Roll Tablets; Bronze Signs and Letters; Fine Bronze Castings; Statues, Figures and Portraits; Busts and Medallions; Monumental Bronze Work; Fountains and Sundials; Iron Driveway Gates; Fencing and Grille Work.



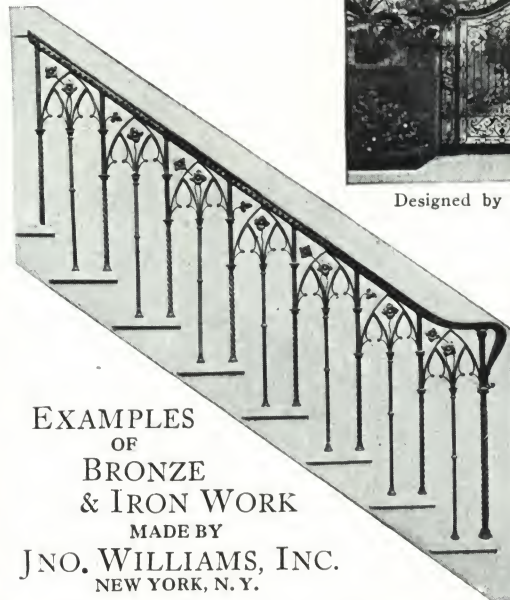
LORD & HEWLETT and KENNETH M. MURCHISON, Associate Architects



Designed by JNO. WILLIAMS, INC.



CASS GILBERT, Architect



EXAMPLES
OF
BRONZE
& IRON WORK
MADE BY
JNO. WILLIAMS, INC.
NEW YORK, N. Y.



Designed by
CARLHIAN OF PARIS, INC.

JANSSEN & ABBOTT,
Architects



DENNISON & HIRONS, Architects



GORDON, TRACY & SWARTWOUT,
Architects

Examples of Bronze and Iron Work Made by Jno. Williams, Inc., New York, N. Y.

ART METAL CONSTRUCTION COMPANY

Hollow Metal Doors and Trim

HOME OFFICE AND FACTORIES
JAMESTOWN, N. Y.

For Branch Offices, see page B2176

Products

HOLLOW METAL DOORS and BUILDING TRIM; ELEVATOR, STAIR and DUMBWAITER ENCLOSURES; CORRIDOR and OFFICE PARTITIONS and CABINET WORK in STEEL and BRONZE.

For Steel and Bronze Interior Equipment, see pages B2176-2179.



Facilities

Largest and most modernly equipped plants devoted to the manufacture of hollow metal products and building equipment.

Service

Main and branch offices maintain competent engineers, whose services are free to architects, engineers, and builders.

Materials

All materials used in Art Metal products are the best of their respective kinds, for their particular purposes. All steel and ingot iron are the best grades commercial furniture stock of U. S. standard gauge. All bronze is best grade commercial stock Brown and Sharpe gauge, of suitable hardness and uniform color.

Workmanship

The work is executed by craftsmen, employing the latest principles of construction and the most modern methods of manufacture.

General Description of Steel Products

Doors and Sash—Stiles and rails are formed of No. 18 gauge stock with cold drawn panel mouldings securely keyed thereto. Stiles are provided with compressed cork inserts.

Joints are fitted, reinforced, welded and dressed to produce invisible connections.

Metal panels consist of two plates of No. 20 gauge stock and $\frac{1}{4}$ -inch heat retarding insulation.

Glass panels are retained by removable cold drawn moulding frames closely fitted and secured to panel mouldings by No. 6-32 countersunk oval head screws.

Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel mouldings.

Astragals are of cold drawn interlocking shapes welded to stiles.

Jambs—For openings in walls up to $7\frac{1}{2}$ inches thick, jambs are formed of No. 18 gauge stock; over $7\frac{1}{2}$

inches No. 16 gauge with $\frac{1}{2}$ -inch plain or moulded stops for regular units and $\frac{3}{4}$ -inch for Fire Underwriters' units. Jambs are secured to bucks by No. 8-32 screws.

Casings—Of No. 18 gauge cold drawn shapes, corners accurately mitered, welded and dressed to produce invisible joints.

Casings are secured to jambs by concealed method.

Pressed Steel Bucks—Of No. 14 gauge stock provided with anchor retainers and plaster bonds, corners accurately fitted, reinforced and provided with interlocking screw connections. Spreaders of $2 \times 2\frac{3}{4}$ -inch by No. 14 gauge channels with No. 12 gauge gussets are secured to bottoms. No. 18 gauge corrugated adjustable anchors are furnished for each 25 inches of opening height.

Bucks for walls of plaster block construction are furnished with struts when called for. Struts are of $\frac{1}{4} \times 3$ -inch bars having No. 12 gauge flanged gusset ceiling connections.

Bucks for opening more than 3 feet 6 inches wide in tile or brick walls are furnished with arched masonry supports when called for where lintels are not provided. Supports are of 4-inch by No. 12 gauge stock welded to head at ends.

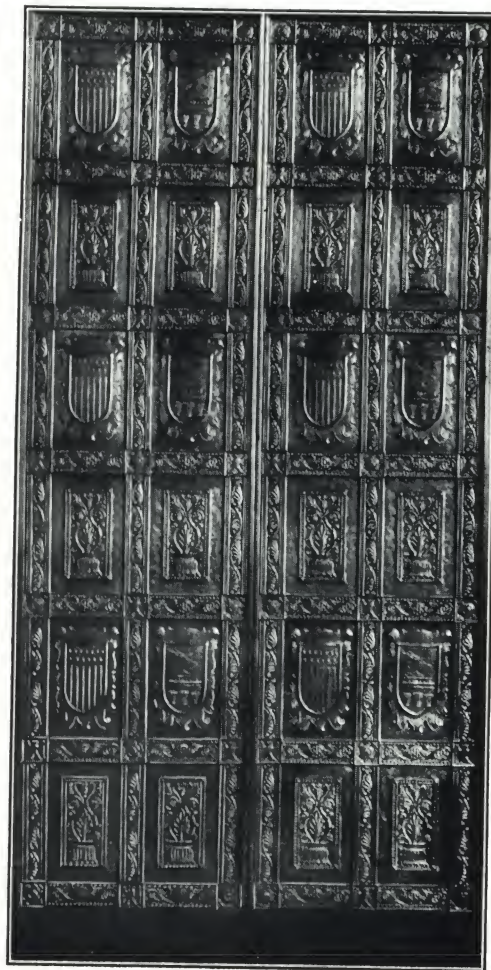
Frames—Combination buck and jamb frames are formed of No. 10, 12, 14 or 16 gauge stock. Corners accurately fitted, welded and dressed to produce invisible rigid joints. Trim members are pressed into frames or of drawn shapes applied by concealed method. Frames are provided with spreaders, anchors, struts and masonry supports as specified for bucks.

Trim Mouldings—Chair rail, staff or scribe, picture and wire mouldings are of No. 18 gauge cold drawn shapes, secured to walls by concealed method.

Bases—Constructed of No. 18 gauge stock with plain or moulded profiles, and secured to walls by concealed method. When called for, bases are fitted with bronze sanitary coves.

Window Trim—Jambs and mullions are of No. 18 gauge stock, plain or paneled, and provided with adjustable moulded stops secured by No. 6-32 countersunk oval head screws.

Stools—Of No. 16 gauge stock with returns accurately mitered, welded and dressed. Stools are secured by No. 8-32 countersunk oval head screws.



Art Metal Bronze Doors, Buckeye Savings & Loan Association, Columbus, Ohio

Casing and Aprons—Of No. 18 gauge cold drawn shapes with corners and returns accurately mitered, welded and dressed, and secured by concealed method.

Partitions—Of sectional type with units of sizes allowing for flexibility of arrangement. Units proper are constructed of formed and drawn shapes reinforced and so assembled as to produce invisible connections.

Owing to the perfected construction, installation is simple and can be performed economically and expeditiously.

Hardware—Hollow metal work is prepared and reinforced for the proper reception of all hardware and appliances. Ordinarily the hardware is furnished under separate contract, but applied at our plant.

Bronze Work

The foregoing description covers our standard products in steel. Bronze work is executed similarly, except that materials are two gauges heavier, joints are made by riveting, screwing and brazing, and finish is produced in accordance with standard methods for durability and desired effects.

Finish

Material is thoroughly cleaned, primed and filled, followed by subsequent coats as required to produce a durable finish of color selected. Each coat is uniformly applied, baked, and sanded, with final coat rubbed to an eggshell gloss.

The following finishes are standard and grouped according to class:

STANDARD FINISHES OF ART METAL DOORS

Class	Finish	Class	Finish
No. 1	Olive "F"	No. 3	White Ivory Cream
No. 2	No. 29 Brewster green	No. 4	No. 36 Dark mahogany, crotch grain
	No. 30 Stone green		No. 61 Brown mahogany
	No. 51 Medium green	No. 5	No. 57 Plain oak, medium
	No. 52 Brown		No. 58 Quartered oak, medium
No. 2½	No. 53 Tan	No. 6	No. 59 Light American walnut
	Maroon		No. 60 Dark American walnut
No. 3	Black	No. 7	No. 56 Verdigris green, stippled
	No. 1 Dull bronze, light		No. R-228 Mottled green, stippled
	No. 2 Dull bronze, medium		
	No. 3 Dull bronze, dark French gray		
	No. 36 Dark mahogany, straight grain		
	No. 36B Light mahogany, straight grain		
	No. 54 Gold bronze		
	No. 55 Silver bronze		

Fire Underwriters' Requirements

The National Board of Fire Underwriters have tested and approved Art Metal products, authorizing their labels for the following situations:

Class "A," Units in Division Walls Between Separate Buildings or Sections of Buildings—

Limitations: swinging type; single doors for openings not exceeding 4x7 feet, and doors in pairs not exceeding 5x7 feet, all steel with approved hardware.

"Class B," Units in Enclosures to Vertical Communications Through Buildings—

Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, all steel with approved hardware.

Class "C," Units in Corridor and Room Partitions—

Limitations: swinging type; single doors for

openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, with or without panels of standard wire glass. Exposed area of individual lights not exceeding 1296 square inches.

Class "D," Units in Exterior Walls Subject to Severe Fire Exposure—Limitations: swinging type; single doors for openings exceeding 4x10 feet, and doors in pairs not exceeding 6x10 feet, with or without panels of standard wire glass. Exposed area of individual lights not to exceed 720 square inches, lights not to exceed 54 inches in height.

The Work of Art Metal Today

The position of Art Metal in the field of hollow metal work is evidenced by the following list of installations:

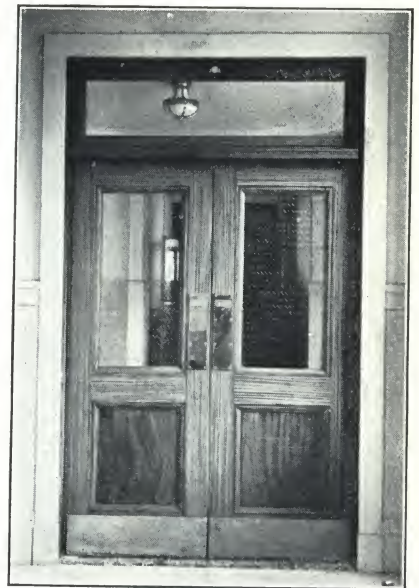
Federal Reserve Bank, New York, N. Y., York & Sawyer, Architects; Marc Eidlitz & Sons, Inc., Contractors
Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks, Architects; John Gill & Son, Contractors
John Hancock Mutual Life Insurance Co., Boston, Mass., Parker, Thomas & Rice, Architects; L. P. Soule & Sons, Contractors
First National Bank of Boston, Boston, Mass., York & Sawyer, Architects; Stone & Webster, Contractors
Union Electric Light & Power Co., St. Louis, Mo., McClellan & Junkersfeld, Engineers & Contractors
Cunningham Piano Co., Philadelphia, Pa., Andrew J. Sauer & Co., Architects; Hughes-Foulkrod Co., Contractors
Federal Reserve Bank, Omaha, Neb., Graham, Anderson, Probst & White, Architects; Selden Breck Construction Co., Builders
New York County Courthouse, New York, N. Y., Guy Lowell, Architect; John T. Brady & Co., Contractors
Ford Hospital, Detroit, Mich., Albert Kahn, Architect; Otto Misch Co., Contractors
Selig Building, Indianapolis, Ind., Vonnegut, Bohn & Mueller, Architects; R. W. Bauman & Co., Contractors
Utica Gas & Electric Light Co., Utica, N. Y., Thos. Murray, Architect; H. R. Beebe, Inc., Contractors
Herman Kiefer Hospital, Detroit, Mich., Albert Kahn, Inc., Architect; Culvertson & Kelly, Contractors
Exchange National Bank, Pittsburgh, Pa., Weary & Alford, Architects and Contractors
Massachusetts Mutual Life Insurance Building, Springfield, Mass., Kirkham & Parlett, Architects; Turner Construction Co., Builders
Brooklyn Lodge B. P. O. E. Club House, Brooklyn, N. Y., McKim, Mead & White, Architects; Mark C. Tredennick Co., Builders
Columbia University, Students Hall, New York, N. Y., McKim, Mead & White, Architects; John Lowry, Inc., Builders
Philadelphia Public Library, Philadelphia, Pa., Horace Trumbauer, Architect; F. W. Mark Construction Co., Builders
Equitable Building, Philadelphia, Pa., A. F. Gilbert, Architect; Earl-Thompson Co., Builders
Barnett National Bank, Jacksonville, Fla., Mowbray & Uffinger, Architects; James Stewart & Co., Builders
Wilson Dam Buildings, Muscle Shoals, Ala., Hugh L. Cooper & Co., Consulting Engineers
New Madison Square Garden, New York, N. Y., Thomas W. Lamb, Architect; James Stewart & Co., Inc., Builders
Number Two Park Avenue Building, New York, N. Y., Buchman & Kahn, Architects
B. F. Keith Theater, Boston, Mass., Thomas W. Lamb, Architect
B. F. Keith Theater, Columbus, Ohio, Thomas W. Lamb, Architect
Fountain Theater, Cincinnati, Ohio, Thomas W. Lamb, Architect
Union Central Life Building, Cincinnati, Ohio, Garber & Woodward, Architects
437 Fifth Avenue Building, New York, N. Y., F. H. Hutton, Architect
Ingraham Building, Miami, Fla., Schultz & Weaver, Architects
Municipal Building, Baltimore, Md., W. H. Emory, Architect



CLOSE-UP OF ONE OF THE MANY ART
METAL ELEVATOR DOORS
New York County Courthouse



ART METAL DOOR
Referee's Room, Referee No. 4, Second Floor,
New York County Courthouse



ART METAL CORRIDOR DOORS
New York County Courthouse



ART METAL BRONZE ENTRANCE DOORS
State Bank of Orlando & Trust Co.,
Orlando, Fla.



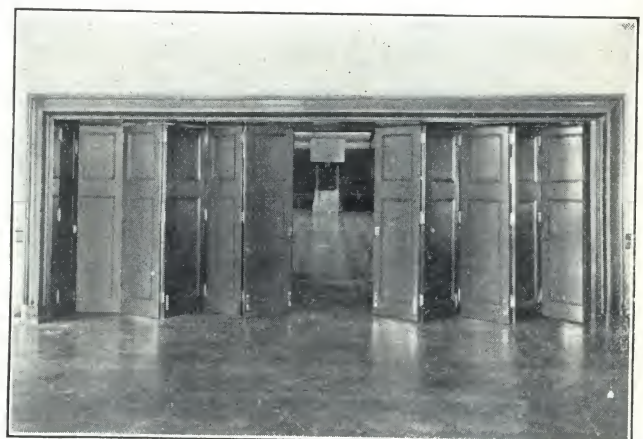
ART METAL BRONZE ENTRANCE DOORS
First National Bank, Fort Wayne, Ind.



ART METAL BRONZE ELEVATOR ENCLOSURES
United Cigar Stores Building, Akron, Ohio

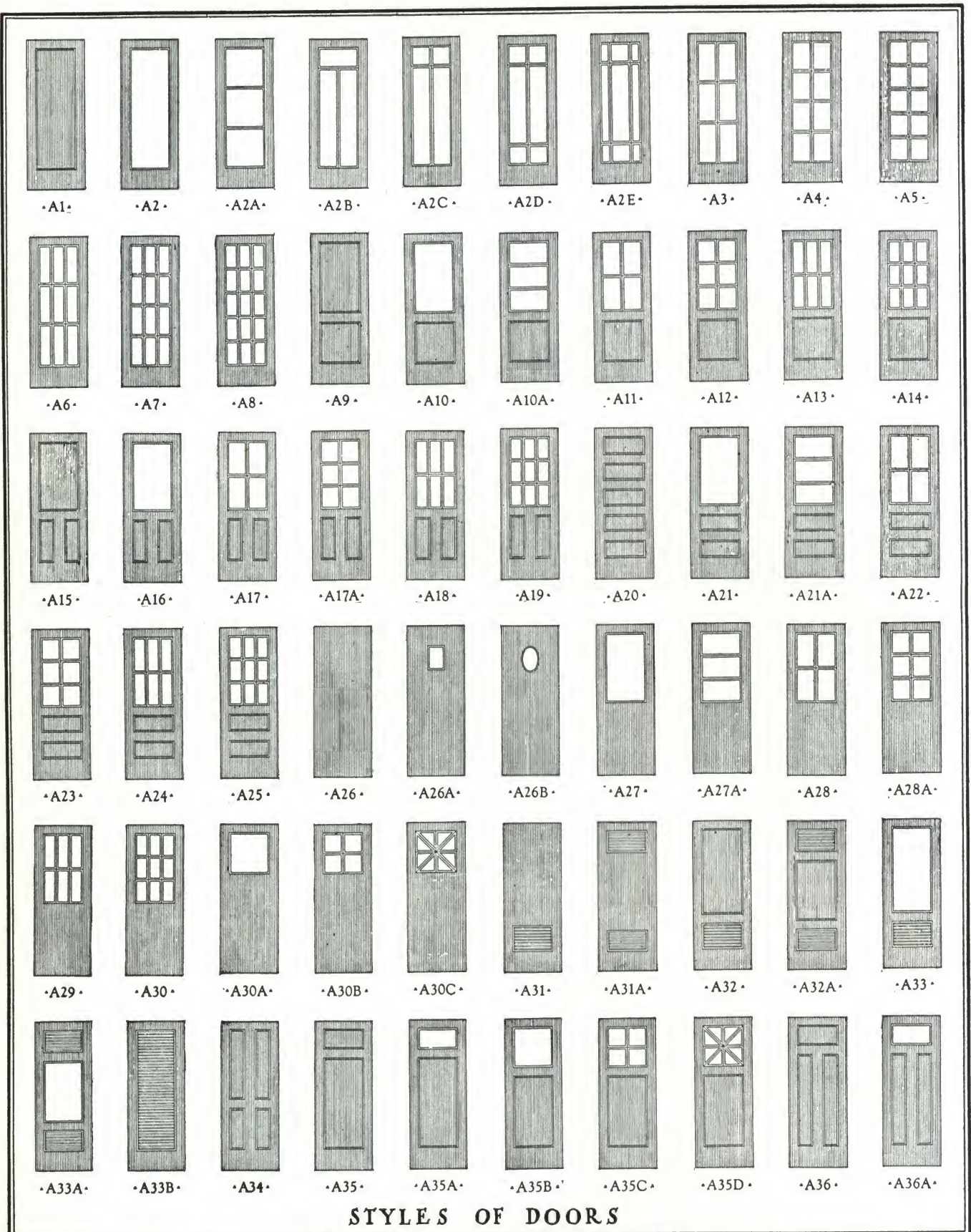


ART METAL ELEVATOR ENCLOSURES
Cunningham Piano Co., Philadelphia, Pa.



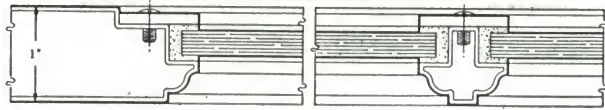
ART METAL ACCORDION DOORS
Federal Reserve Bank, Cleveland, Ohio

Typical Installations of Art Metal Entrance and Elevator Enclosures



STANDARD • DETAILS •
•ART • METAL • CONSTRUCTION • CO •

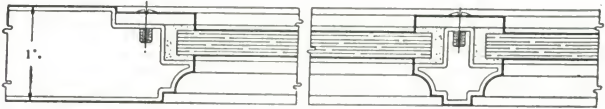
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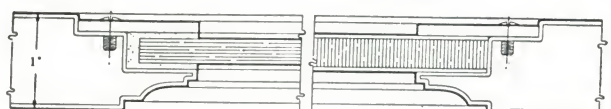
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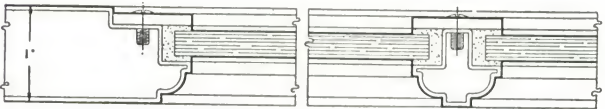
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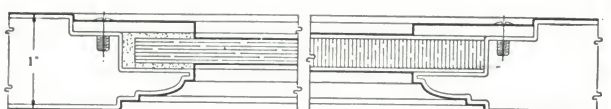
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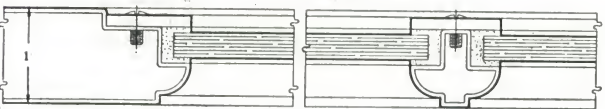
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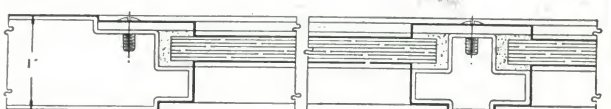
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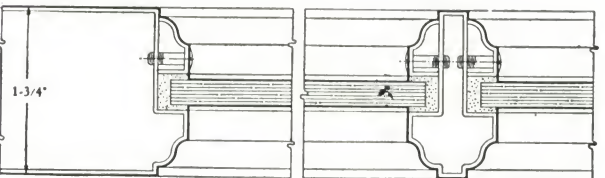
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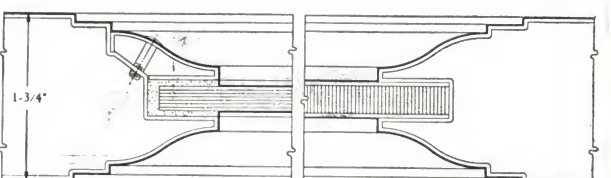
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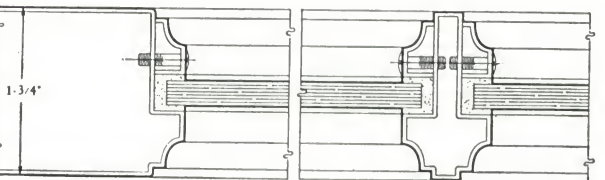
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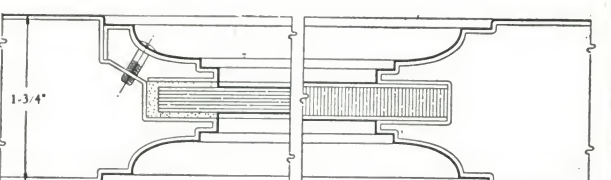
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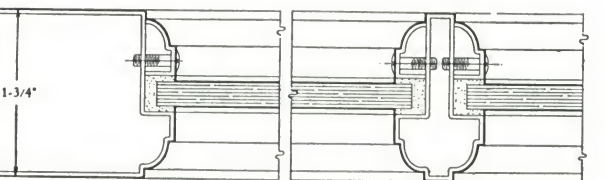
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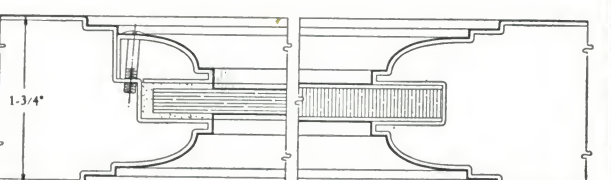
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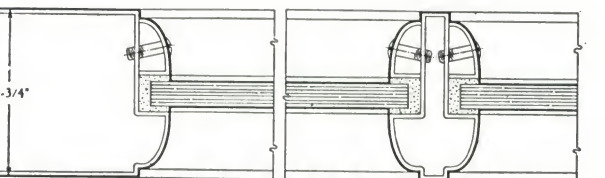
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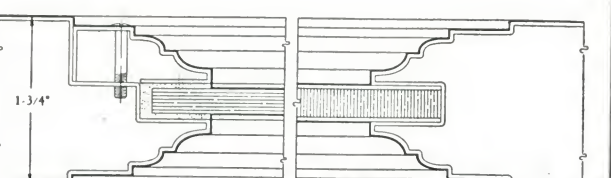
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• TYPE • 53 •



• TYPE • 89 •



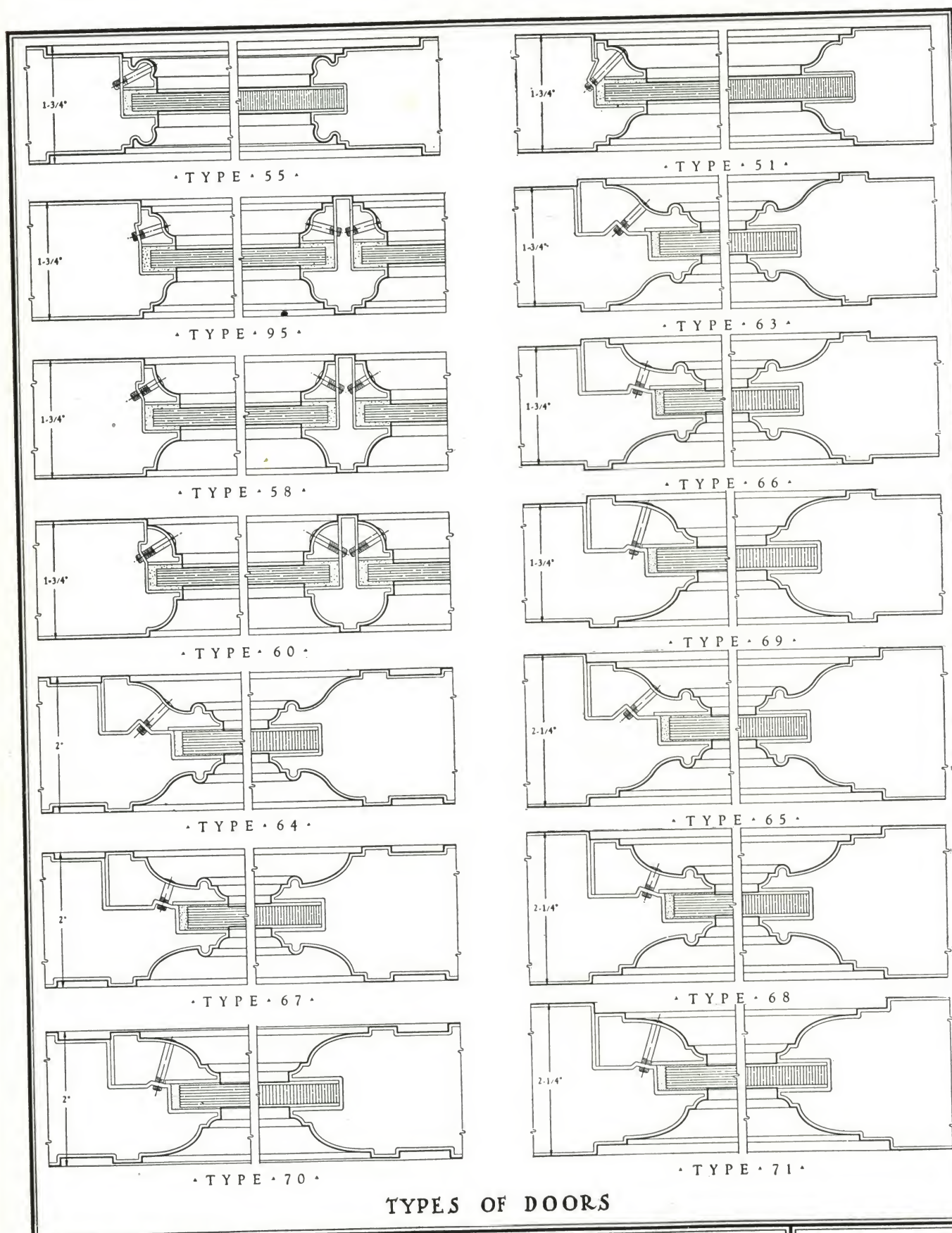
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TYPES OF DOORS



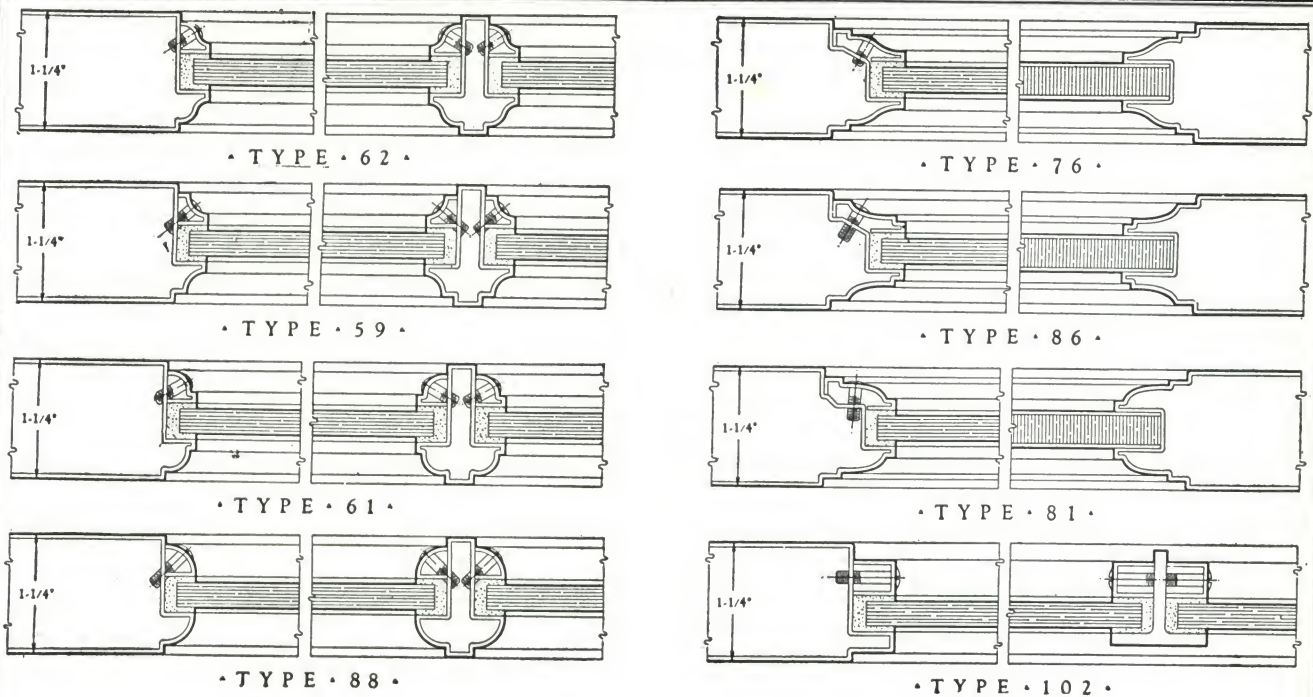
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• ART • METAL • CONSTRUCTION • CO •

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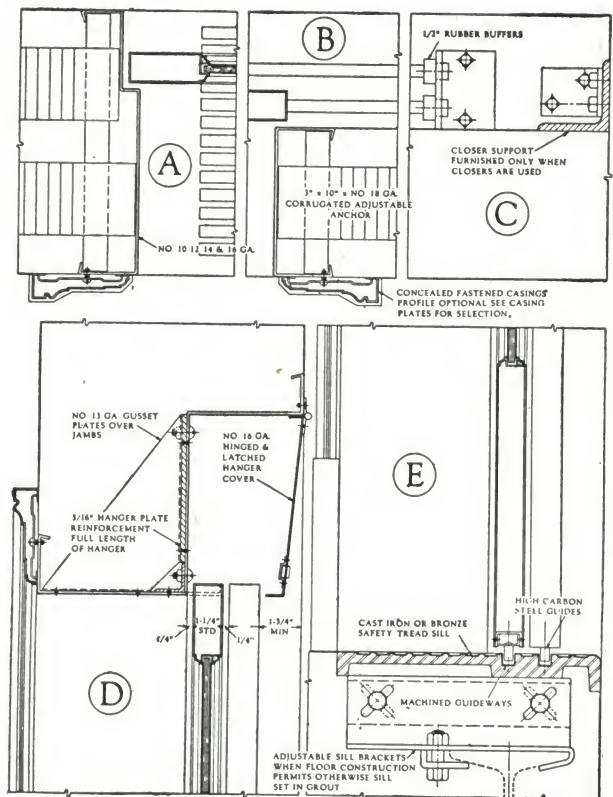
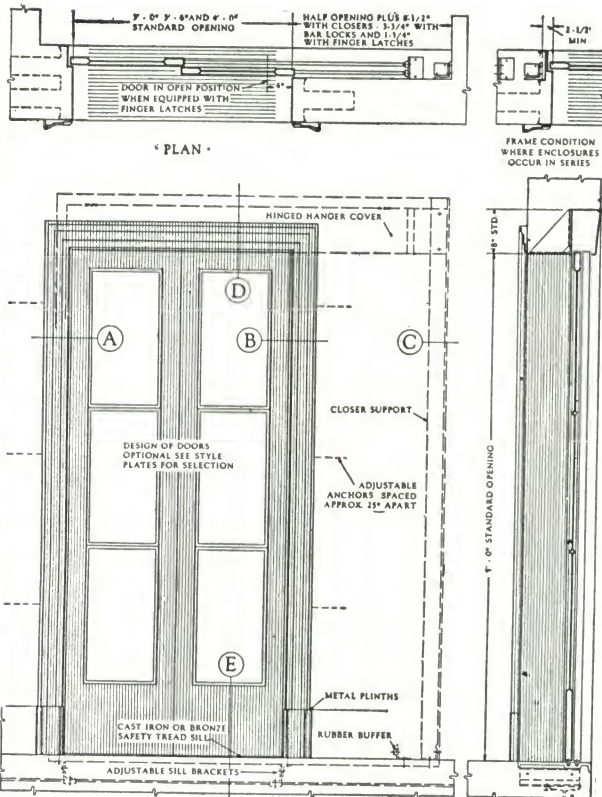


• STANDARD • DETAILS •
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TYPES OF DOORS

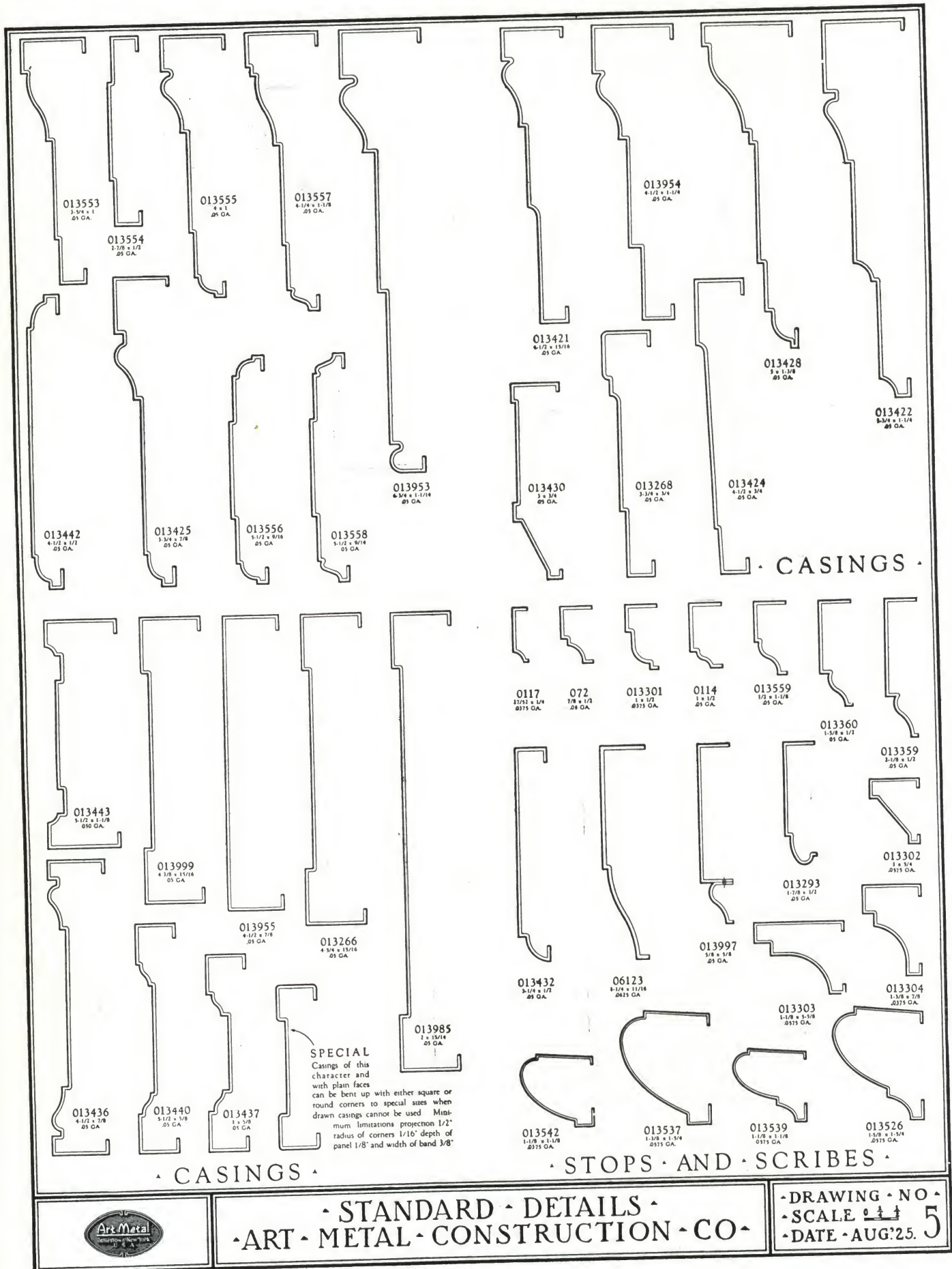


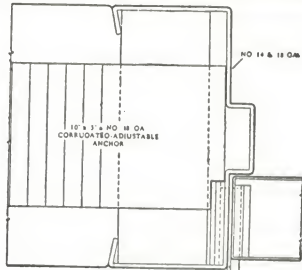
DETAILS FOR TWO SPEED ELEVATOR ENCLOSURE



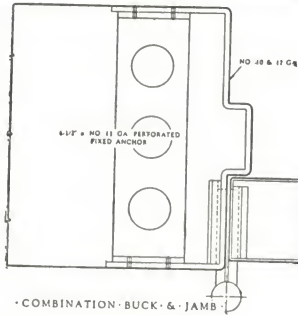
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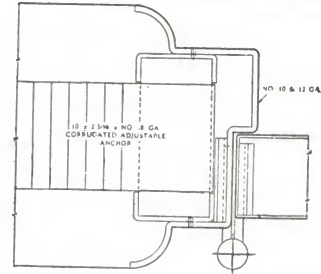




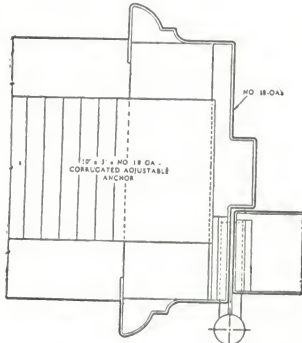
COMBINATION BUCK & JAMB
TYPE B2



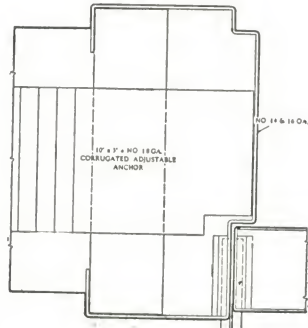
COMBINATION BUCK & JAMB
TYPE C2



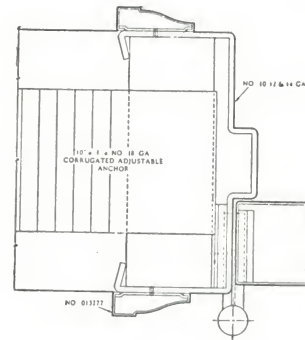
COMBINATION BUCK & JAMB
TYPE E2



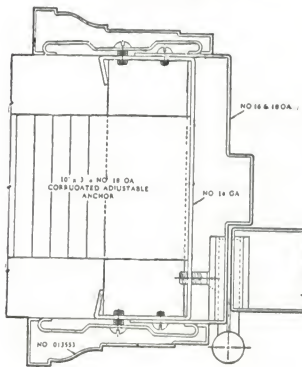
COMBINATION BUCK JAMB & TRIM
TYPE F2



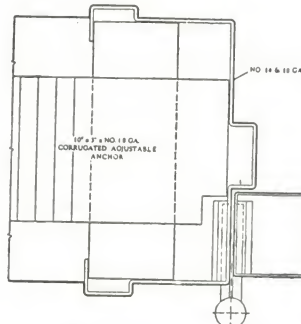
COMBINATION BUCK JAMB & TRIM
TYPE T2



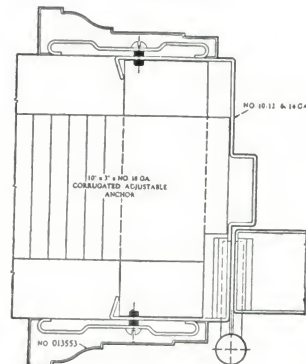
COMBINATION BUCK JAMB & TRIM
TYPE H2



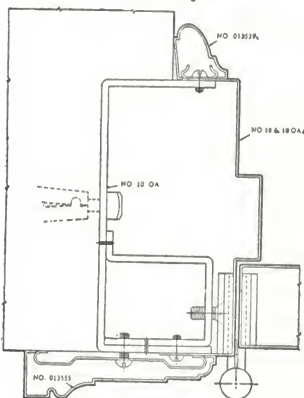
BUCK JAMB & TRIM
TYPE J2



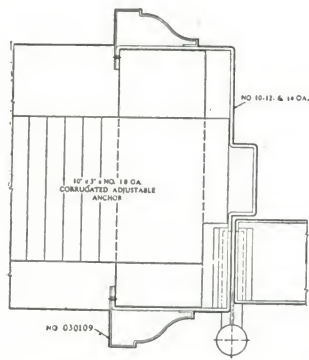
COMBINATION BUCK JAMB & TRIM
TYPE S2



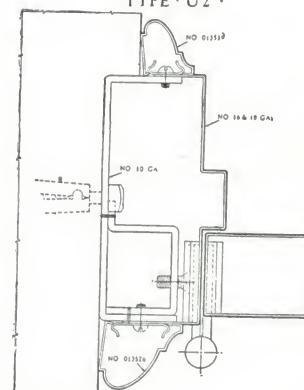
BUCK JAMB & TRIM
TYPE U2



BUCK JAMB & TRIM
TYPE L2



COMBINATION BUCK JAMB & TRIM
TYPE R2



BUCK JAMB & TRIM
TYPE N2

TYPES OF FRAMES



STANDARD DETAILS
ART METAL CONSTRUCTION CO.

DRAWING NO.
SCALE 3"=1 FT
DATE AUG. 26. 6

THE CINCINNATI MFG. CO.

Kalamein and Hollow Metal Doors

CINCINNATI, OHIO

Products

HOLLOW METAL and KALAMEIN DOORS and TRIM, all types and designs.

HOLLOW METAL DOORS, bearing Underwriters' Laboratories, Inc., label of approval.

ELEVATOR ENCLOSURES, DOORS and CARS.

For Ornamental Iron and Bronze Work, see pages A752-753.

Kalamein Doors

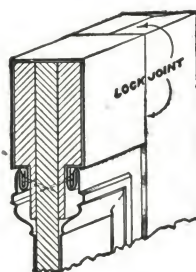
These doors are constructed with a wood core over which sheet metal is applied. This kalamein will not warp or bulge, as expansion and contraction are allowed for in a special lock seam.

They can be furnished in a variety of stock designs.

Catalogue No. 53 sent on application.

In addition to doors, kalamein trim, mouldings, muntin bars, astragals, and stop strips are manufactured by this company in either stock or special designs.

Specification Data—Core of thoroughly kiln dried lumber, tongue and groove joined, and clinch nailed. Stamp panels and rails in separate pieces, of metal specified. All joints are blind nailed and lock seamed securing covering to core in a manner which allows for expansion and contraction of metal. Doors exposed to weather covered with galvanized steel or sheet copper. Interior doors covered with Armco steel, bronze or copper. Steel doors finished with one coat gray priming paint, or baked enamel in imitation of wood, to be specified.



Detail of Construction for Kalamein Door



Style B

Style E

Style F

Kalamein Doors, with Glass Panels

Hollow Metal Doors

Made to architect's designs in special finishes permitting a wide range of individual expressions, or in stock patterns and standard finishes. Thoroughly insulated throughout to insure an efficient fire retardant and to prevent metallic sound. The construction obviates necessity of installing jamb during erection of walls, and permits hanging and adjusting of doors independently of frames. The Underwriters' Laboratories, Inc., have tested and approved these doors and their label is affixed to them, for all classes of openings.

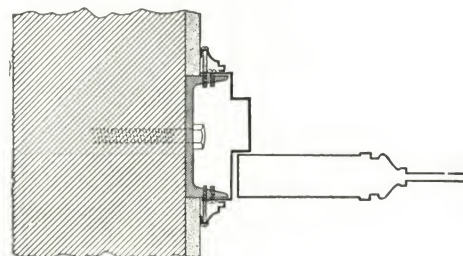
Complete information should be given when asking for estimates, as they are based on the requirements of each particular installation.

Catalogue No. 53 sent on request.

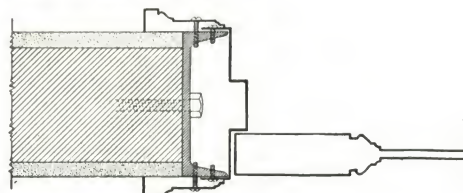
Specification Data—Doors of highest grade No. 18 gauge Armco open hearth steel specially treated. All surfaces true, level, and free from all imperfections. Parts interlocked and welded with invisible seams and joints. Insulate stiles, rails, and panels throughout with asbestos. Apply baked enamel finish in imitation of wood specified. Frames of No. 14 gauge steel, welded at joints to form one piece. Attach to walls by means of adjustable anchor plates. Jambs, furnished in separate pieces, fit over frames.



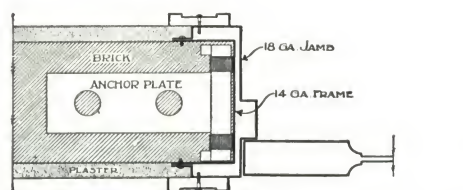
Corner Section Hollow Metal Door



Applications to Channel Iron Frames



Application to Wooden Frames



Application to Cincinnati Approved Frame with Adjustable Anchor Plates
Section Through Door Jambs Showing Approved Buck Jamb and Casing Constructions for Hollow Metal Doors

Elevator Enclosures, Doors and Cars

Many years' experience and a completely equipped plant enables us to produce any type of elevator enclosure in bronze, or steel. Several of our stock designs are shown here. Our engineering department is ready at all times to assist and co-operate with you in designing enclosures for special conditions.

We make enclosures of steel diamond mesh, steel square mesh, kalamein and hollow steel construction with polished wire, glass or steel bar panels, made in any wood finish desired.

Standard doors are made in the following types: single sliding, two-speed sliding, two-thirds opening sliding, and combination sliding and swinging. Doors furnished complete with hardware.

Catalogue No. 54 on request.



Elevator Enclosure—Push Button Type with Collapsing Gates



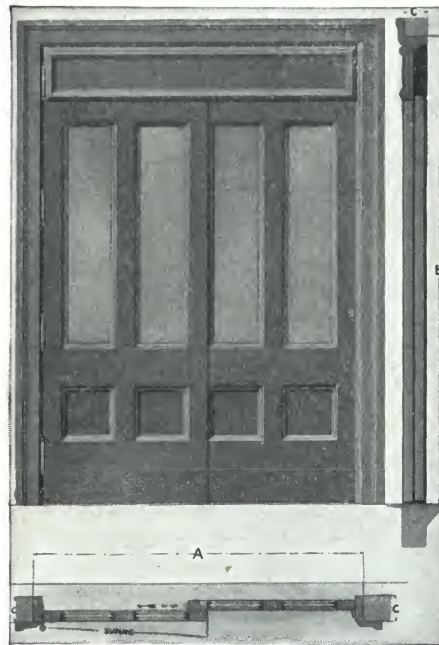
Design No. 757 Elevator Enclosure

Made of No. 14 gauge sheet steel, hollow construction. Panels fitted with 1/4-in. polish wire glass



Two-thirds Opening Sliding Door

Estimates furnished on receipt of dimensions A, B, C and D

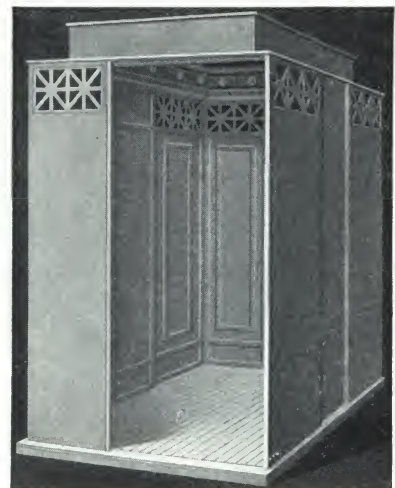


Combination Slide and Swing Door

Desirable where elevator is used for both passenger and freight service. Estimates furnished on receipt of dimensions A, B and C



Design C-192 Elevator Car



Design C-152 Elevator Car

DAHLSTROM METALLIC DOOR COMPANY

EXECUTIVE OFFICES AND FACTORIES

JAMESTOWN, N. Y.

BRANCH OFFICES

CHICAGO, ILL.

DETROIT, MICH.

NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

METAL DOORS and TRIM; ELEVATOR ENCLOSURES; CONDUO-BASE.

Also manufacturers of Adjustable Steel Partitions, Hose Cabinets, Switch Box Panels, and General Trim for office buildings, hotels, apartments, hospitals, schools, banks and theaters.



TRADE-MARK

tion for their superior quality. Only expert workmanship and first-class materials enter into their manufacture.

Undoubtedly a semblance of Dahlstrom products can be produced at lower cost, but any inferiority makes the substitution dear at any price.

Dahlstrom Metal Doors and Trim

Design—Originators and largest manufacturers of metal doors and trim in the world. Dahlstrom metal doors were originated by the founder of this Company and perfected by us. Twenty years of designing and manufacturing doors and trim to meet various conditions have given our product the well earned title of "The Specified Standard."

Construction—Dahlstrom metal doors and trim do not contain a combustible core, which is evidence in itself that they are fire retarding. No portion of the product can burn.

All joints are carefully welded. Reinforcements are also welded to the construction members. The whole design of Dahlstrom metal doors is for rigidity, stability, fire protection and elegance.

Door frames are fabricated from Nos. 10 to 14 gauge metal, according to the size of the opening and the service required.

Finish—All surfaces are thoroughly cleaned before finish is applied. Each coat of paint or enamel is carefully baked and properly treated to secure the superior finish for which Dahlstrom products are noted. The same care and attention is given all finishes whether plain colors, stipples or reproduction of wood graining.

Quality—Dahlstrom products enjoy a good reputa-

Hardware—To facilitate delivery and avoid undue delay, we keep on file in our hardware department a large number of templates of standard pieces of hardware. This permits us in most instances to proceed with our work immediately after we receive the architect's approval and schedule of hardware.

Three-point Lock—One of the requirements of the Board of Fire Underwriters is that swinging fire doors for stair halls and similar locations must be locked at not less than three points, to prevent the doors from warping away from the frames in case of fire, which would allow the flames to pass through.

The multiple gravity latch is another Dahlstrom product of unusual merit, entirely contained within the metal doors. This locking device is approved by the Underwriters' Laboratories, Inc.

Panic Bar and Checking Device—An improved panic bar can be furnished in connection with the three-point locking device; also a checking device for use on automatically closing double doors to prevent the service door from closing until the opposite door is in place in the opening. Both of these devices are Dahlstrom developments.

Classification of Finishes—In order to make it clearly understood that the kind of finish required will affect prices, a list of standard classifications is given below:

Class A—Plain color finishes such as: No. 10 dark green; No. 11 olive green; No. 15 maroon; No. 17 chocolate; No. 19 black; No. 30 sea green; No. 33 statuary brown; No. 47 bottle green; No. 48 slate; No. 49 navy gray; No. 50 dark gray; No. 51 quaker drab; No. 52 medium brown.

Class B—Plain color finishes such as: No. 13 white; No. 18 French gray; No. 34 pearl gray, cream and light blue.

Class C—Stipple enamel finishes such as: No. 26A verve antique stipple; No. 28 green; No. 42 medium brown.

Class D—Grained and stipple finishes such as: No. 1 light mahogany; No. 2 tuna mahogany; No. 3 dark mahogany; No. 8 birch; No. 36 bronze stipple, statuary; No. 38 bronze stipple, black; No. 46 mottled Egyptian green; No. 53 gumwood; No. 54 American walnut.

Class E—Grained and stipple finishes such as: No. 4 medium oak; No. 5 light oak; No. 6 dark oak; No. 7 circassian walnut, light; No. 9 ash; No. 31 circassian walnut, dark; No. 35 natural bronze stipple; No. 37 bronze stipple, mottled; No. 40 bronze stipple, mottled verdigris; straight oak and pine.

Class G—Grained and special finishes such as: fumed oak, silver oak; special crotch mahogany, Australian mahogany; teakwood; burl walnut; also marble, inlay work and special bronzes.

Specifications

Complete specifications have been prepared covering the entire field of hollow metal. Separate specifications covering elevator entrance inclosures are also available. We shall be glad to send these specifications to architects on request.



Emigrant Bank Building, New York, N. Y.

THOS. E. MURRAY, INC., Designing and Constructing Engineers
Equipped with Dahlstrom metal doors and trim

Conduo-Base

Conduo-Base is a combination metal base and electric conduit for high and low tension wires, in the form of a continuous electric outlet box.

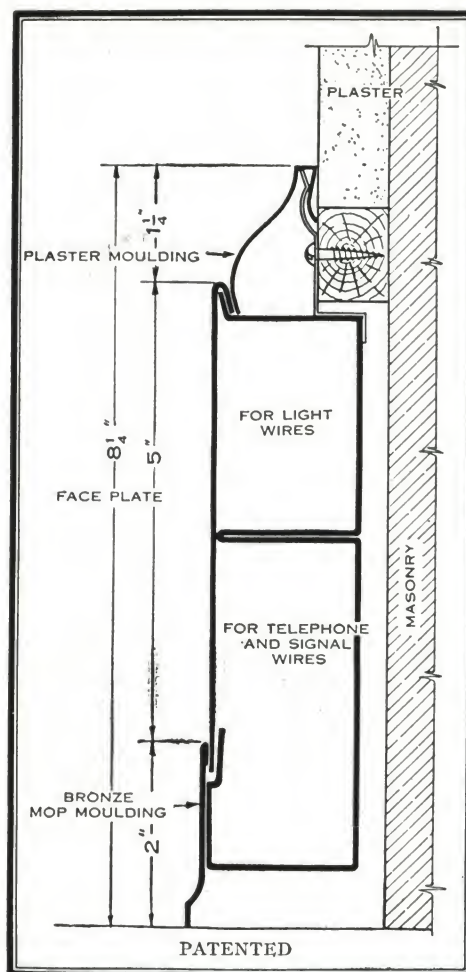
As a base, it is handsome, sanitary and fireproof. It can be finished to match any wood, marble or metal and is provided with a natural bronze floor moulding to prevent rubbing off the finish of the base from cleaning.

As an electrical device, it is provided with two large concealed raceways for high and low tension wires. These raceways are easily accessible by removing the face plate.

Conduo-Base will more than pay for its cost in the saving it makes by eliminating extensive conduits and wiring for prefixed base outlets and by eliminating changes of wiring for tenants.

There is no damage to the walls and floors, as the wires are all carried in the base. It is an easy, simple, clean matter to remove the face of the base, pick out the required wires, make the connections and notch the face for the receptacle. The face of the base is then re-attached and the work is completed. The Conduo method is the only way to provide convenient outlets, conveniently located, no matter what the tenant's requirements may be.

Design—Conduo-Base is so designed as to make it possible to place



Quarter Size Cross Section of Conduo-Base

High and low tension receptacle and bushings in place

a number of electric receptacles and low tension current outlets along any point of the base, and at any time desired, with extreme ease, instead of extending numerous conduits to a number of prefixed base outlets, none of which may suit each tenant's requirements. By installing Conduo-Base and extending in the floor-fill one low tension wiring conduit from main wiring shaft to any convenient point in Conduo-Base, and extending 1/2-in. conduit from wall switch box to Conduo-Base, any number of high and low tension wires can be extended at any time in the Conduo-Base raceways, and any number of outlets for fans, desk lights, dictaphones, motors, telephones, intercommunicating telephones, district telegraph call bells, buzzers, etc., can be installed and connected at any desired points whenever wanted.

Conduo-Base Eliminates—

(1) Guesswork as to each future tenant's electric outlet requirements.

(2) The necessity of predetermining the exact location of outlets before the offices are rented.

(3) The cost of extensive conduits and wires, outlet boxes, etc., required for all prefixed outlets.

(4) The cost of large wire moulds for low tension wires.

(5) Unsightly exposed wires tacked along all wall trim and hanging in a maze of network.

(6) The cost of constant changes for each new tenant's requirements, and the cost of cutting and patching of floors and walls for each change.

Conduo-Base Provides—(1) A safe, fireproof and concealed raceway for all wires needed in a modern building.

(2) All the outlets each tenant wants, just when and where he wants them, with minimum cost and without marring the building.

Metal Elevator Inclosures

Just as the internal combustion engine made the automobile possible, so the development in elevator engineering made the skyscraper possible. With the skyscraper came apprehension as to safety from fire hazards, and attention was drawn to the menace of the open elevator shaft as a means of rapidly spreading a fire from floor to floor and providing a veritable chimney draft. The timely appearance of the Dahlstrom door provided a solution to this problem, and it is a pleasure to check up at this time the efficient service still rendered by the early elevator inclosures of twenty years ago. In fact, ninety per cent of the early installations were for elevator inclosures, which speaks well for the adaptability of the then new Dahlstrom construction.

The weight of the door permitted easy operation, while the general design gave fire protection and beauty. With these features the problem on inclosing elevator shafts was solved.

The years of experience in designing and manufacturing these doors for many hundreds of buildings have given this Company valuable data and information as to

the proper type of inclosure for various types of openings. Standard types and designs have been worked out which will suit practically any type of opening. Should special designs be desired our Engineering Department will gladly work with you in designing inclosures to meet special conditions.

Dahlstrom elevator inclosures receive that same high standard of workmanship and finish for which Dahlstrom products are noted.



Dahlstrom Elevator Inclosure Installed in 1906

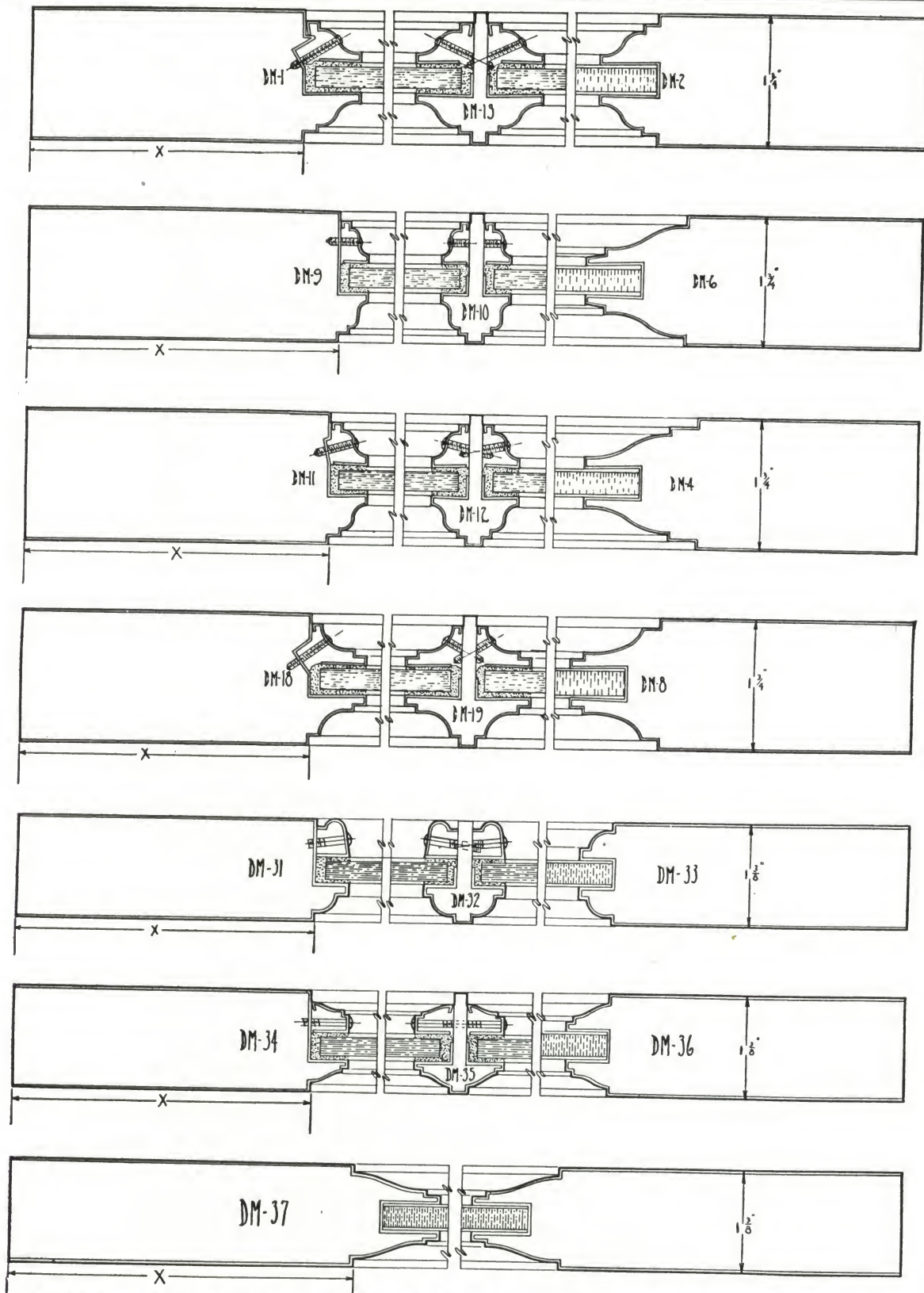
Porter Building (formerly Wells-Fargo Building), Portland, Ore.



DAHLSTROM
METALLIC DOOR
COMPANY

× STANDARD DOOR DESIGNS ×

PLATE
I

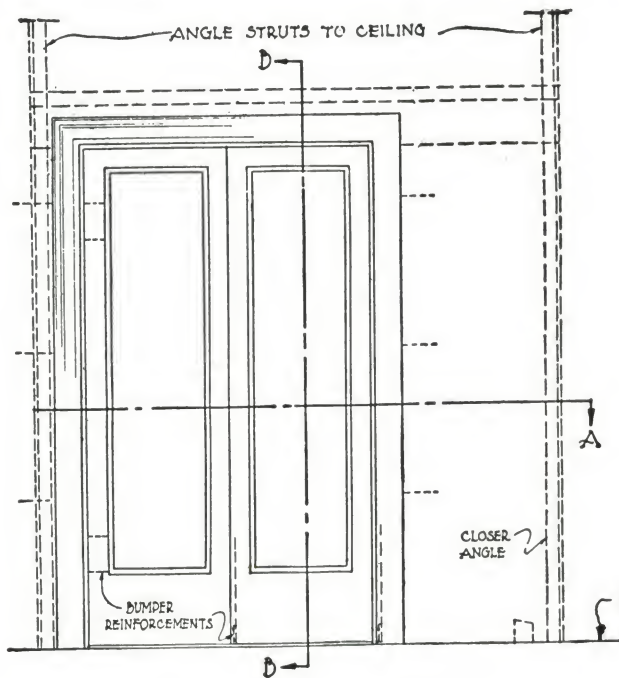


NOTE :- X REPRESENTS width of door style We recommend 3" for minimum width.

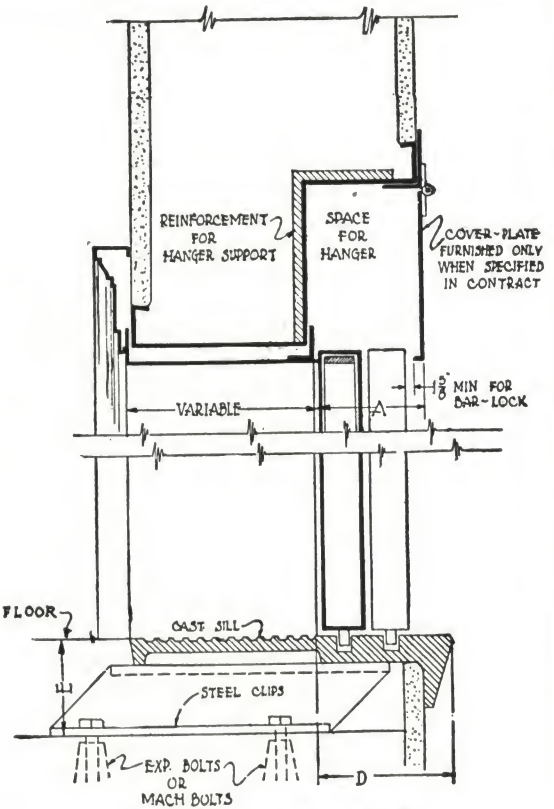
DAHLSTROM
METALLIC DOOR
COMPANY

STANDARD DETAILS OF
DAHLSTROM METAL DOORS.

DRAWING
2



• ELEVATION OF UNIT •

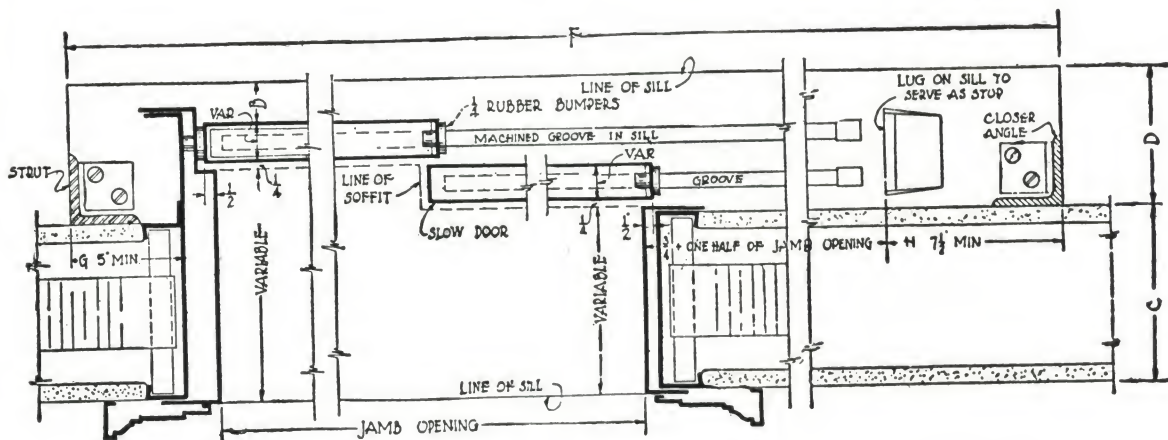


SECTION • D-D •

• INDEX TO LETTERS SHOWN FOR DIMENSIONS •

- A — DETERMINED BY TYPE OF HANGER USED
- B — NOT LESS THAN $1\frac{1}{2}$ WHEN BAR LOCK OR CLOSING DEVICE IS USED
- C — DETERMINED BY THICKNESS OF FINISHED WALL
- D — DETERMINED BY DISTANCE FROM WALL TO PLATFORM OF CAR
- E — DETERMINED BY DISTANCE FROM FINISHED FLOOR TO CONCRETE OR STRUCTURAL BEAM
- F — MAXIMUM OVERALL WIDTH OF UNIT

$$\text{JAMB OPENING} = 2 \left[\frac{F - (G + \frac{1}{2}H)}{3} \right]$$



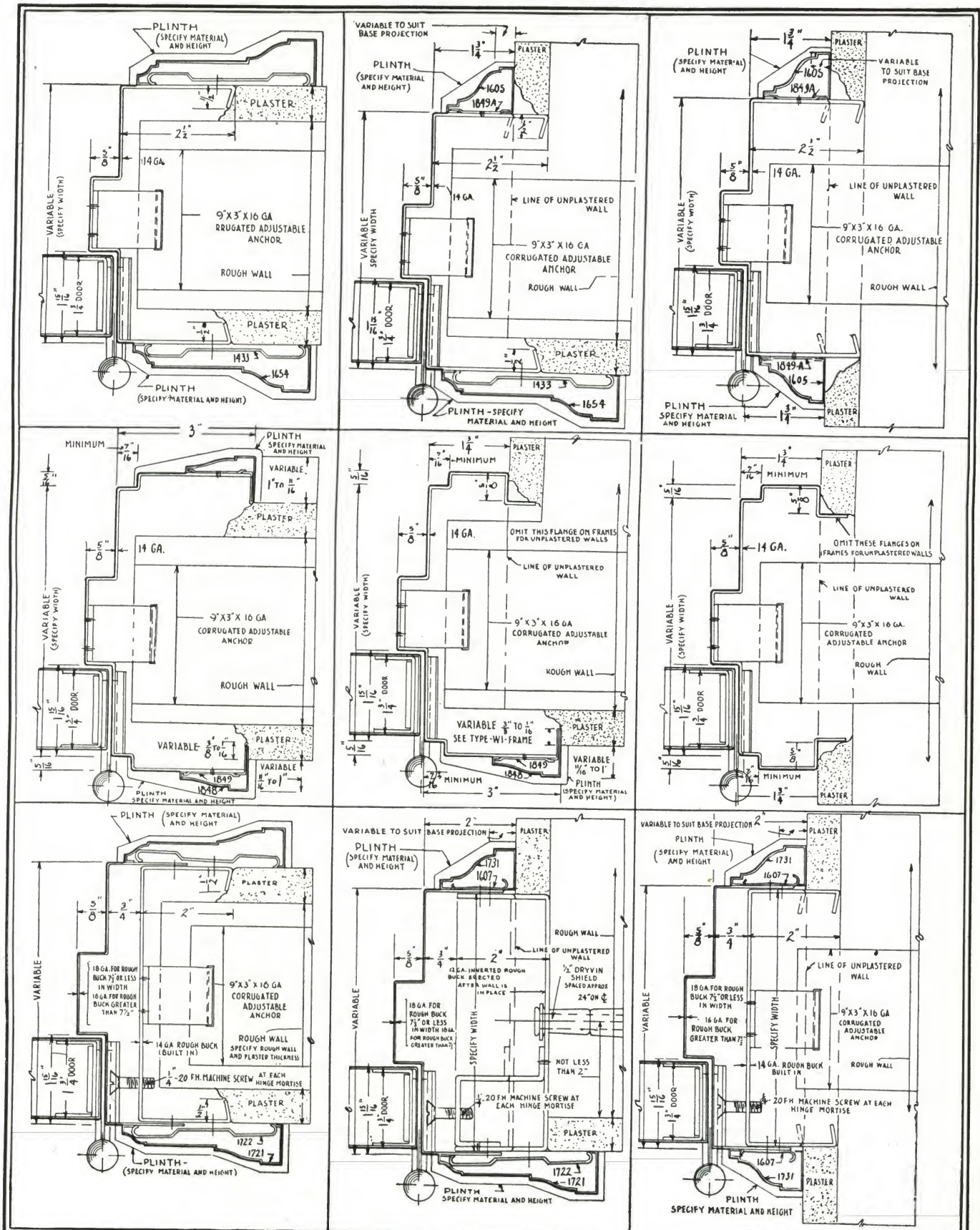
• SECTION A-A •

DAHLSTROM
METALLIC DOOR
COMPANY

STANDARD DETAILS OF DAHLSTROM TWO-SPEED
METAL ELEVATOR DOORS

SCALE $1\frac{1}{2}$ " DRWG
EQUAL 1'-0"
DATE AUG. 24

3



GROSS METAL PRODUCTS COMPANY

Manufacturers of Architectural Hollow Metal Doors, Frames and Trim

2575 Como Avenue
ST. PAUL, MINN.

3325 Como Avenue
MINNEAPOLIS, MINN.

REPRESENTATION IN ALL PRINCIPAL CITIES

Products

GROSS STEEL SLAB DOORS, HOLLOW STEEL and BRONZE DOORS, FRAMES and TRIM, ELEVATOR ENCLOSURES and CABS.

Also special Sash and Frames; Steel Partitions.

Service

Competent engineers at all times are at the disposal of architects and contractors for special information or assistance.

Gross Hollow Metal Doors

The panel doors are built according to the best practice, and quality is at all times the first consideration.

Labels—Underwriters' labels can be furnished when required.

Material—Doors are constructed of No. 1 furniture steel, full pickled, full cold rolled and stretcher leveled.

Frames are constructed of pickled cold rolled steel.

General Description—All doors and frames have gas or electric welded joints, all perfectly ground after welding.

Rails and stiles are constructed of No. 18 gauge steel properly reinforced for hardware, with compressed cork inserted to deaden metallic sound. Panels are two thicknesses of No. 20 gauge steel, with $\frac{5}{16}$ -in. asbestos between. Mouldings are of one piece and firmly locked to stiles and rails, or separate mould on each side, no screws being used except for loose glass mould.

Frames are constructed of No. 16 gauge pickled cold rolled steel, true to profile with clean sharp lines; mortised and reinforced for all hardware, then joints properly welded. Six anchors are regularly furnished with each frame without transom, and eight for frame with transom.

Finish—All surfaces of metal are first thoroughly cleaned to be free from all grease and other foreign material, then each coat as applied is baked and sanded. Any finish can be applied whether primed, enameled solid color, or grained to match woodwork adjacent to metal doors or trim.

The personnel of our finishing department is composed of highly skilled metal finishers, and all work is given expert attention.

In asking for quotations, the color and nature of finish should be carefully described.

Installations of Hollow Metal Doors

Following is a partial list of installations executed by us:

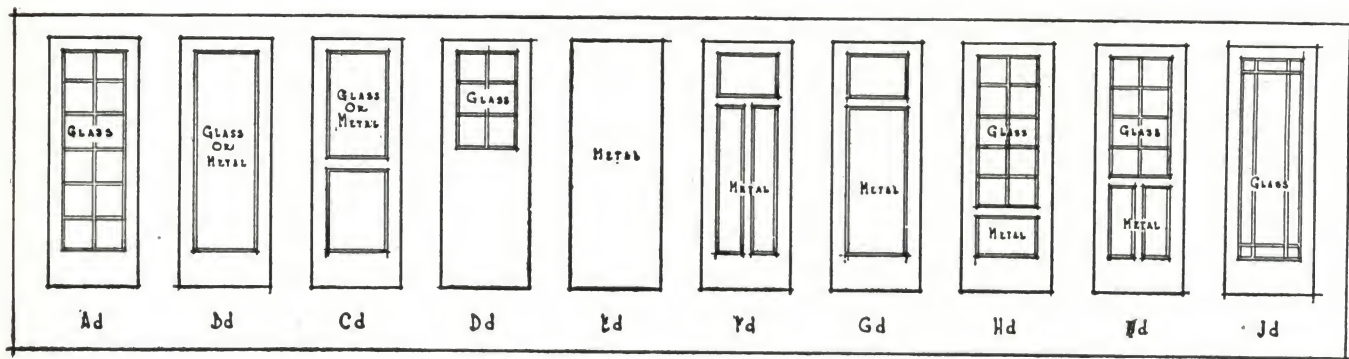
St. Luke's Hospital, Aberdeen, S. D., John H. Wheeler, Architect.

House of Good Shepherd, Milwaukee, Wis., Eschweiler & Eschweiler, Architects.

National Tea Co., Milwaukee, Wis., Herbst & Kuenzli, Architects.

W. I. Cook Memorial Hospital, Fort Worth, Tex., W. G. Clarkson & Co., Architects.

Library Building, University of Illinois, Urbana, Ill., Chas. A. Platt, Architect.



Various Types of Gross Hollow Metal Doors

Gross Hollow Metal Slab Doors

Gross Hollow Metal Slab Doors being spot-welded on both sides every $2\frac{1}{2}$ in. both vertically and horizontally, become so rigid that they cannot be twisted or warped by any reasonable pressure.

In making a careful examination of Gross Hollow Metal Slab Doors, architects and engineers are astounded at the complete absence of any metallic ring.

The surface of the door is perfectly flat and smooth and can never become unsightly, as in the case of wood doors, by gradual peeling of veneer; or buckling of steel covering applied on kalamein doors.

They can be finished in either solid color enamels, or beautiful wood grain effects baked on in carefully tempered ovens. Unless otherwise specified, however, all doors leave the factory with a prime coat of paint.

All hardware is fitted to the doors at our factory from templates and, after delivery to the building, are ready for erection as soon as hardware is attached.

A careful survey of erection costs proves that a complete unit of Gross frame and door can be installed at a cost very little above a complete wood unit. When estimating the cost of installation, the fact should not be overlooked that there is no future annoyance caused by swelling or warping, or expense of refitting due to climatic conditions, as is the case with wood doors.

Specifications—

All flush slab doors, where shown on plans or schedule, shall be Gross Hollow Metal Slab Doors constructed with a single No. 20 gauge steel sheet for each side; each side spot-welded to a web-formed reinforcing extending full width and length; approximately $2\frac{1}{2}$ in. on centers. Butts shall be recessed into door and lock properly mortised.

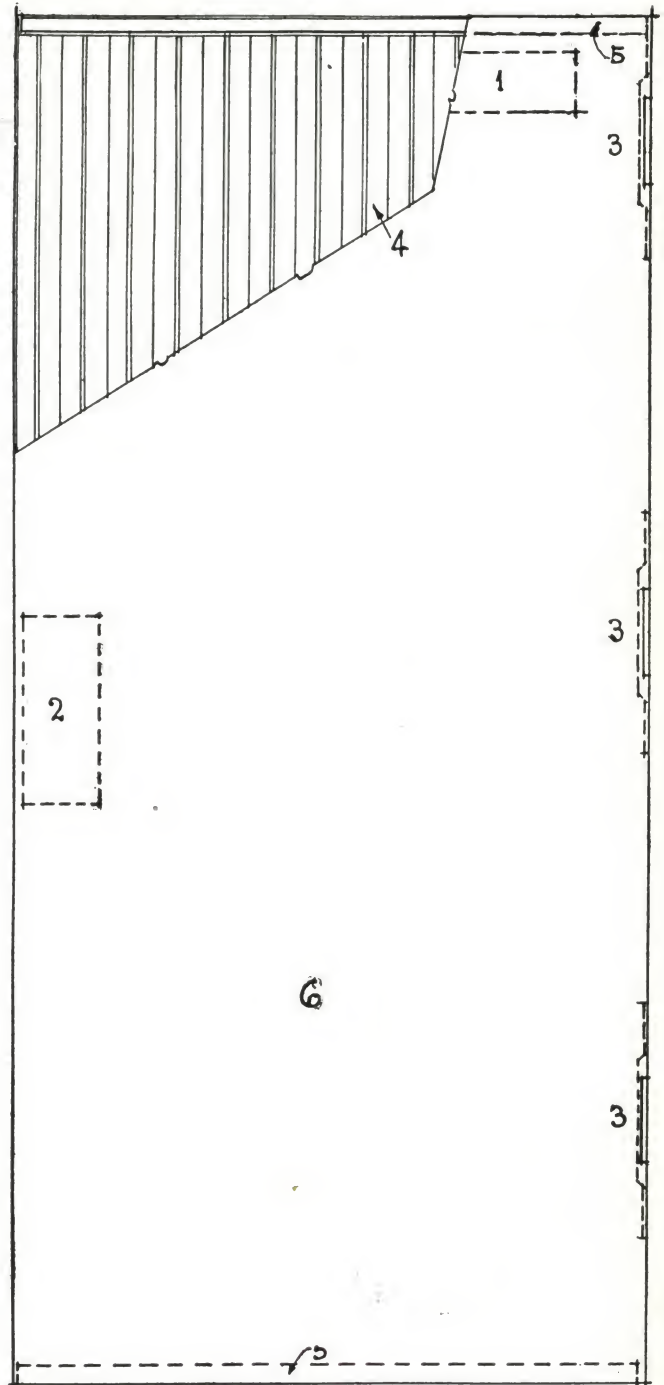
After doors are finished they shall be coated with paint; dipped so that the inside, as well as the outside, is thoroughly coated and left perfectly flat.

Underwriters' Labeled Doors—Where required, our Slab doors can be furnished with Underwriters' labels except for fire walls.

Guarantee

Gross Metal Products are guaranteed to be of the highest quality both in materials and workmanship.

They are absolutely fireproof.

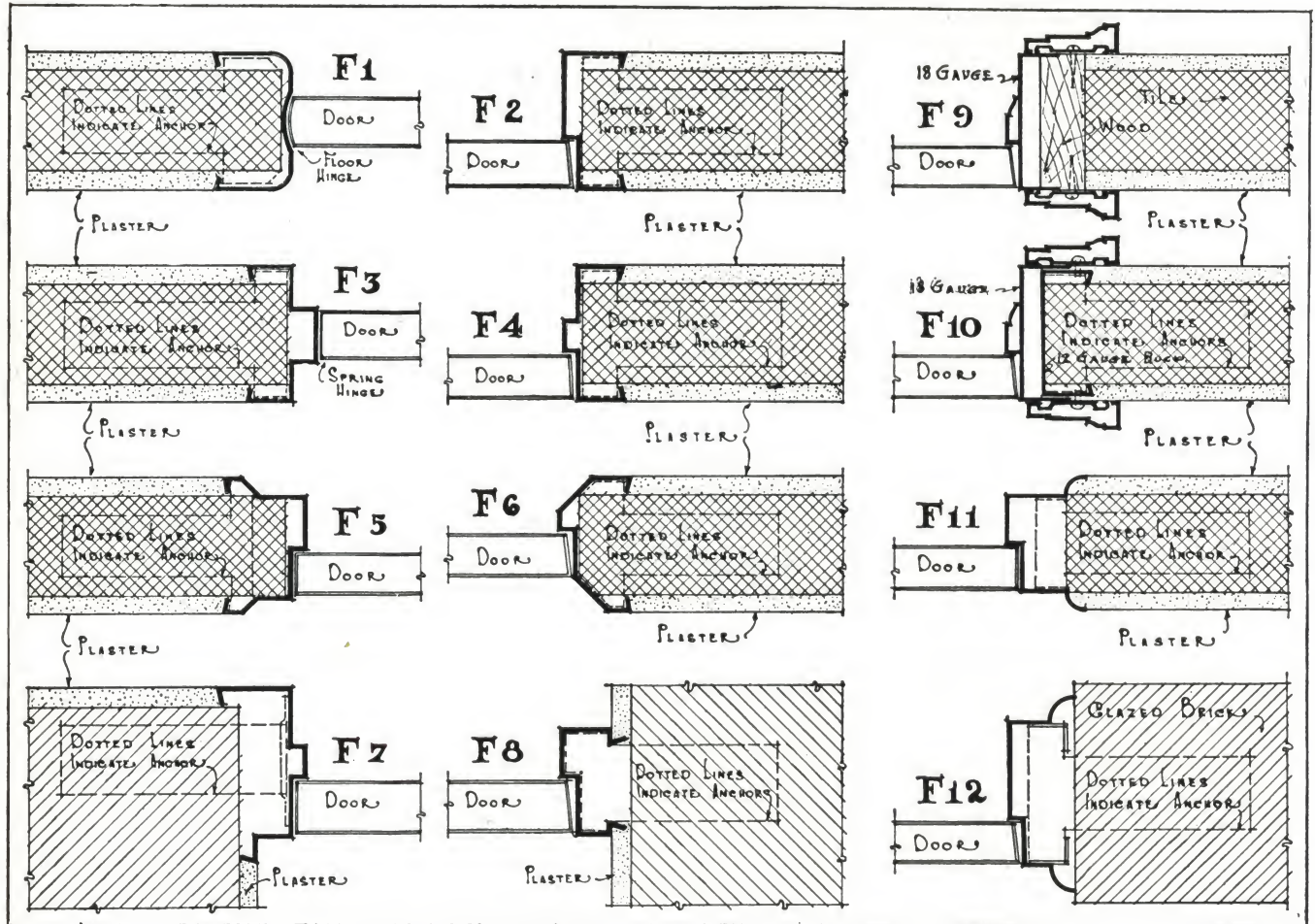


Elevation of Gross Slab Door

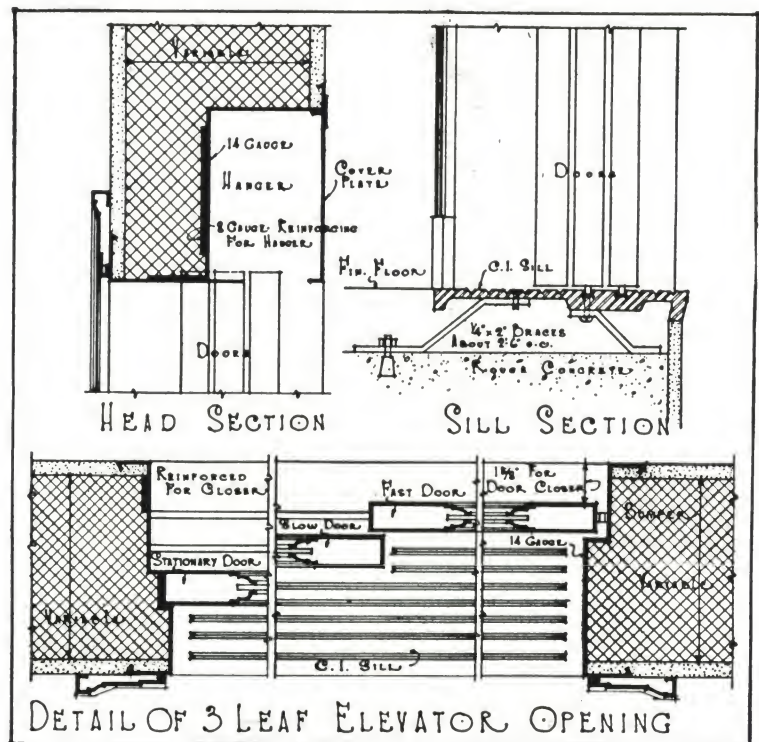
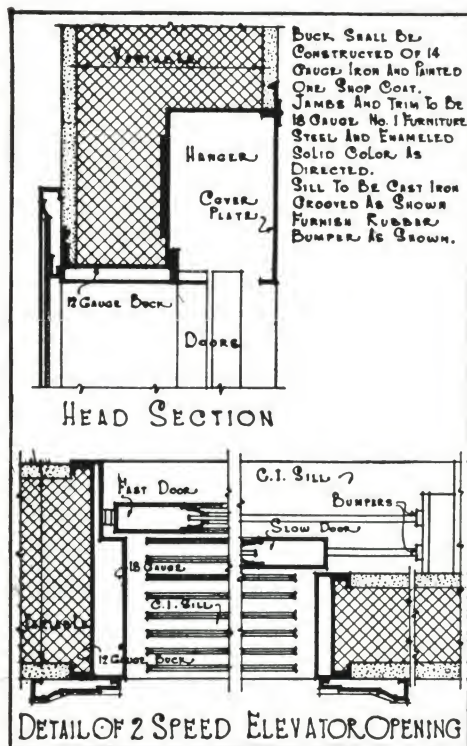
- (1) Reinforcement for door check, placed in all doors.
- (2) Reinforcement for lock and trim. Lock fitted and all holes drilled and tapped for screws by templates.
- (3) Reinforcement for hinges or butts. Doors recessed and all screw-holes drilled and tapped by templates to receive butts.
- (4) Formed web stiffener full length and width of door. Spot-welded to both cover sheets approximately $2\frac{1}{2}$ in. on centers, vertically and horizontally.
- (5) Closing channel $\frac{1}{2}$ in. deep and spot-welded to cover sheets top and bottom of door.
- (6) Cover sheets of No. 20 gauge highly finished stock blanked for hardware, and formed to size.



Section Through Gross Slab Door



Typical Details of Frames



LAWTON-STEPHENS CO., INC.

SUCCESSORS TO GRINDEN ART METAL CO.

Hollow Steel Doors, Drawn Steel Mouldings, Sheet Steel Specialties

SALES OFFICES AND PLANT

427 Marcy Avenue, BROOKLYN, N. Y.

REPRESENTATIVES

SAN FRANCISCO, CAL., BADT, FALK & Co., 346 Call Building
LOS ANGELES, CAL., HAROLD L. LEWIS, 1118 Commercial Exchange Building

CLEVELAND, OHIO, GEORGE KIMBLE, 308 Euclid Avenue Building
PITTSBURGH, PA., FIREPROOF MATERIALS Co., 339 Second Avenue
TAMPA, FLA., STOVALL & ARCHER, 105½ Zack Street
WASHINGTON, D. C., CONSOLIDATED SUPPLY Co., Bond Building
BOSTON, MASS., LAWMAC SALES Co., 80 Boylston Street
HOUSTON, TEX., F. B. WALCOTT, 322 West Building
BALTIMORE, MD., CONSOLIDATED SUPPLY Co., 10 W. Chase Street

ENGLAND: RAILWAY SUPPLIES Co., LTD., 68 Victoria Street, Westminster, LONDON, S. W. 1
SHANGHAI, CHINA, J. E. HAYES ENGINEERING CORPORATION

YORK, PA., C. H. STRAYER, 50 W. Philadelphia Street
DENVER, COLO., GEORGE P. HEINZ & Co., Tietjen and No. 3rd Streets
PHILADELPHIA, PA., R. C. KRATZ, 419 Perry Building
ATLANTA, GA., BUILDERS SUPPLY Co., Bona Allen Building
COLUMBUS, OHIO, BUILDING PRODUCTS Co., 975 W. Goodale Street
SCRANTON, PA., G. F. BECKER, 517 Lackawanna Ave.
HARTFORD, CONN., LAWMAC SALES Co., 183 Ann Street
ROCHESTER, N. Y., SWALBACH BUILDING PRODUCTS Co., 164 Inglewood Drive
ST. LOUIS, MO., SYDNOR HALL & Co., 211 No. 7th Street
Victoria Street, Westminster, LONDON, S. W. 1
MONTREAL, CANADA, C. G. PORTER & Co., 305 New Birks Building

Products and Services

HOLLOW STEEL DOORS; ELEVATOR ENCLOSURES, consisting of Doors, Frames, Trim, Saddles, Hardware, etc.; COMBINATION BUCKS, JAMBS and TRIM; CABINET JAMBS and TRIM; BORROWED LIGHTS.

Also Railway Car Doors; Drawn Mouldings from stock dies or made to special details, including extensive lines of Panel Moulding; Metal Base; Wire Moulding; Picture Moulding; Chair Rail; Trim; Automobile Moulding; Channels; Angles, and Special Shapes of various kinds adapted to the manufacturer's special requirements.

The LAWTON-STEPHENS CO., INC. cordially invites architects and engineers to use its Sales Department Services. Without obligation of any kind, it will be glad to submit tentative designs and specifications, and co-operate in any way regarding methods of construction or problems where products of this nature are contemplated.

Doors

The LAWTON-STEPHENS CO., INC., hollow metal doors are made in any variety of styles and sizes as de-

manded by architects and builders—embracing solid panel, glass panel, raised panel, louver, or flush doors.

Lawton-Stephens hollow steel doors are constructed with care, and represent years of study in this field. They are adapted to meet all conditions where the best and most durable type of fireproof construction is required, such as in hotels, hospitals, apartment houses, office buildings, residences, etc.

Specifications for Standard Hollow Doors—All doors to be of size and design as shown on door schedule and drawings, of LAWTON-STEPHENS CO., INC. manufacture, or equal, constructed throughout of open hearth, cold rolled, patent leveled, furniture steel. They shall be of 1¼ in. thick, 5-in. stiles and rails, except bottom rail which shall be 10 in. in height, and be welded at all points of intersection. Stiles and rails to be of No. 18 gauge steel, with suitable asbestos or cork filler; panels to comprise two sheets of No. 18 gauge steel with suitable asbestos or other filler, or to be a single sheet of No. 12 gauge patent leveled furniture steel, and mouldings to be cold drawn of No. 20 gauge steel. Mouldings to be interlocked with and into these stiles and rails and, where doors are glazed, to be provided with loose steel stops arranged to receive the glass.

Note: If Underwriters' doors are required, they should be so specified—in which event, stiles and rails are lined with asbestos with Z-bar or other suitable spreader.

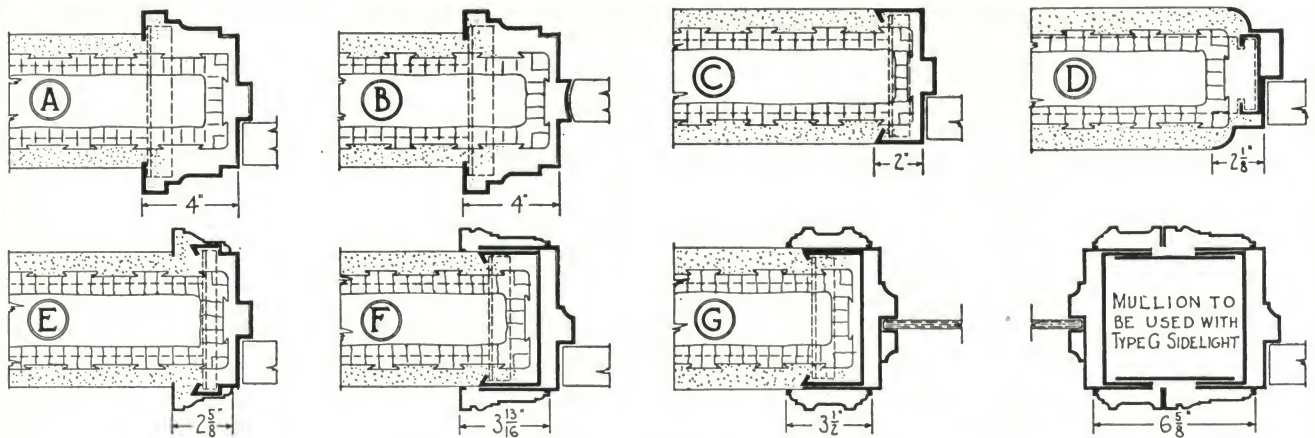


Steel Doors Installed in Art Center Building,
New York, N. Y.

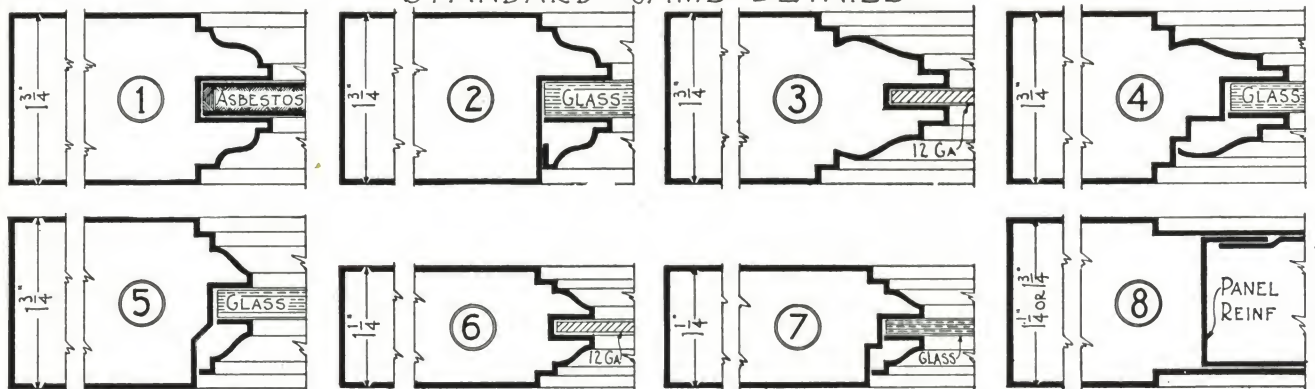


Steel Doors Installed in Academy of Arts & Letters Building,
New York, N. Y.

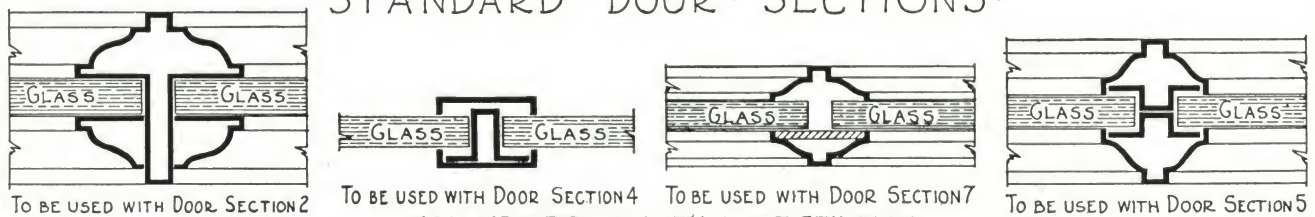
McKim, Mead & White, Architects



STANDARD JAMB DETAILS



STANDARD DOOR SECTIONS



STANDARD MUNTIN SECTIONS



STANDARD CASINGS



STANDARD HOSPITAL DOOR SECTIONS



STANDARD FIRE UNDERWRITERS DOOR

STANDARD DOOR

LAWTON
STEPHENS
COMPANY INCDETAILS OF
HOLLOW METAL DOORS & TRIMDRAWING
NO. 1

Elevator Enclosures

THE LAWTON-STEPHENS CO., INC., is a pioneer in this field of endeavor and has completed extensive installations where the full responsibility for the elevator enclosure has been entrusted to the door manufacturer. The entire opening, including doors, bucks, jamb, sill, glass, glazing and hardware is installed as one contract, thereby doing away with divided responsibility and faulty operation. Particular attention has been given to push button installations for apartment houses and this company has developed a special standard installation for this type of enclosure.

LAWTON-STEPHENS CO., INC., will be pleased to forward to architects and builders complete data, including specifications, photographs and sketches, on request.

Special Hospital Construction

This door was developed specially for hospitals and institutions to take the place of the old and costly flush door. As shown in detail on preceding page, it is rigidly constructed and has a slight $\frac{1}{8}$ -in. inset paneling. This adds character to the door and still retains all the desirable sanitary features of the flush door.

Over 2500 doors of this construction are used in the Columbia-Presbyterian Foundation, New York City.

Jambs

Jambs may be No. 12, 14, or 16 gauge integral combination buck, jamb and trim, or No. 18 gauge cabinet jambs installed with rough steel bucks. With cabinet jamb installation, trim is separate, either clipped on or screwed on, and both jamb and trim can be finished to match the door.

Finish

All surfaces are thoroughly cleaned of all grease and foreign matter before finish is applied. Each coat is then applied and baked.

This Company has an enviable reputation for the quality and durability of its finish and is prepared to furnish a large variety of enamels in plain colors, grained to match wood, or metallic finishes of various shades such as bronze, copper, verde antique or any other finish desired.

Where a prime coat finish is specified, the final coat is applied at the building by the painting contractor.

Mouldings

This Company specializes in drawn metal mouldings, made from either stock dies, or to special detail.

Our service includes a complete machinshop, to make either new dies or to keep old dies in first class condition. A large number of dies are in stock, including such shapes as panel mouldings, trim, automobile mouldings, channels, angles, and special shapes of many kinds. These may be specified in either hot or cold rolled strip steel, galvanized steel, bronze, copper, monel metal or various other metals, as desired.

Other Products

This company manufactures various types of pressed or stamped metal shapes for a large number of different purposes.

Installations

Brooklyn Municipal Building, Brooklyn, N. Y., McKenzie, Voorhees & Gmelin, Architects; Cauldwell-Wingate Co., Builders
Columbia Presbyterian Medical Center, New York, N. Y., James Gamble Rogers, Architect; Marc Eidlitz, Builder
Architects Building, 101 Park Avenue, New York, N. Y., Post & McCord, Architects
Courtlandt-Bishop Apartments, New York, N. Y., Carrère & Hastings, Architects; Cauldwell-Wingate Co., Builders



Westinghouse Building, 150 Broadway, New York, N. Y.

STARRETT & VAN VLECK, Architects FRED T. LEY & Co., General Contractors
Equipped throughout with hollow metal doors and trim base, picture wire moulding, elevator enclosures, etc., by LAWTON-STEPHENS CO., INC.

Mountainside Hospital, Glen Ridge, N. J., York & Sawyer, Architects; Wm. L. Crow Construction Co., Builders
Loew's Theatre, Pittsburgh, Pa., C. W. & G. L. Rapp, Architects; Boaz-Kiel Construction Company, Builders
Eagleville Sanatorium, Eagleville, Pa., Simon & Simon, Architects; Irwin & Leighton, Builders
Hotel Bermudiana, Bermuda, Warren & Wetmore, Architects; James Stewart & Co., Builders
Somerset Hospital, Somerville, N. J., Crow, Lewis & Wick, Architects; John Lowry, Inc., Builders
Washington Central Trust Building, Washington, D. C., Coolidge, Shepley, Bulfinch & Abbott, Architects; James Stewart & Co., Builders
Germantown Hospital, Germantown, Pa., Arthur H. Brockie, Architect; Irwin & Leighton, Builders
Roosevelt Memorial House, New York, N. Y., Theodate Pope, Architect
St. Vincent's Hospital Nurses' Home, New York, N. Y., I. E. Ditmars, Architect
Metropolitan Life Building, Yonkers, N. Y., D. Everett Waid, Architect; Turner Construction Co., Builders
Bank of Africa, New York, N. Y., Kenneth Murchison, Architect
St. Luke's Hospital, New York, N. Y., Ernest Flagg, Architect; C. T. Wills, Inc., Builder
Apartment, 510 Park Avenue, New York, N. Y., F. H. Dewey & Co. and Yasuo Matsui, Architects; Starrett Brothers, Builders
Astor Fifth Avenue Building, New York, N. Y., Chas. I. Platt, Architect; Marc Eidlitz & Son, Builders
Hebrew Hospital, Baltimore, Md., Joseph Evans Sperry, Architect; M. A. Long Co., Builders
Sutton Place Apartments, New York, N. Y., Cross & Cross, Architects; Max J. Kramer, Builder
New York Steam Co., Kips Bay Station, Thomas E. Murray, Architect, Dwight P. Robinson Co., Builders
Donahue Building, Hartford, Conn., R. W. Foote, Architect; H. Wales Lines, Builders

JAMESTOWN METAL DESK COMPANY, INC.

Hollow Metal Doors and Trim

JAMESTOWN, N. Y.

REPRESENTATIVE SALES OFFICES

NEW YORK, N. Y., 15 East 40th Street
BOSTON, MASS., Chamber of Commerce Building

PHILADELPHIA, PA., Pennsylvania Building
DETROIT, MICH., Buhl Building

REPRESENTATIVES IN PRINCIPAL CITIES

Products

HOLLOW METAL DOORS and TRIM.

ELEVATOR ENCLOSURES.

Also Furniture and Metal Desks.

For Sectional Office Partitions, see pages B2146-2147.

General Description

The stiles and rails are formed from a single sheet of No. 18 gauge steel. All joints and miters are made a continuous weld with acetylene gas process. Panel mouldings electric welded to the stiles and rails, insuring perfect alignment and rigidity. Cork insulation strips are inserted in the stiles and rails to deaden the metallic ring of hollow metal. Panels are insulated with 1/4-in. thick asbestos.

Reinforcing plates are placed inside, backing up all hardware. Drilling and tapping for hardware is done at factory. Combination bucks and jambs are made of No. 18, 16, 14 or 12 gauge steel as required. Corners are mitered and gas welded and provided with anchors. Trim is made of No. 18 gauge steel drawn cold through rolls. Mitered corners are gas welded. Trim is secured with concealed fasteners or with special oval head screws.

All finished products are thoroughly cleaned, primed and filled, followed by required coats to produce a durable finish of color desired. Each coat is uniformly applied, baked, and sanded with final coat rubbed as required.



U. G. I. Building, Philadelphia, Pa.

PERRY, SHAW & HEPBURN, Architects, Boston, Mass.
MURPHY-QUIGLY & Co., and U. G. I. CONTRACTING Co., Contractors,
Philadelphia, Pa.

Sectional office partitions, elevator enclosure doors, hollow metal swing doors, counter work and equipment, manufactured and installed by
JAMESTOWN METAL DESK COMPANY, INC.

Installations

A partial list of installations executed by this company:

Mellon National Bank, Pittsburgh, Pa.,
Trowbridge & Livingston, Architects; Mellon Stuart Co., contractors

Federal Reserve Bank, Minneapolis, Minn., Cass Gilbert, Architect; C. F. Haglin & Sons, Contractors

Barclay-Vesey Telephone Bldg., New York, N. Y., McKenzie, Voorhees & Gmelin, Architects; Marc Eidlitz & Son, Inc., Contractors

Philadelphia General Hospital, Administration and Ward Bldgs., Philadelphia, Pa., Philip H. Johnson, Architect; F. W. Mark Construction Co., Contractors

Roosevelt Hospital, New York, N. Y., York & Sawyer, Architects; Marc Eidlitz & Son, Inc., Contractors

Liberty Bank of Buffalo, Buffalo, N. Y., Alfred C. Bossom, Architect; John Gill & Sons, Contractors

Keith Theatre and Office Bldg., Cleveland, Ohio, C. W. & Geo. L. Rapp, Architects; Lundoff-Bicknell Co., Contractors

Life Insurance Co. of Virginia, Richmond, Va., Clinton & Russell, Architects; John R. Wilson & Co., Contractors

Federal Trust Co., Newark, N. J., Dennison & Hiron, Architects; George E. Jones, Associate; Public Service Production Co., Contractor

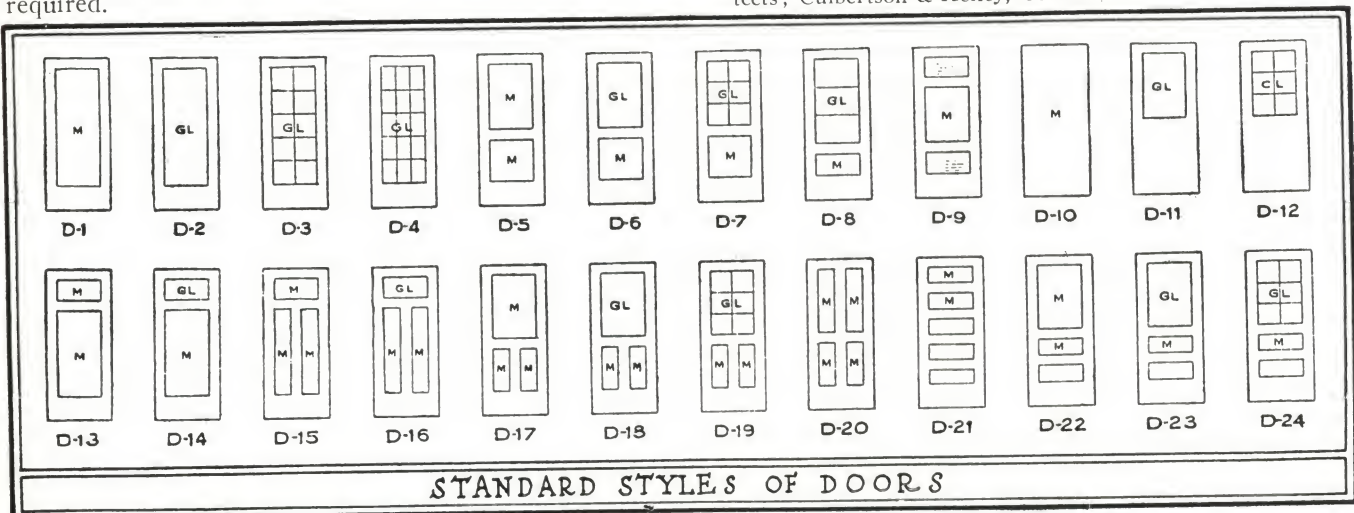
One State Street Office Bldg., Boston, Mass., Mowll & Rand, Architects; Olympia Construction Co., Contractors

Beth Israel Hospital, Boston, Mass., Densmore, LeClear & Robbins, Architects; Holt Fairchild Co., Contractors

Cincinnati Enquirer Building, Cincinnati, Ohio, Lockwood Greene & Co., Architects; George A. Fuller Co., Contractors

Detroit Free Press, Detroit, Mich., Albert Kahn, Inc., Architects; Crowell Little Construction Co., Contractors

Children's Hospital, Detroit, Mich., Albert Kahn, Inc., Architects; Culbertson & Kelley, Contractors

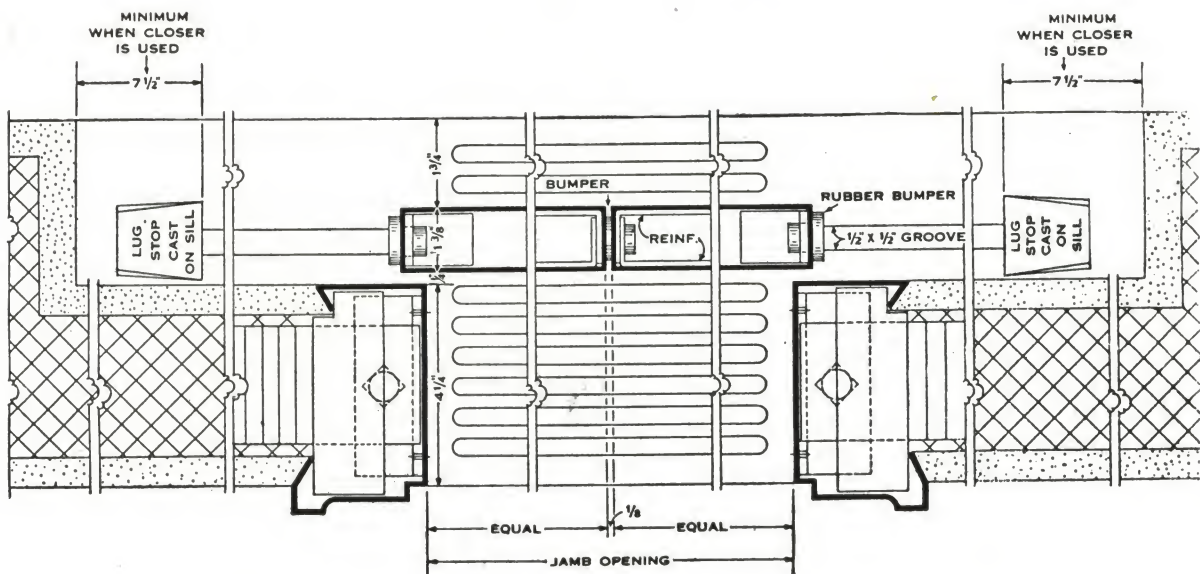
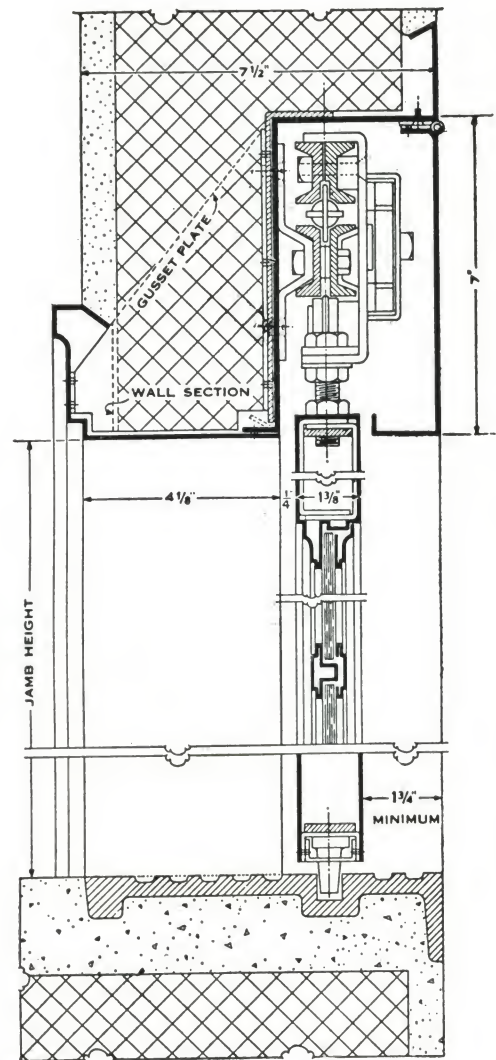


STANDARD STYLES OF DOORS



**Design D-7 Bi-parting Elevator Door Unit
with Combination Buck, Jamb
and Trim Frame**

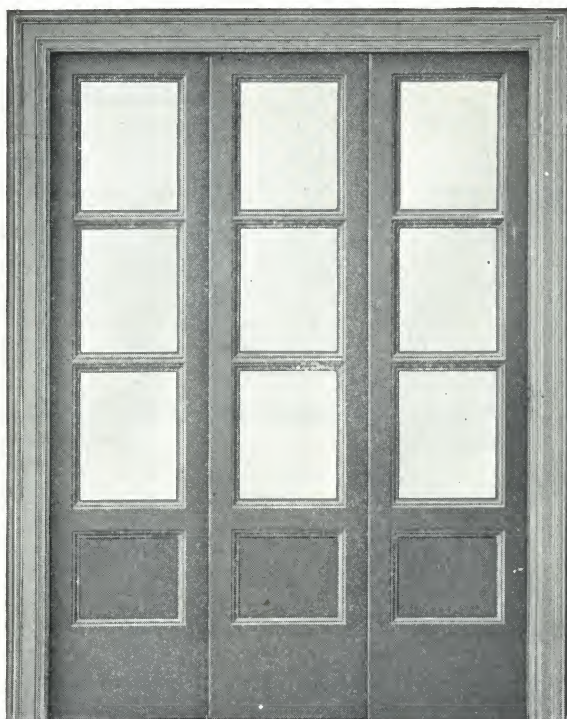
Any of our stock moulding can be used in the various door types, and door units finished in plain enamel or grained to match finished samples approved by architects.



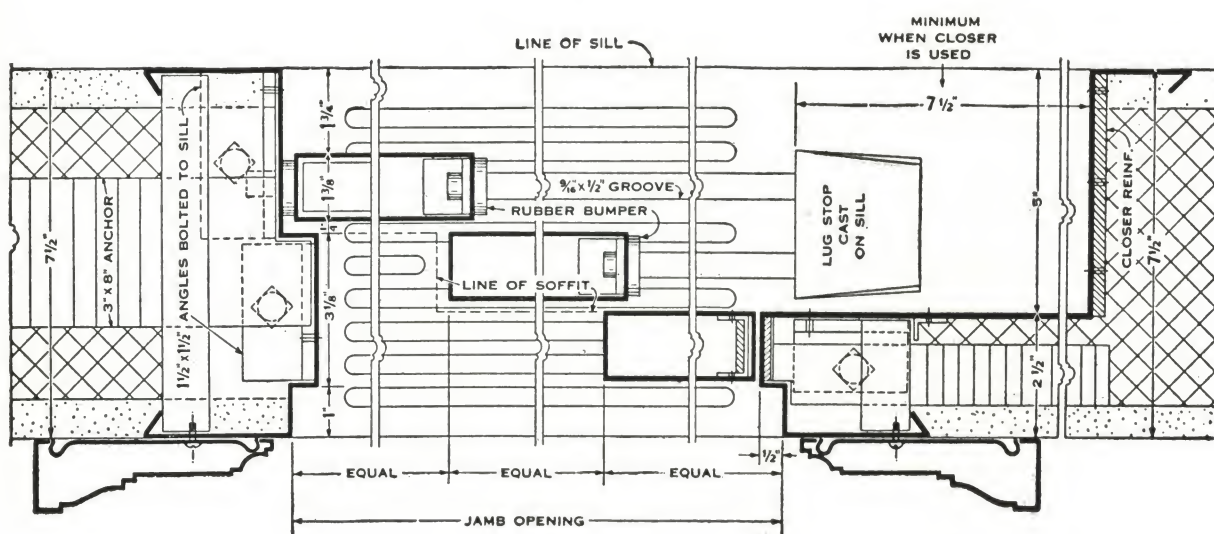
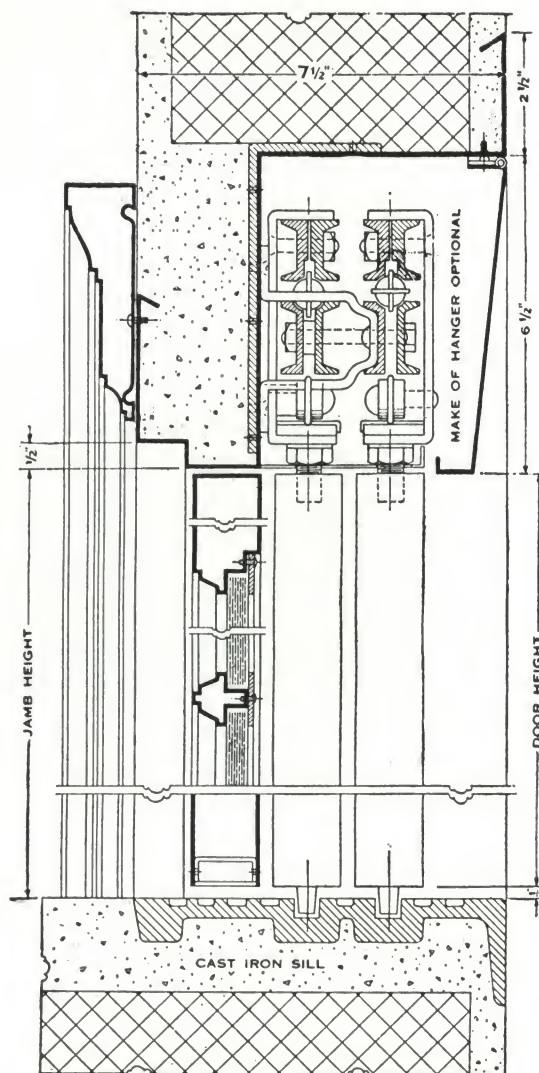
**JAMESTOWN
METAL DESK
COMPANY**

**DETAILS OF
HOLLOW METAL DOORS & TRIM**

Jamestown Metal Desk
DRAWING 1



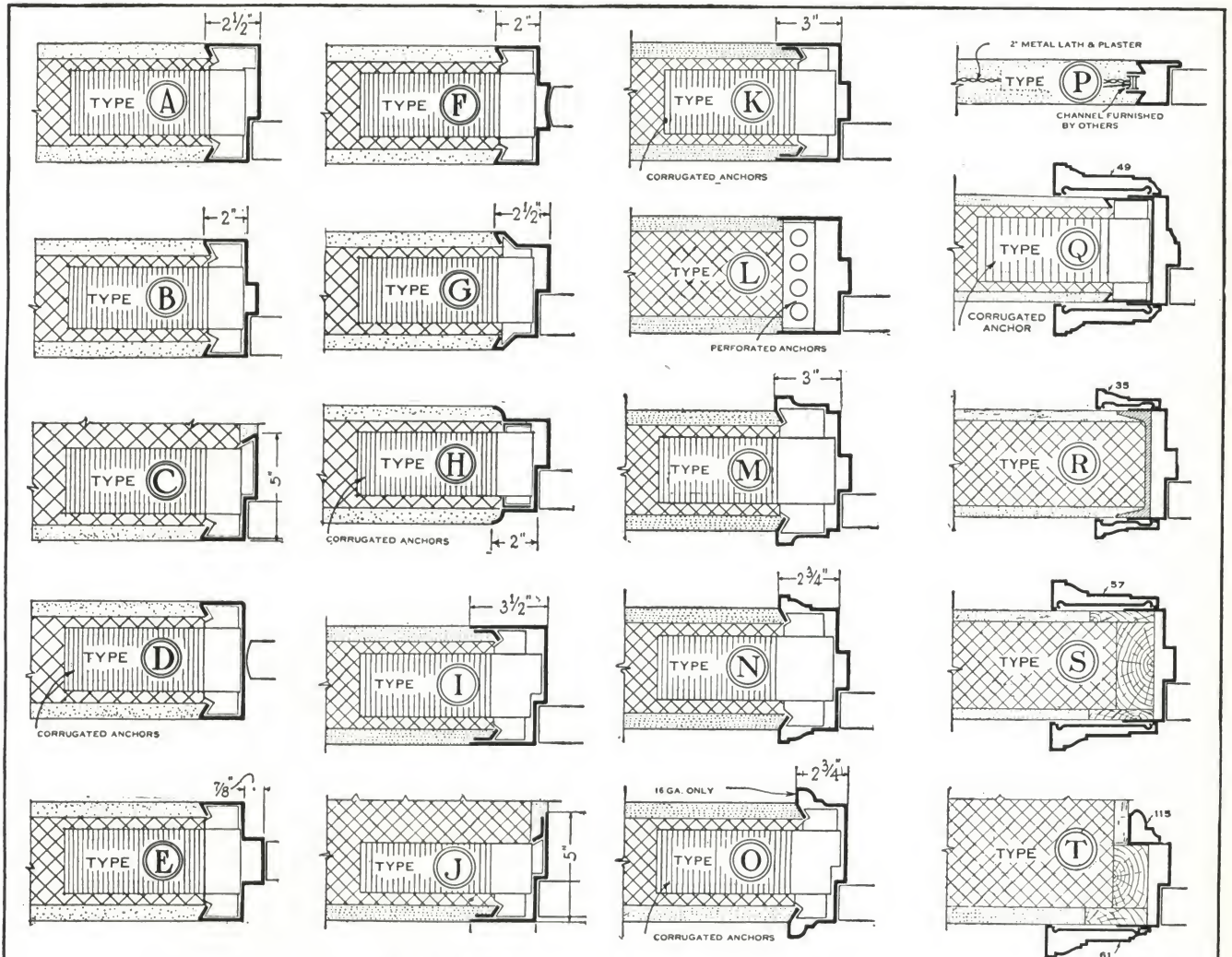
Design D-8, Two-speed Elevator Doors and Hinged Panel with Combination Buck, Jamb and Separate Trim



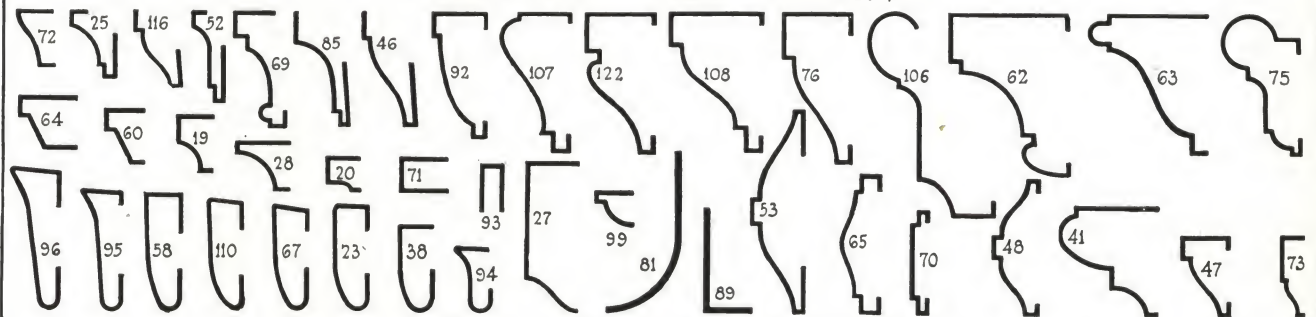
JAMESTOWN
METAL DESK
COMPANY

DETAILS OF HOLLOW METAL DOORS & TRIM

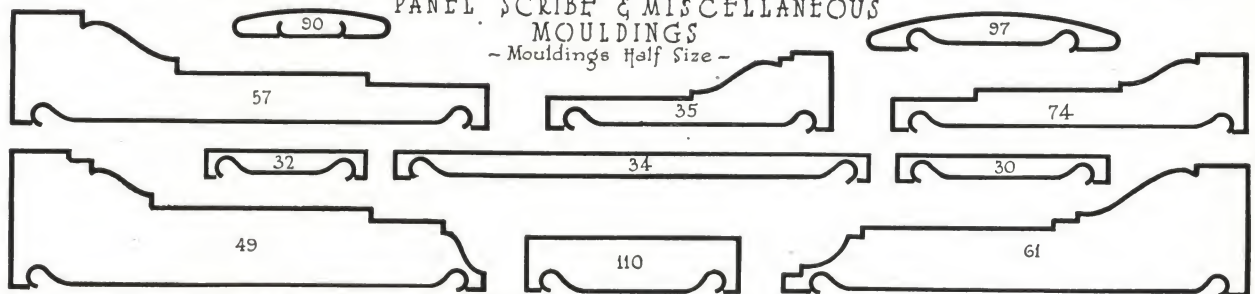
Jones Steel
JAMESTOWN METAL DESK
DRAWING 2



• STANDARD JAMB DETAILS •



PANEL SCRIBE & MISCELLANEOUS
MOULDINGS
~ Mouldings Half Size ~

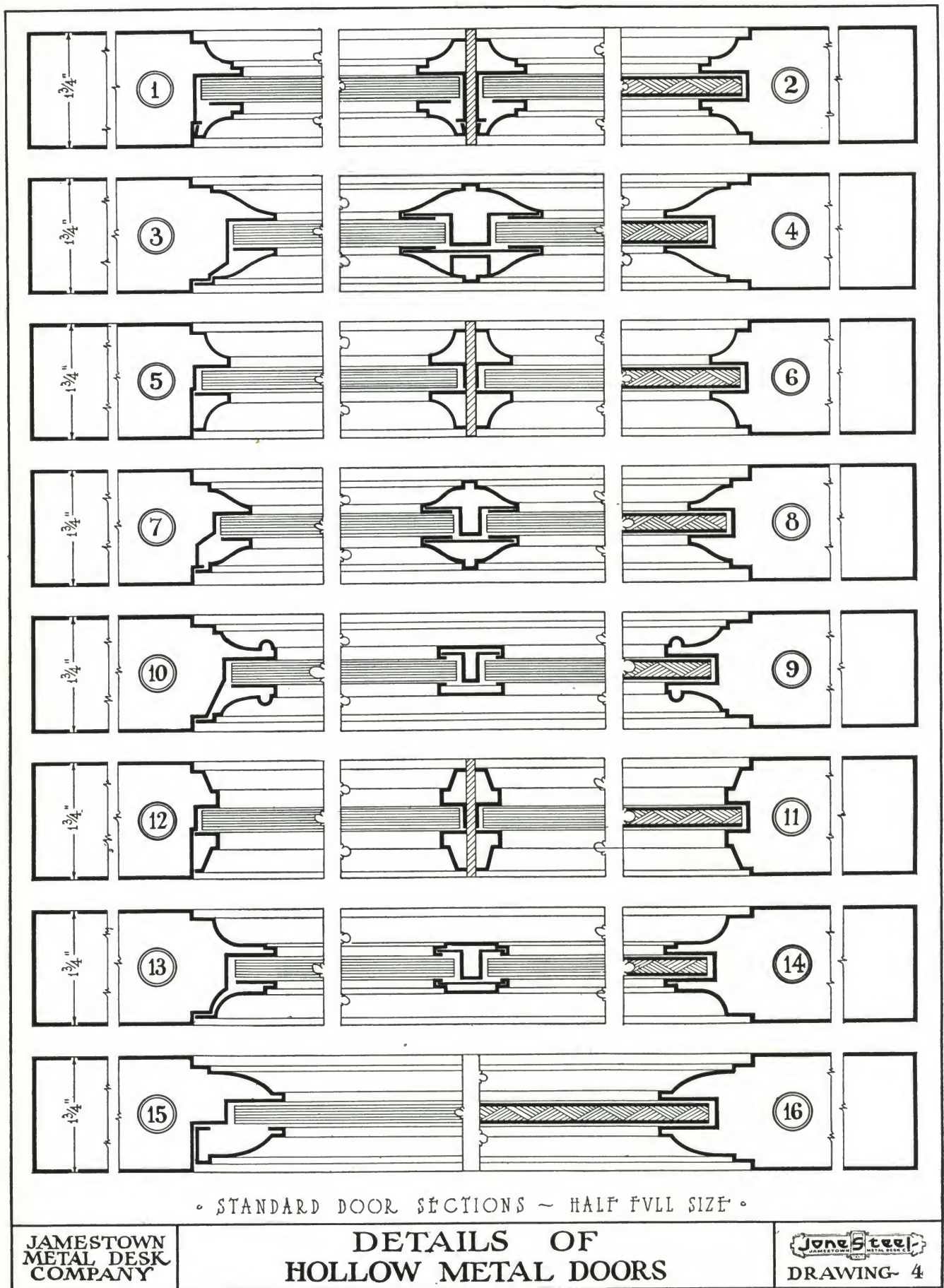


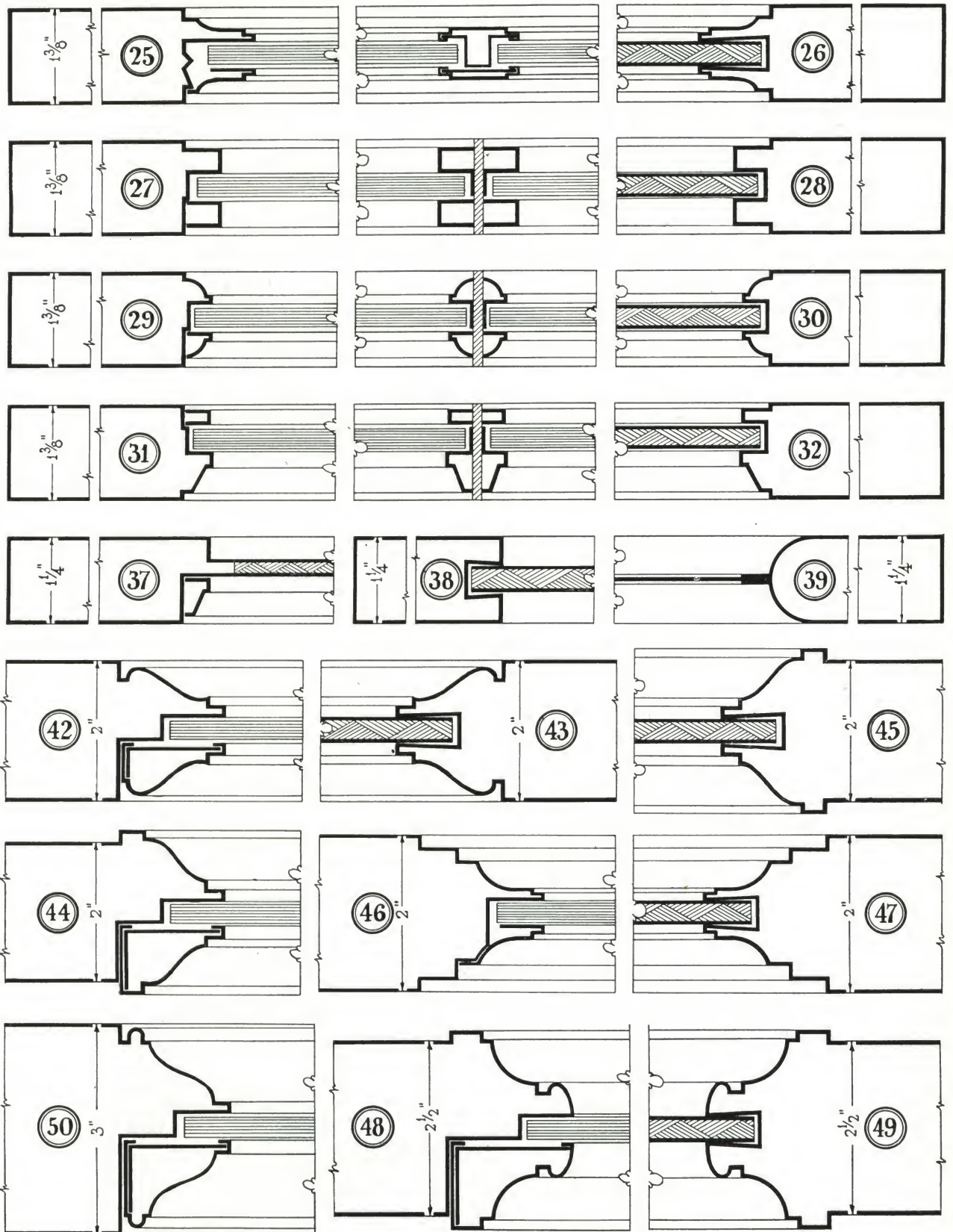
• HALF SIZE SECTIONS OF STANDARD CASINGS •

JAMESTOWN
METAL DESK
COMPANY

DETAILS OF
HOLLOW METAL DOORS & TRIM

JONE Steel
DRAWING- 3





• ELEVATOR DOOR & SPECIAL DOOR SECTIONS ~ HALF FULL SIZE •

JAMESTOWN
METAL DESK
COMPANY

DETAILS OF HOLLOW METAL DOORS

Jones Steel
COMPANY
DRAWING 5

THE McCOY BRONZE COMPANY, INC.

Manufacturers of Pyramid Bronze Doors

FACTORY AND GENERAL OFFICES

Forsythe and Holden Streets, DETROIT, MICH.

Products

PYRAMID EXTRUDED BRONZE DOORS.

For Pyramid Extruded Bronze Casements and Architectural and Ornamental Bronze Work, see page A1048.



have carefully tested, and have had many prominent architects and engineers pass upon our construction, and we have yet to find anything but words of praise for Pyramid construction.

Pyramid Bronze Doors through their novel construction may be purchased at a price that

will astound the most skeptical buyer.

They are standard in many thicknesses and widths of rail. On the following pages are shown a few of the standard types, made in many sizes. Pyramid Doors are no heavier than the ordinary type of hollow bronze doors.

Facilities

A complete modern plant manned with experienced and capable workmen in their several lines.

Service

Estimates will be furnished from architects' plans and specifications. Suggestions and designs or models will be furnished when desired. We solicit your inquiries.

Pyramid Bronze Doors

Suitable for all types of buildings.

The Pyramid Bronze Door is superior in appearance and many times as strong as the ordinary type of bronze door generally built of No. 14 gauge sheet bronze with rivets, screws, or solder to hold members together. Pyramid Doors have no screws or rivets to loosen up, no welds, brazes nor solder to break. The thickness of material is $\frac{1}{8}$ in. which eliminates wavy effects and is heavy enough so that reinforcing is not necessary. Pyramid Doors are made of special extruded bronze members dovetailed and locked together, making a door one hundred per cent more rigid than heretofore obtainable in any other type of construction. Our Pyramid Doors are made in many types and sizes due to this novel construction.

Before placing Pyramid Doors on the market we

Hardware

Our prices include the application of all hardware as selected and furnished by the owner. Our factory is equipped with templates of standardized hardware, which will facilitate delivery and avoid undue delay.

Finish

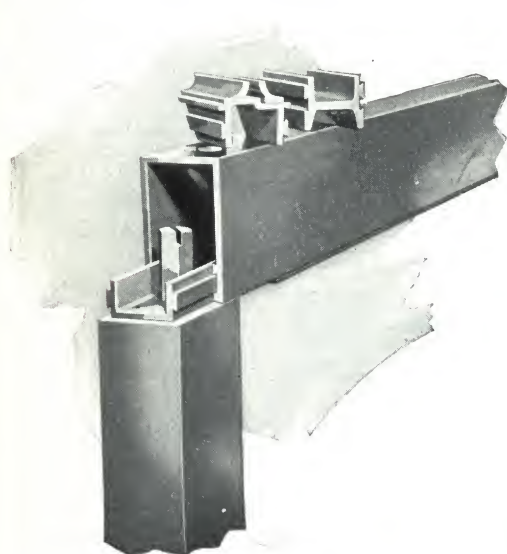
All work is hand rubbed, removing all scratches and discolor marks. Many beautiful finishes may be obtained on Pyramid Doors.

Door Bucks

Bucks are made of extruded bronze, structural steel or heavy bent plates and are ordinarily erected before the walls.

Bucks are anchored into the walls with either the legs outstanding or turned into walls.

The frames are securely anchored to these bucks.



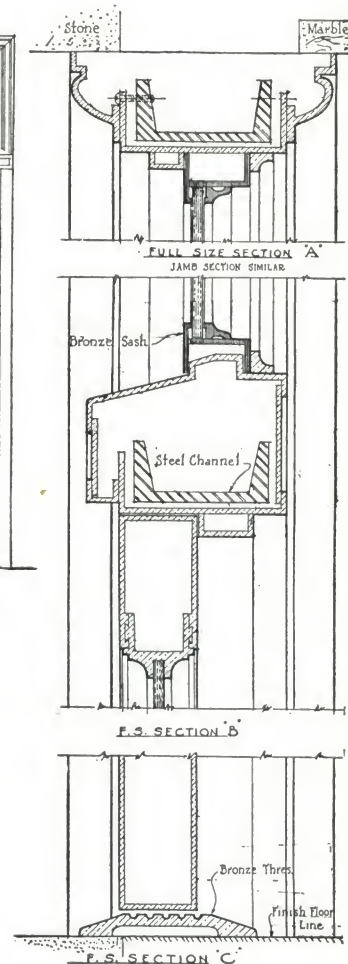
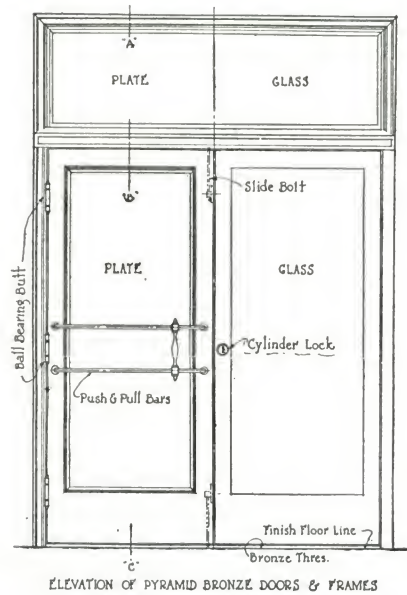
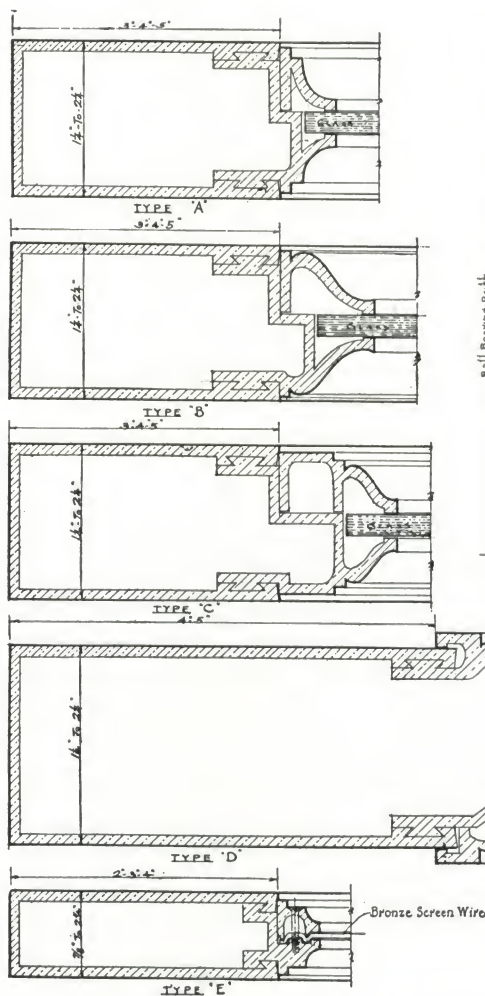
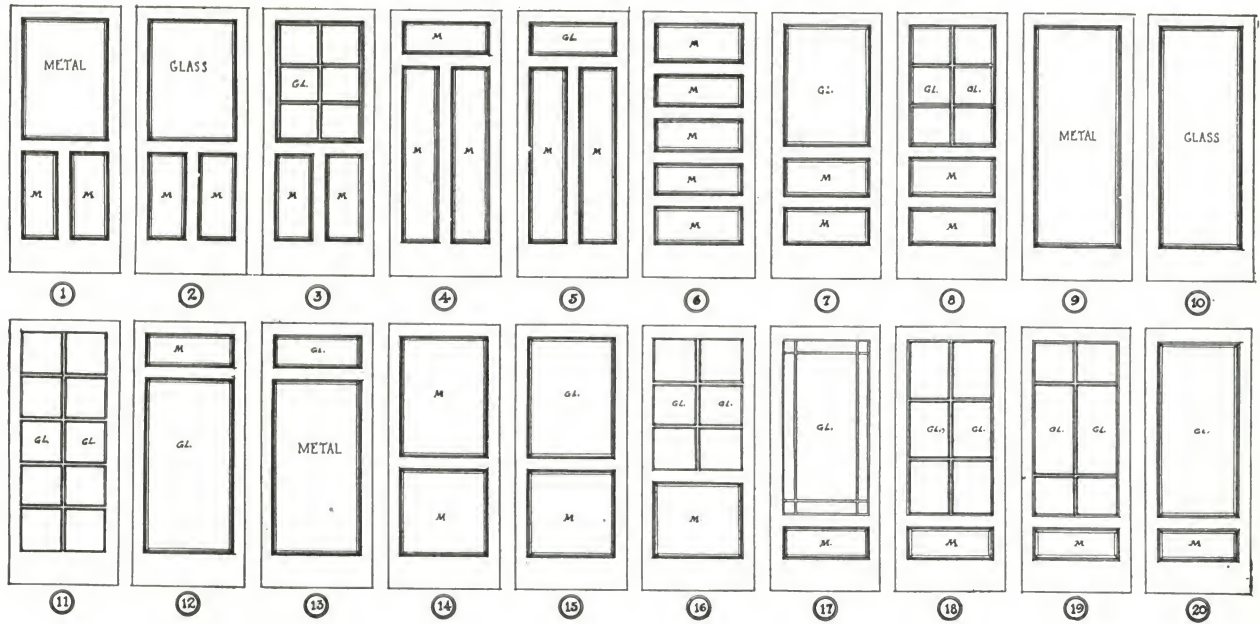
Section of Construction



Entrance, Stewart Warner Speedometer Corp., Detroit, Mich.
MURPHY & BURNS, Architects



Test of Door



THE McCOY
BRONZE CO.

Standard Types and Details of Frames of
PYRAMID BRONZE DOORS

VARIOUS
SCALES

THE NEWMAN MANUFACTURING CO.

Cast, Extruded, Kalamein and Hollow Bronze and Steel Doors

416-424 Elm Street

CINCINNATI, OHIO

CHICAGO, ILL., 165 West Wacker Drive

OFFICES IN SIXTY CITIES

Products

SOLID CAST BRONZE DOORS and FRAMES.

EXTRUDED (BUILT-UP) BRONZE DOORS and ENTRANCES.

KALAMEIN BRONZE and STEEL DOORS, WINDOWS, TRIM, PARTITIONS, and ELEVATOR ENCLOSURES and CARS.

HOLLOW BRONZE and STEEL DOORS and TRIM, PARTITIONS and ELEVATOR ENCLOSURES.

For Cast and Extruded Thresholds, Architectural and Ornamental Brass, Bronze, Steel and Iron Work, see pages A784-786.

Facilities

New and modern plant with kalamein and hollow metal departments second to none. Competent engineers always at the service of architects and contractors requiring special data, stock details or estimates of cost. Can furnish standard design and construction doors, as well as special types.

Kalamein Doors

Newmanco Kalamein Doors are made of galvanized Armco steel for outdoor use, and of Armco steel or genuine bronze for interior use. Sheet metal is applied over kiln-dried wood cores, tongue and groove joined, and nail clinched. Positively no bulging or warping out of shape.

Metal panels and rails in separate pieces. All joints blind nailed and lock seamed to prevent expansion and contraction.

Finishes—Steel doors finished in one coat of gray priming. Or completely finished in baked enamel of any color, either plain or stippled, or in grained wood effects.

Extruded Bronze Doors

Solidly constructed of 1/8-in. genuine sheet bronze, with extruded bronze members applied, forming heavy, rigid doors of undoubted class. Made in both standard and special types in all sizes. Write for details and estimates of cost.

Sheet Bronze Mausoleum Doors and Solid Bronze Entrances

Likewise we make sheet steel and bronze vault doors, with or without applied ornaments, and the very finest hand-tooled entrances for public buildings, banks, etc., including vestibules, transoms, side grilles and sills.

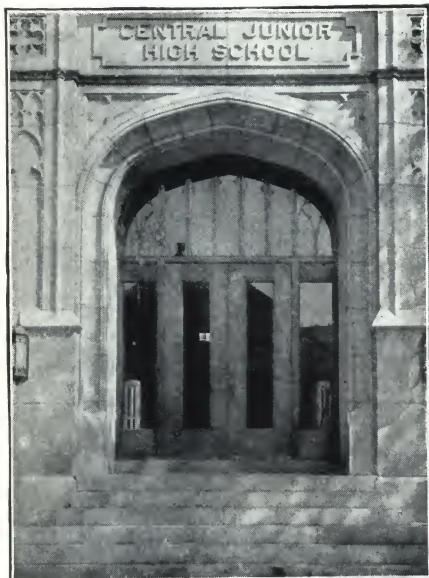
Hollow Doors

Newmanco Hollow Doors are made of 18 gauge Armco open hearth steel or 10 gauge bronze, with panel mouldings securely affixed. Joints are reinforced, welded or brazed and hand finished to perfect levels. Stiles have compressed cork or asbestos inserts.

Metal panels are made of two plates of 20 gauge steel or 18 gauge bronze, and 1/4-in. thick heat-retarding insulator. Glass panels fitted in removable metal frames. Muntins made of interlocking shapes welded or brazed to mouldings. Astragals of interlocking shapes, welded or brazed to stiles. Hardware customarily furnished by others.

Frames of 14, 12 or 10 gauge steel, or 12 gauge bronze, welded or brazed, and attached to walls by adjustable anchor plates, and reinforced for hardware.

Finishes—Same as kalamein doors.



Hollow Doors, Clarksburg, W. Va.



Commonwealth Bank, Baltimore, Md.



Kalamein Doors, St. Louis, Mo.

Typical Installations of Newman Metal Doors

THE RIESTER & THESMACHER COMPANY

Hollow Metal Doors and Trim

1514-1526 West 25th Street
CLEVELAND, OHIO

Products

HOLLOW METAL DOORS, PARTITIONS, ELEVATOR FRONTS, COMBINATION BUCKS and JAMBS, METAL BASE and PICTURE MOULD.

For Steel Stairs, see page A643.

Construction

The R & T hollow metal door with its interlocking joint construction has been developed through fifteen years in the door business. The doors are constructed of first grade No. 18 gauge furniture steel, full pickled, full cold rolled, re-annealed, patent leveled, re-squared and oiled. Jambs and casings are of same gauge material. Bucks or frames are fabricated from No. 10 to 14 gauge material in accordance with size of opening and service required. All joints in construction are electric process welded, practically making the door one continuous piece of metal. Proper reinforcements are welded within the door to take care of all hardware requirements and the entire design makes for rigidity, stability, fire protection and neat appearance. These doors can be fitted to either the cabinet jamb design or combination buck and jamb. R & T hollow metal doors, having no combustible material within the door, are fire retarding and fully meet the requirements of the National Board of Fire Underwriters and bear their label, when specified.

Finish

Before assembly, all parts are paint dipped in order to protect the interior of the door. Before final finish, all surfaces are thoroughly cleaned to remove grease or oil.

Each coat of paint or enamel is carefully baked and properly treated to secure the highest possible finish. Doors are finished in prime coat, plain color enamels, stipples and wood graining reproductions.

Hardware

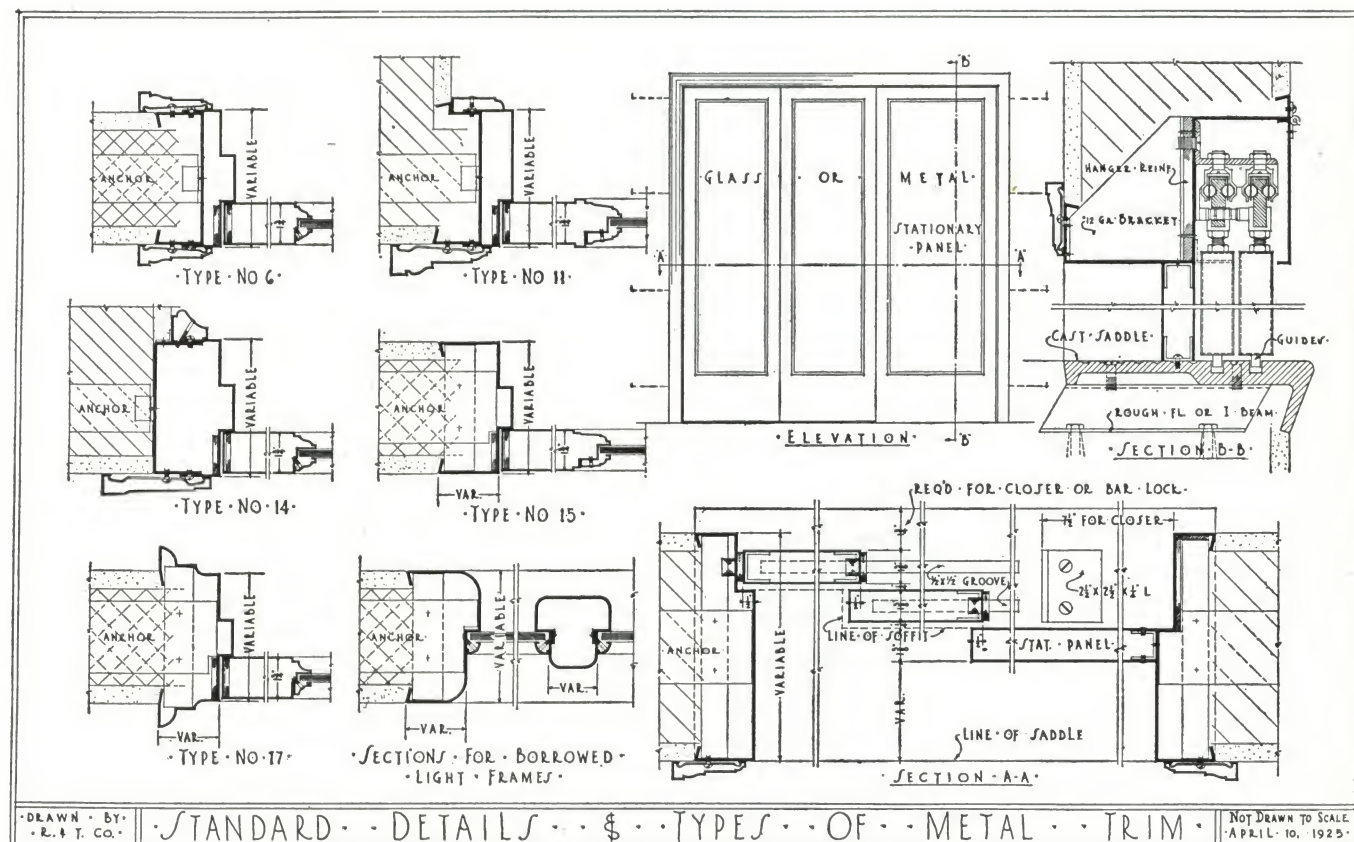
Hardware, as selected and furnished by the owner, is applied at the factory, and we have a good selection of templates of standardized hardware which facilitates delivery and avoids undue delay.

Upon request we are glad to furnish typical details and stock mouldings in order to assist in designing metal trim.

References

A few buildings of varied types in which we have recently made installations of metal trim:

Cleveland Public Auditorium, Cleveland, Ohio
Weymouth Power Station, Boston, Mass.
Maternity and Children's Hospitals, Cleveland, Ohio
Burton Abstract and Title Co., Detroit, Mich.
Elyria Savings & Trust Co., Elyria, Ohio



THE UNITED METAL PRODUCTS COMPANY

Manufacturers of Hollow Metal Doors and Trim

CANTON, OHIO

DISTRICT OFFICES OR SALES REPRESENTATIVES IN ALL IMPORTANT CITIES

Products

HOLLOW METAL DOORS and TRIM.

UNIT DOOR FRAMES (Combined Buck, Jamb and Casing in one piece).

METAL MOULDINGS, including Picture Moulding, Wire Moulding, Scribe and Closure Moulding, Cornices, Base, Chair Rails, etc.

HOLLOW METAL ELEVATOR DOORS and ENCLOSURES.

CONDUO-BASE (for carrying electric wires).

METAL PARTITIONS.



Plant and Facilities

U.M.P. doors are made in the largest plant in the world devoted exclusively to the manufacture of hollow metal doors, frames and trim. We are equipped to handle contracts of any magnitude, and, as our plant is located in the heart of the steel producing industry, we enjoy unusual facilities in deliveries of raw material. Our plant is equipped with the very latest machinery and our methods of producing the finest type of interior metal trim are most modern.

U.M.P. Standard Hollow Metal Doors and Trim

Stiles and Rails—Formed from U. S. Std. No. 18 gauge steel, thoroughly pickled, double annealed, patent leveled, free from blisters, pits or other imperfections. Stiles are formed of one piece and rails of two pieces, all interlocked with continuous channels constructed to form a reinforcing binder, a deep groove for panel and an interlocking clip for panel moulding (see illustration). All stiles and rails have cork inserts of suitable size to prevent metallic sound.

Doors are 1 $\frac{3}{4}$ in. thick.

Panels—Constructed of two sheets of U. S. Std. No. 18 gauge steel between which two sheets of asbestos and one sheet of felt are inserted to make panel $\frac{1}{8}$ in. thick over all. Panels are inserted in the groove provided by the interlocking channels. (An exclusive feature of this product.)

Panel mouldings are neatly mitered or coped at corners and intersections and clipped into interlocking member as described above.

All seams and joints connecting stiles and rails are oxy-acetylene welded their entire length. All joints are made perfectly level and invisible. Steel channels, placed at top and bottom of door full width, are spot-welded in place. Reinforcing bars of sufficient length and thickness are welded in hinge stile at all cut-outs, and are drilled and tapped for butts. Reinforcing plates are spot-welded in lock stile to receive locks, and additional reinforcements are placed in door to receive the hardware specified. All doors are reinforced for door checks, whether specified in hardware schedule or not.

No bolts or rivets are used and no screws are allowed, except where glass panels occur and then oval head machine screws are used to hold glass moulds or beads in place.

This construction has merited the approval of the Underwriters' Laboratories, Inc., it having withstood a fire test of unusual severity without the slightest indication of failure.

We invite investigation and inspection of the U.M.P. standard door and with special reference to the panel construction. Investigation will show as fire tests have proven, that the U.M.P. standard hollow metal door is a fire retardant without equal.

Jambs—Made of the same quality steel as described for doors—U. S. Std. No. 18 gauge for walls $7\frac{1}{2}$ in. thick or less; No. 16 gauge for walls exceeding $7\frac{1}{2}$ in. thick. Notched and reinforced for all necessary hardware. Jambs are formed to detail and made to fit accurately over buck. All intersecting members are neatly coped and fitted before shipment.

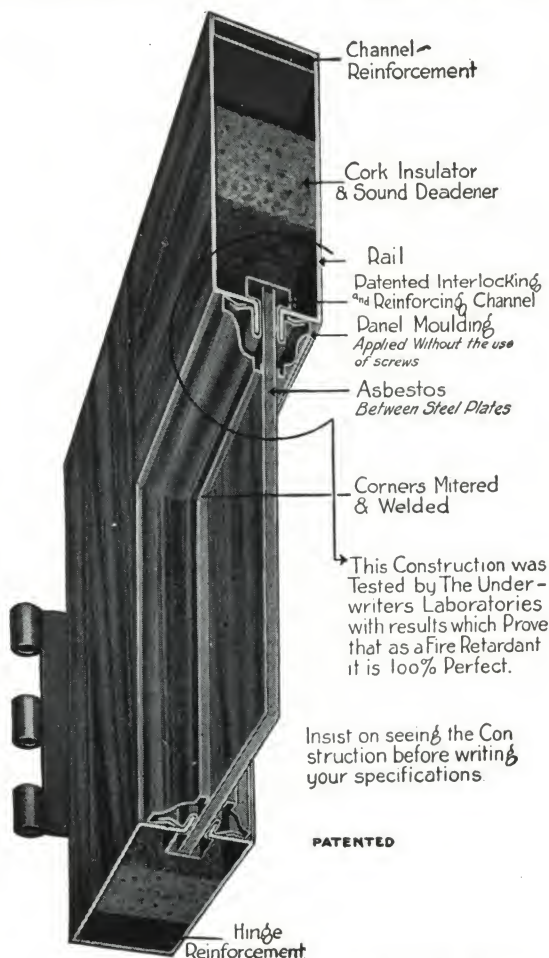
Casings—Made from cold rolled strip steel of not less than .050 in. thick. A large assortment of sizes and profiles designed by architects is available for trimming the opening. All casing corners and miters are neatly welded and ground to insure invisible joints.

Transom Sash—Constructed of U. S. Std. No. 18 gauge steel, similar to doors, and properly reinforced for necessary hardware.

Rough Bucks—Usually made of U. S. Std. No. 14 gauge blue annealed steel. Intersecting joints are acetylene-welded and steel spreaders placed in bottom of all bucks. With rough bucks, we furnish adjustable crimped or corrugated anchors which can be built into the walls. Depth of buck is determined by thickness of wall, including plaster. Rough bucks receive a dip coat before shipment.

Unit Frames (Combined Buck, Jamb, Stop and Casing)—Made from U. S. Std. No. 12, 14, 16 or 18 gauge steel of the same quality described for doors (No. 16 gauge is standard). Hospital type bucks are No. 12 or 14 gauge, as required. All bucks and frames prepared for hardware and heavily reinforced where necessary. Unit frames receive one dip coat and one filler coat. Both coats baked on, after which a prime coat is applied and baked. Finishing coats of paint are applied at building by painting contractor.

Standard Finish—Inside of panels are painted before assembling. After fabrication the door is immersed in enamel. Enamel is then allowed to drain off, after which doors are thoroughly baked. A filler coat is then applied and baked, and the surface sanded or ground perfectly smooth. Two coats of high grade mineral paint are then applied, each baked on separately. All grained finishes receive two coats of best baking varnish, each coat baked on separately. All finished work is rubbed to an eggshell gloss.



Detail Showing Construction of U.M.P. Door

Jambs, casings and mouldings are finished in the same manner as the doors.

Hardware—Applied to doors at factory before shipment, except where crating of materials might be interfered with. Drilling and tapping for such items as doors and transom closers are done at the building by the erector after materials are installed.

Underwriters' Labels—The standard U.M.P. construction has been tested and approved by the Underwriters' Laboratories, Inc., and we have been granted the privilege of applying the Underwriters' label to all doors for corridor, room partition and fire escape openings.

We have also been granted the right to label fire wall doors made from No. 18 gauge steel and of hollow construction. Such doors are of the all-metal type and, while of special construction, they can be divided into any number of panels and grained to match any finish desired.

The U.M.P. fire wall door displaces the old fashioned tin clad type. It can be hung with ordinary butts to a regular standard No. 16 gauge jamb attached to a No. 10 gauge buck. The only item of hardware needed on the U.M.P. inspected fire wall door in excess of what is required on any other door is a 3-point lock.

We furnish labeled doors and frames in any size up to and including 4 ft. wide by 8 ft. high for single doors, and up to 8 ft. wide by 8 ft. high for a pair of doors.

Shop Drawings—These illustrate all work in detail and are prepared and submitted for architect's approval before materials are fabricated.

Samples—We will furnish a corner section of this door

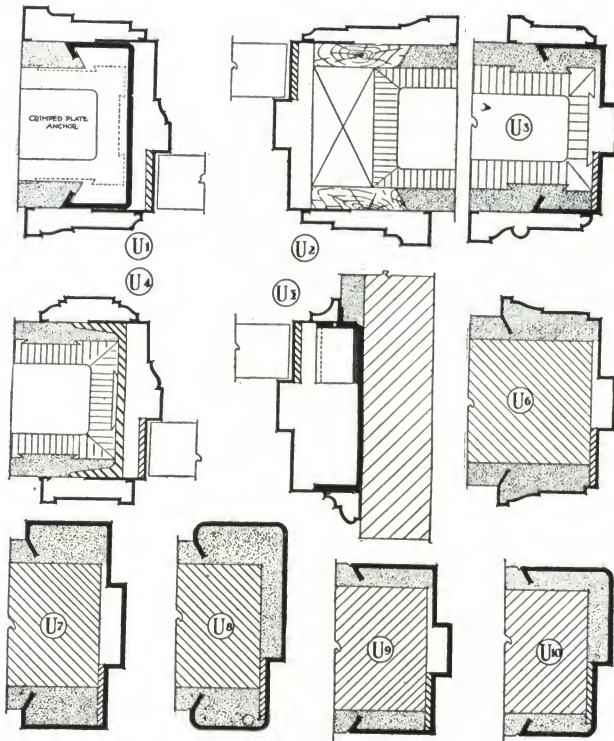
and suggest that a comparison be made of its construction with the old system of a tubular stile and rail with the panel mouldings simply screwed or spot-welded to it.

Samples of finish are submitted for approval before materials are finished.

Architects' Handbook—Full size sections of all standard U.M.P. door mouldings and casings are shown in our Architects' Handbook, which will be sent on request, without charge.



Standard U.M.P. Hollow Metal Doors



Details of U.M.P. Standard Buck and Jamb Construction

Type U 1—Rough buck, cabinet jamb and casing construction.
 Type U 2—Wood buck, cabinet jamb and casing construction.
 Type U 3—Combination buck and jamb, with applied casing.
 Type U 4—Channel iron buck, cabinet jamb and casing construction.
 Type U 5—Inverted buck. Cabinet jamb and scribe mould construction.
 Type U 6—Unit frame (combined buck, jamb and casing).
 Type U 7, U 8, U 9 and U 10—Combination frames suitable for hospital or school construction.

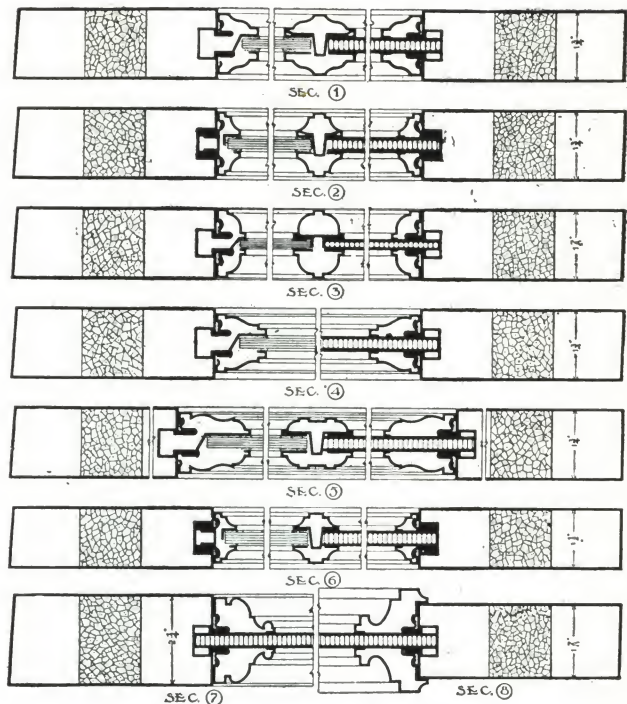
Note: When materials must be finished before shipment, constructions shown for Types U 1, U 2, U 4 and U 5 may be used. Rough bucks can be set, walls built and plastered and finished materials installed after all other work is in place.

Type U 3 permits of a more flexible casing design than is possible in a standard unit frame. Casing can be made to match any design required. A considerable saving can be effected in cost by specifying construction shown for Types U 6, U 7, U 8, U 9 and U 10.

Unit frames must be built into masonry and should not be shipped to job with finishing coats applied. This work should be done by painting contractor.

We can furnish Underwriters' labels for all types of construction shown with the exception of U 2 and U 5.

Crimped plate anchors furnished with all combination frames.



Standard U.M.P. Hollow Metal Door Sections

Metal Mouldings

We manufacture a complete line of metal mouldings, including picture moulding, wire moulding, scribe enclosure moulding, muntin moulding, chair rail, base, cornices and handrails, which can be furnished promptly in any quantity. These are made from .050-in. cold rolled strip steel.

Special steel or bronze shapes, cold rolled or pressed, can also be furnished.

A large assortment of styles is shown in full size sections in our Architects' Handbook, a copy of which will be sent on request, without charge.

Elevator Enclosures

Doors—Construction of United elevator doors is the same as that of the standard U.M.P. hollow metal doors described on the two preceding pages, except that they are 1½ in. thick and are provided with special noiseless easy-sliding guides at bottom of door to run in sill groove.

Frames—May be of either rough buck, cabinet jamb construction, or of the combination frame type, heavily reinforced for attachment of hardware. Crimped plate anchors furnished with all combination frames and rough steel bucks.

Trim—Made from No. 18 gauge strip steel of stock design or profile, and fastened to frame with concealed clips.

Cover Plates—Protect hangers from dirt and dust. Made of No. 14 or 12 gauge steel, depending on size. Provided with hinges and latches for easy access.

Facia Plates—When specified, Nos. 14 or 12 gauge facia plates are furnished, extending from top of cover plate to sill above and 6 in. wider on each side than jamb opening. Numerals furnished when specified.

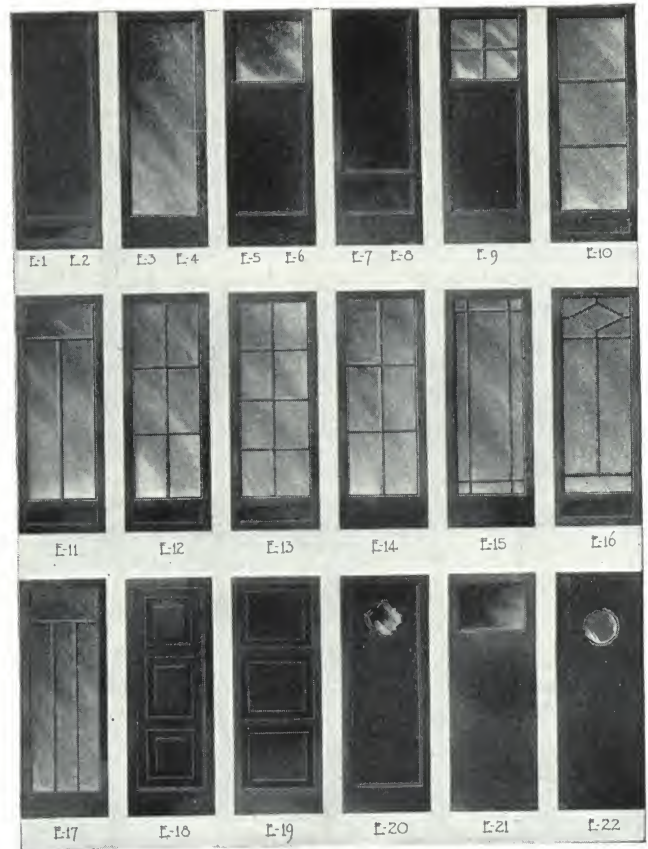
Sills—Furnished in either cast iron with fluted surface, or Feralun sills with grooves milled straight and true, in order that the friction of guide pin and groove be reduced to the minimum.

Hanger and Closing Device—Furnished in the type specified. We suggest careful choice in this specification, as poor equipment of this nature will ruin an otherwise perfect installation.

Underwriters' Labels—United elevator enclosures, including doors, bucks and jambs, can be furnished with Underwriters' labels, except enclosures having glass paneled doors.

Owing to varying construction, it is necessary to mention distinctly in the specification that the elevator doors are to bear the Underwriters' label and be manufactured in accordance with the standard construction of UNITED METAL PRODUCTS COMPANY.

Elevator Specifications—Complete elevator specifications and list of prominent United installations will be mailed on request.



Standard Types of United Elevator Doors

Where two designations are shown for one type, the following applies to panel arrangement:

- | | |
|----------------------------|----------------------------|
| E 1—Two-panel, all metal | E 5—Two-panel, all metal |
| E 2—Two-panel, upper glass | E 6—Two-panel, upper glass |
| E 3—One metal panel | E 7—Two-panel, all metal |
| E 4—One glass panel | E 8—Two-panel, upper glass |

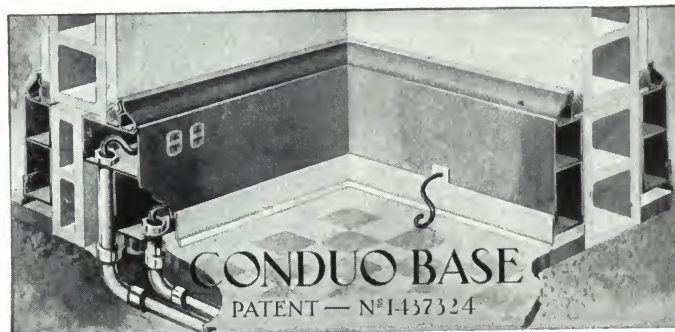
Conduo-Base—Combined Base and Conduit

Conduo-Base serves both as a baseboard and as a raceway or conduit for electric light, telephone and other wires. Conduo-Base is not intended to replace the entire conduit system in a building, but is an extension of that system.

High and low tension feeder conduits located in the floor fill and running from cable shaft or panelboard, are extended to and connected with the Conduo-Base at any convenient point. The wires are then carried around the room in the Conduo-Base and are accessible for outlets at any point along the base. Outlet boxes for the reception of feeder conduits are attached to the raceway, knockouts being provided in these boxes to receive feeder conduits.

Strictly fireproof—every section bears the Underwriters' label. One standard height, 8¼ in. over all.

Raceway—Made of one piece of No. 18 gauge steel and formed into two separate compartments. The upper compartment is used exclusively for light or power wires up to 300 volts; lower compartment for telephone or other low tension signal or communicating wires. Shipped in 10-ft. lengths.



Cover Plate—Made of No. 18 gauge furniture stock steel. Easily removed when additional outlets are required or when access to raceway is desired. Shipped in 10-ft. lengths.

Plaster Mould or Top Member—Made of .050-in. strip steel. Easily clipped in place. No screws or other visible fixing required. Shipped in random lengths of about 15 ft.

Mop Mould or Bottom Member—Made of .050-in. drawn strip bronze. Rests on floor and provides protection against damage to base when floors are swept or scrubbed. Drilled on 15-in. centers and fixed to raceway with round head machine screws (drilling and tapping of raceway done at building). Shipped in random lengths of about 15 ft.

Fittings—Grounding clips, end closers and plaster mould clips are furnished by us with each order.

Finish—All exposed surfaces of Conduo-Base are finished to match sample furnished by architect.

Especially Desirable for Subdivision—When United Metal partitions are used for the subdivision of space, Conduo-Base is especially desirable in that it serves both as a neat, artistic and sanitary base for the

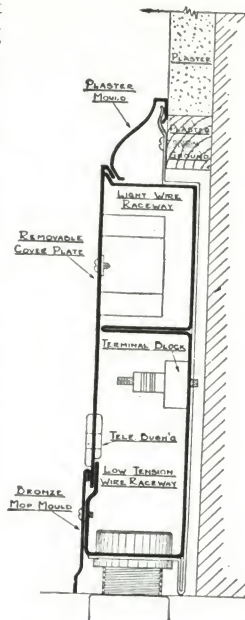
partition and as a conduit for distribution of light and telephone wires within the rooms. The combined use of *United Metal Partition* and *United Conduo-Base* simplifies the task of the architect and the building manager in providing for future tenant wiring requirements. The convenience and economy resulting make the use of *Conduo-Base* desirable and necessary.

How to Specify—Furnish and install *Conduo-Base* in all rooms and spaces throughout the building where base of other types is not shown or specified. Base shall be *UNITED METAL PRODUCTS COMPANY*'s standard patented *Conduo-Base*, each section bearing the Underwriters' label. All exposed surfaces shall be finished to match sample furnished by the architect.

Conduit Work for Conduo-Base—Extend from each light switch outlet box, one $\frac{3}{4}$ -in. feeder conduit to the upper section of special outlet box which is attached to and forms part of raceway. This box shall be furnished by the *Conduo-Base* manufacturer. Extend from the nearest low tension panel or junction box at least one $\frac{3}{4}$ -in. feeder conduit to each suite of rooms, connecting same to the lower raceway of outlet box mentioned above.

Note: It is recommended that the above conduit feeders be made at columns, outside walls or permanent partitions where same are not likely to be removed by changes or rearrangements of suites of rooms. Feeder conduits of both light wire and low tension wires to *Conduo-Base* should be made of number and size so that each isolated run of *Conduo-Base* or each suite of rooms has ample and independent feeder capacity.

At every door opening, low-set radiator and every other point where the continuous run of *Conduo-Base* is intercepted by an opening or otherwise, "jumper" both raceways of *Conduo-Base* with $\frac{3}{4}$ -in. conduits



Section Through
Conduo-Base

across the opening or interception so that each isolated run of *Conduo-Base* in every suite of rooms is properly connected with the section of *Conduo-Base* equipped with the feeder conduits.

Note: Where "jumper" conduits terminate in partitions that are likely to be removed at a future date, we recommend the use of cast elbows and nipples, with the conduit proper finishing at floor level so that it can be capped.

For each light or low tension wire floor outlet shown, extend one $\frac{3}{4}$ -in. conduit "jumper" from the nearest *Conduo-Base* run, and from its proper potential raceway, terminate same at floor with its axis perpendicular to same, with one adjustable floor outlet fitting with blind cap.

Conduo-Base Installation—After completion of plastering and floor work, install *Conduo-Base* in the following manner. Attach raceway to plaster ground with round head wood screws through clips which are spot-welded to raceway, special care being exercised to maintain true alignment, elevation from floor and projection from plaster line, in strict accordance with manufacturer's full size details.

When all raceways are installed, wiring in same completed and approved, install *Conduo-Base* finishing members in accordance with manufacturer's standard directions, with all exposed joints well made, corners neatly fitted and finished surfaces kept unmarred in strict cabinet quality of workmanship.

Electrical Requirements—The entire installation of *Conduo-Base* shall be made in strict accordance with the Underwriter's rules and regulations, with continuous unbroken grounding of every isolated run of base, with all wiring within free from grounds.

United Metal Partitions

We have perfected and patented an inexpensive metal partition for subdividing office and warehouse space.

Panels are made from two sheets of furniture stock steel, with a layer of asbestos between and joined together under hydraulic pressure. Mullions, and top, bottom and intermediate rails are of hollow construction, all drawn to detail with sharp reveals and pleasing architectural profiles.

Bottom member of partition can be fitted to receive *Conduo-Base* where desired, so that electric and telephone wires may be distributed throughout the rooms without the necessity of floor conduits, thus enabling the contractor to install finished floors and ceilings throughout the entire floor, subdividing the floor space afterward to suit tenant requirements.

United partitions can be set up and taken down without dam-

age to walls, floors or ceilings. Parts can be moved and stored in a very small space and reset without damage to finish or waste of material. Adjustment to varying conditions is a special feature.

The high cost and scarcity of building labor, together with the inconvenience and expense of pulling down and rebuilding tile and plaster walls in an occupied office or warehouse building, make it imperative that the architect and owner investigate the United partition before deciding on the type of subdividing wall material to be used.

United partitions are made from cold rolled shapes, the members of which are fabricated at our factory and shipped to the job knocked down. The various members are prepared so they can be easily and quickly locked together on the job.



United Metal Partition with Conduo-Base

VARIETY FIRE DOOR COMPANY

Manufacturers of All Kinds of Fireproof Doors

Sacramento and Carroll Avenues, CHICAGO, ILL.

ATLANTA, GA.
BUFFALO, N. Y.
CHARLOTTE, N. C.
CHATTANOOGA, TENN.
DALLAS, TEX.
DAVENPORT, IOWA

DAYTON, OHIO
DECATUR, ILL.
DETROIT, MICH.
EL PASO, TEX.
FORT WAYNE, IND.
GRAND RAPIDS, MICH.

HOUSTON, TEX.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MEMPHIS, TENN.
MILWAUKEE, WIS.

MINNEAPOLIS, MINN.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.

RICHMOND, VA.
ST. LOUIS, MO.
SAN ANTONIO, TEX.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
TULSA, OKLA.

Products

UNIVERSAL PASSENGER ELEVATOR DOORS.
HOLLOW METAL FIREPROOF DOORS and TRIM.
KAL-O-MINE METAL COVERED FIREPROOF DOORS
and TRIM.
VARIETY STEEL ROLLING DOORS and SHUTTERS.
VAMANCO and VARCLAD COUNTERBALANCED
FREIGHT ELEVATOR DOORS.

Also manufacturers of Cross Horizontal Folding Doors, Saino Fire Doors and Shutters, Tin Clad and Metal Covered Doors and Trim.

Universal Passenger Elevator Doors

Type V. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type V. U. passenger elevator doors are constructed of No. 18 gauge furniture metal throughout, with all connections between stiles and rails formed by continuous lock joints and solidly welded over entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

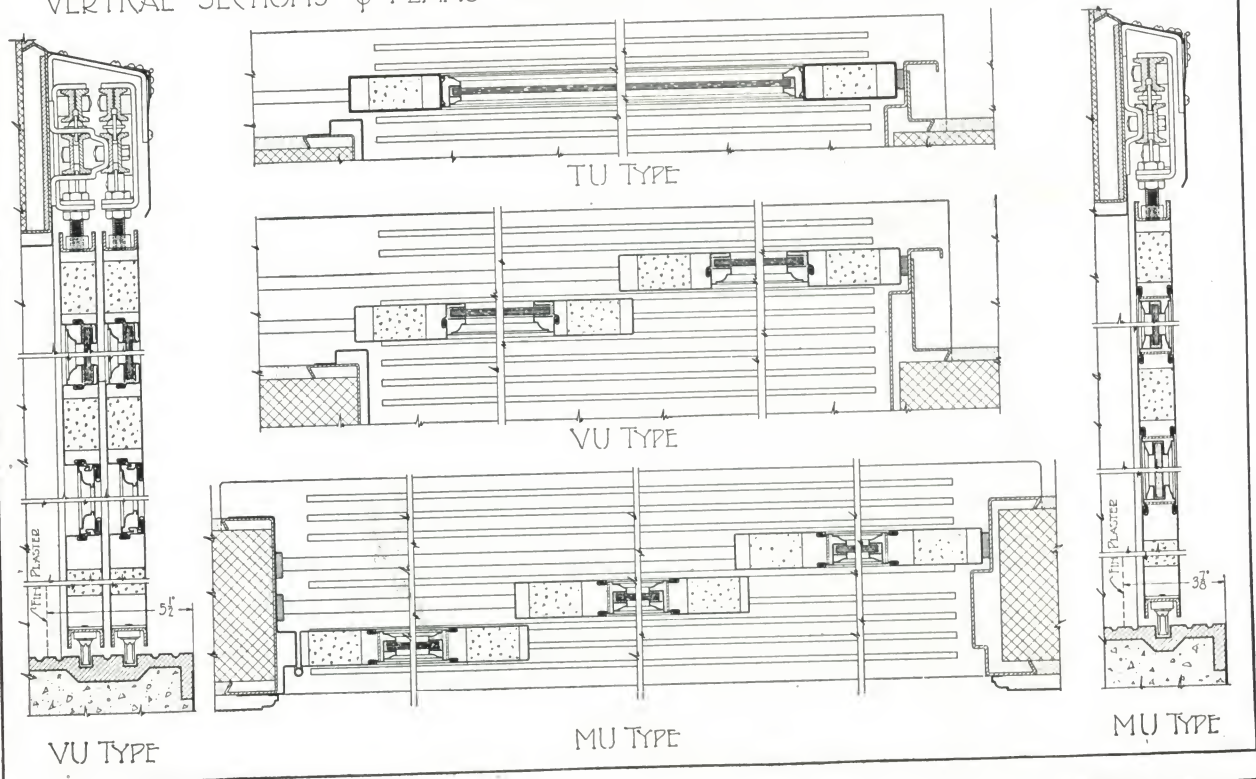
Type M. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type M. U. passenger elevator door construction is similar to V. U. type except that both shaft and corridor sides of door have recessed panels finished against stiles and rails with drawn mouldings mitered and welded. Finish is either air dried, baked enamel

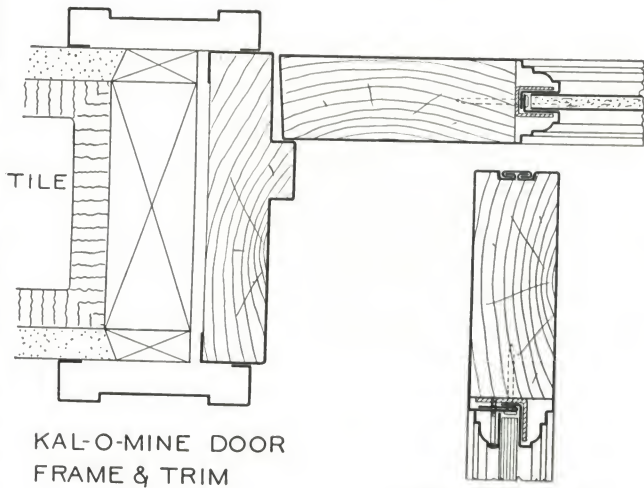
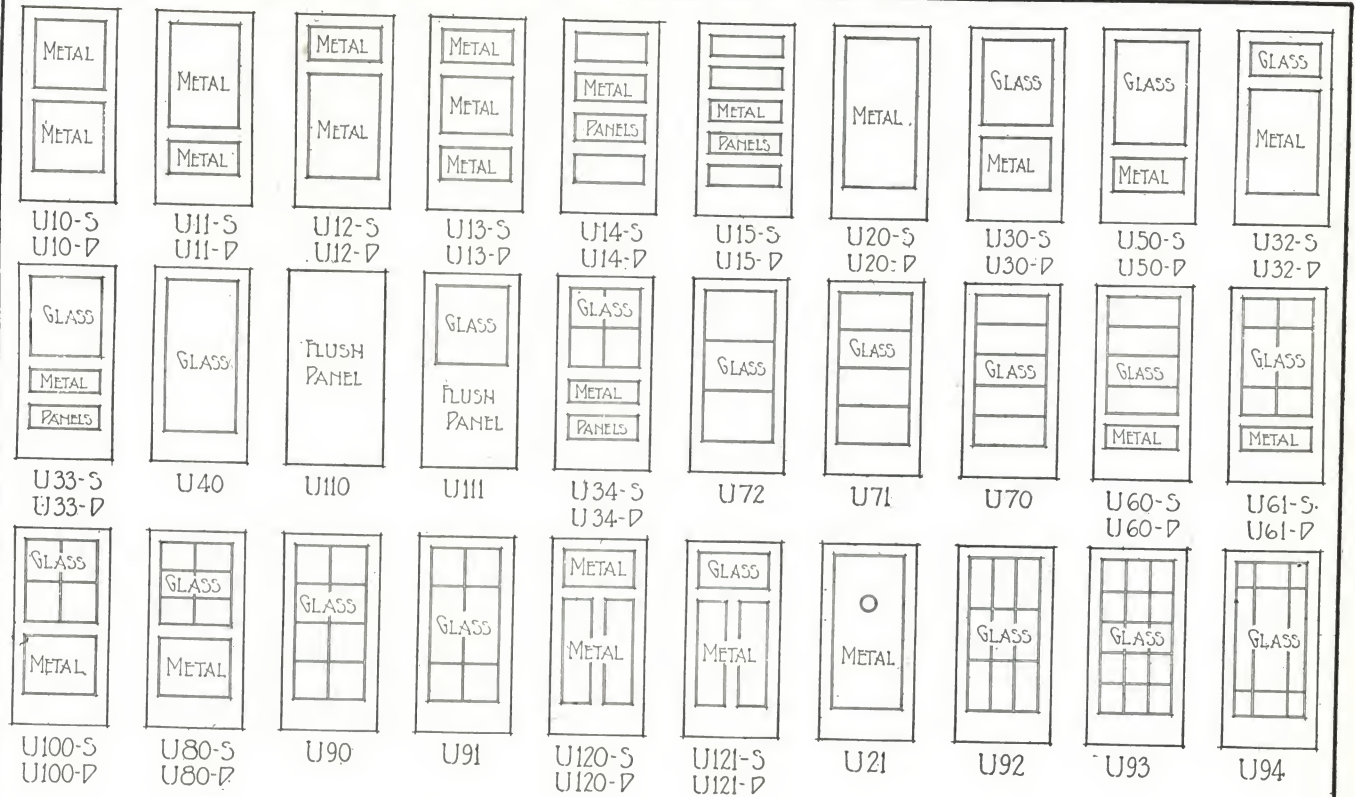
in any color, or grained to match any kind of wood finish.
Type T. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type T. U. passenger elevator doors are constructed of rectangular tubes drawn from No 14 gauge cold rolled strip stock and welded. All connections between stiles and rails are formed by continuous lock joints and solidly welded over the entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.



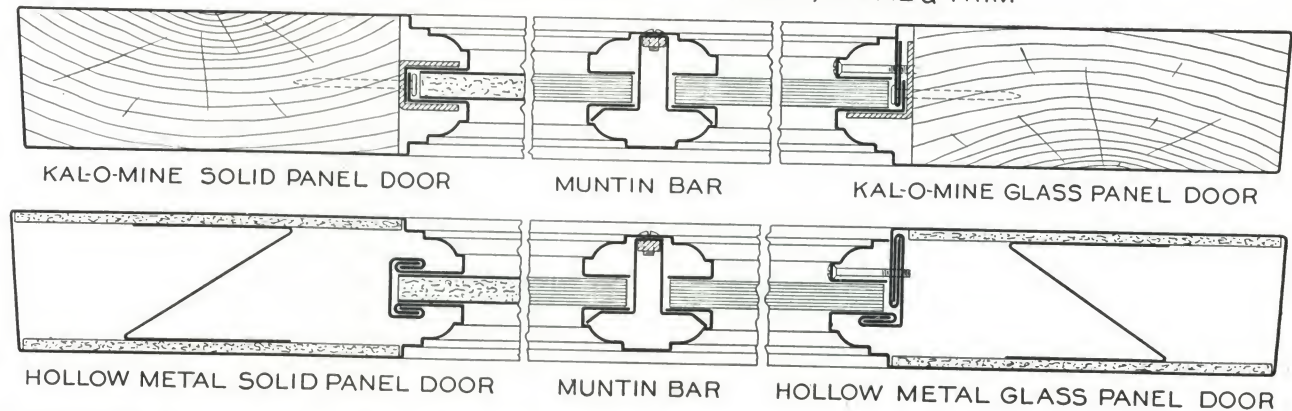
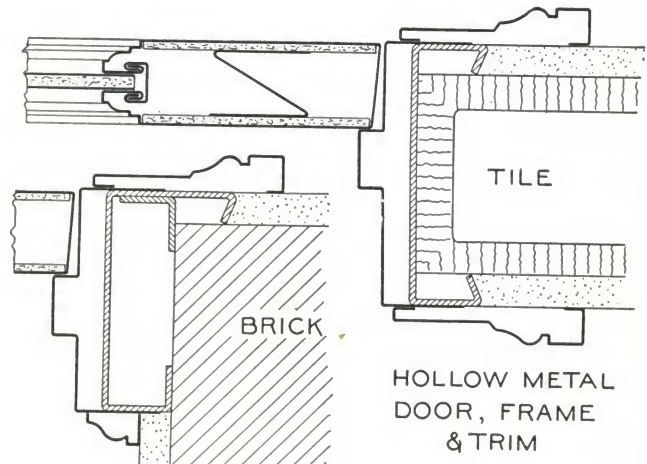
Universal Passenger Elevator Doors

VERTICAL SECTIONS & PLANS SHOWING STANDARD UNIVERSAL DOORS





SECTION THRU
TOP RAIL OF DOOR



Details of Variety Hollow Metal and Kal-O-Mine Fireproof Doors and Trim

Variety Steel Rolling Doors

Recommended for use in the following openings: Construction No. 20 Non-labeled, on exterior openings, mounted on face of wall. Construction No. 41 Non-labeled, shutter mounted under the lintel.

These types are most frequently used on exterior openings not exposed to fire hazards, and are not automatic, unless so specified. They are made in all gauges according to the openings and are operated manually or with chain hoist. Construction No. 20 can also be operated with crank arrangement or by chain hoist from opposite side of wall.

Construction No. 60 and 61 Labeled for exterior openings. No. 33 Labeled for vertical hatches. No. 33-33 Labeled for firewalls.

Construction No. 60 is not automatic and is generally used on exterior openings, adjacent to fire hazards which are not sufficiently close to necessitate the use of automatic shutters.

All the requirements of the Underwriters' Laboratories, Inc. have been met and the door bears their label.

Construction No. 61 is equipped with automatic closing device. This type is generally used on exterior openings where fire hazards occur sufficiently close to cause the Underwriters to demand automatic closing device.

Construction No. 33 is made in No. 20 gauge or heavier, according to size of opening. It is labeled by the Underwriters for use on vertical hatches and corridor and room partitions and is always automatic. It must have continuous end locks and baffle plate and governor if needed. Shutter mounted either under the lintel or on the face of wall, and is operated manually or by means of chain hoist from either side of wall as desired.

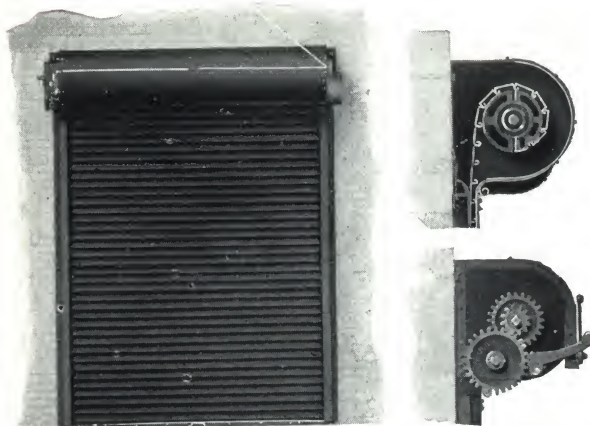
Construction No. 33-33 is similar in construction to No. 33, except that it is always made of No. 16 gauge material and is labeled by the Underwriters for use on fire walls. This type is mounted on face of wall only, and is operated either manually or by means of chain hoist as desired.



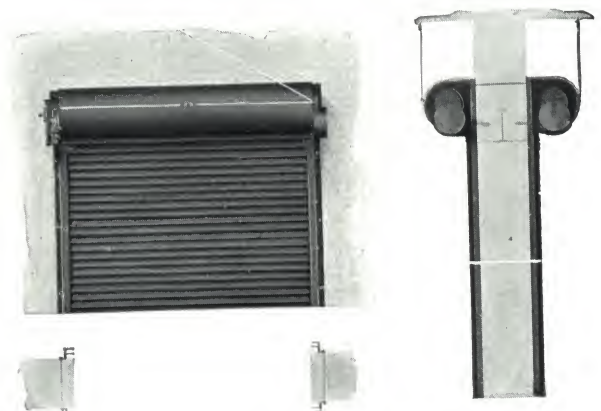
No. 20DH—Non-labeled, Chain Operated



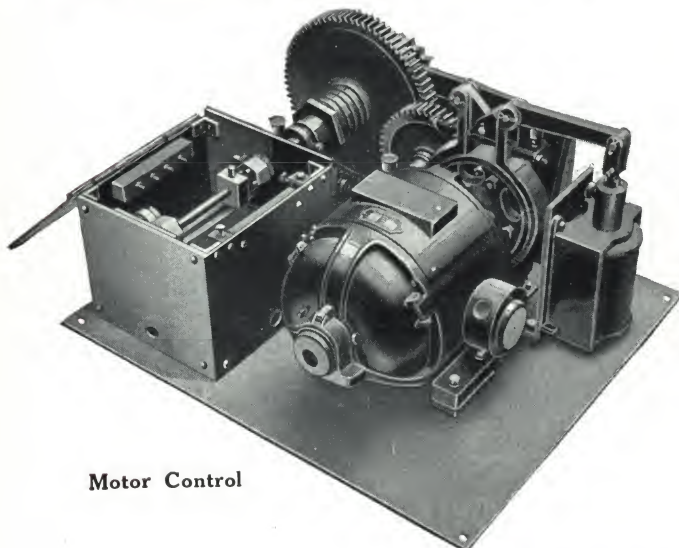
No. 20DM—Non-labeled, Manually Operated



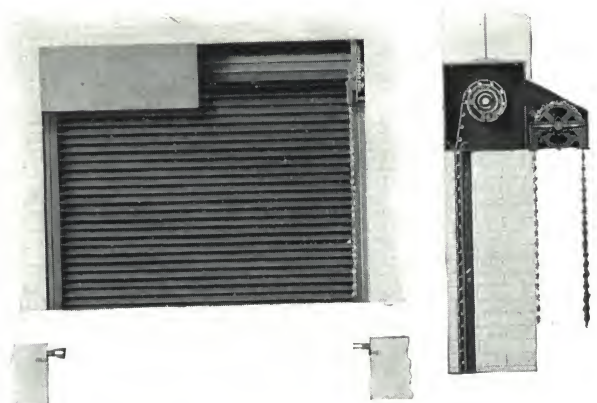
No. 33DM—Labeled, Manually Operated, Automatic Closing



No. 33-33—Labeled, Fire Wall, Manually Operated



Motor Control



No. 41UH—Non-labeled, Exterior, Chain Operated

Variety Steel Rolling Doors

Specifications for Counterbalanced Freight Elevator Doors—Vamanco Varclad Doors

(1) **Freight Elevator Doors**—All door openings to freight elevator, except penthouse doors, shall be counterbalanced doors as sold by VARIETY FIRE DOOR COMPANY and shall be type known as [Vamanco] [Vamanco Hollow Metal] [Varclad] [Varclad Kal-O-Mine].

(2) **Work Furnished by Manufacturer**—The manufacturer shall furnish, freight allowed to freight station nearest building site: (a) all doors complete with guides, roller bearing sheaves, bar locks, trucking sills, bolts, anchors and all necessary hardware to properly secure doors to walls of shaft; (b) drawings and full directions required for erection; (c) all parts to receive priming coat of metallic paint at factory.

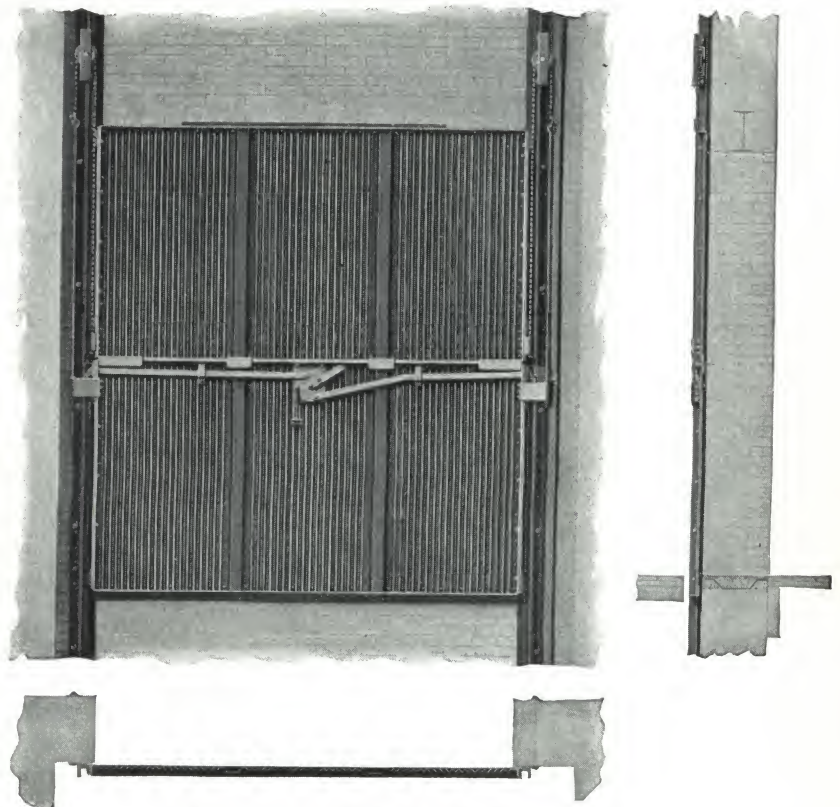
(3) **Underwriters' Label**—All doors shall be approved and labeled by Underwriters' Laboratories, Inc., for "Fire Door for Vertical Shaft."

(4) **Special Lock**—Special lock shall be provided at (ground) floor to permit access to elevator shaft when all doors are closed.

(5) **Operation**—Doors to be manually opened and closed: (a) If electric interlocks are desired add: Each door to be provided with a Varlock operated by bar locks so that when door is *unlocked* the current will be cut off from the car and it will be impossible to run the car until all doors are closed and locked. (b) If full automatic operation is desired add: Door contractor to furnish mechanical operating device to open and close doors automatically by simply pressing button when car is at landing. This device to be full circuit type and to contain interlocks cutting current from car when door is unlocked.

(6) **Trucking Sills**—All doors shall be provided with special design trucking sills (state if for heavy or light duty) so that no part of load passing over doors will be sustained by door mechanism or guides, but will be carried entirely by sill of building.

(7) **Glass Panels**—Each door shall be equipped with a panel 12 in. square, arranged to receive 1/4-in. wire glass (glass by glazing contractor). The glass panels are to be backed by a sliding metal panel, with fuse link for automatic closing and doors must bear the Underwriters' label.

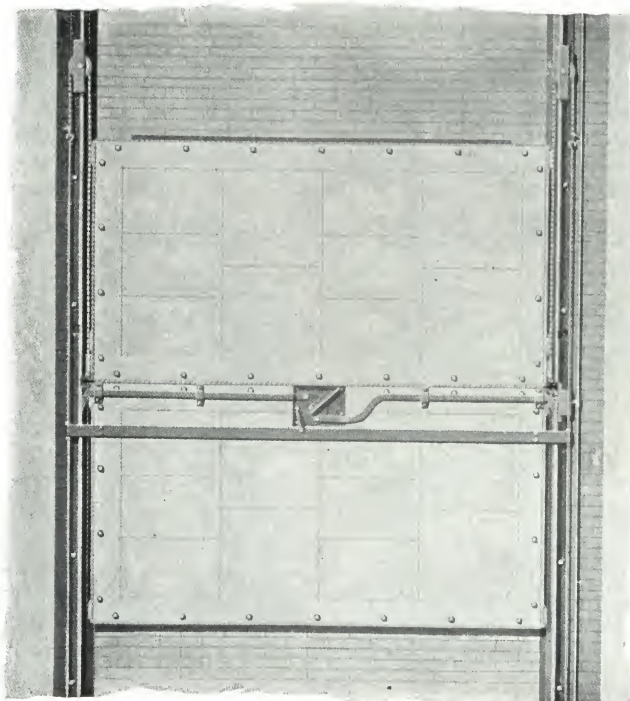


Elevation and Plan of Vamanco Door

(8) **Clearance**—There shall be not more than 1 1/2-in. clearance between door and elevator car at all floors. In case there is any inequality of construction of shaft that will not allow this, the architect will decide whether to cut the masonry or put extension on doors to make correction of same, which is to be charged to contractor who built the shaft.

(9) **Erection**—The manufacturer shall erect the entire equipment in a substantial manner and shall leave the installation in perfect working order.

(10) **Painting**—The contractor shall apply 2 coats lead and oil paint to all parts exposed to view, in colors selected by the architect, as specified under "painting."



Elevation of Varclad Door

COUNTERBALANCED DOORS		A	B	F
CORRUGATED STEEL SINGLE GUIDE LABELLED DOOR	V	3 1/4	2'	
CORRUGATED STEEL STAGGERED GUIDE LABELLED DOOR	A	6	2'	
TIN CLAD-KALOMINE OR HOLLOW METAL SINGLE GUIDE LABELLED DOOR	E	3 1/4	2'	
TIN CLAD-KALOMINE OR HOLLOW METAL STAGGERED GUIDE LABELLED DOOR	S	6 7/8	2'	

RECESS FOR FLUSH TYPE CONTINUOUS TRUCKING ANGLE—F
A-DIMENSION VARIES ACCORDING TO WIDTH OF OPENING. WRITE FOR THIS DIMENSION.

DIMENSIONS FOR LABELLED DOORS	
C	60 63 66 69 70 73 76 79 80 83 86 89 90 100
D	310 315 41 42 44 45 47 48 410 415 51 52 54 510
E	910 102 107 108 114 118 121 125 126 132 137 138 144 1510
S	34 36 37 39 310 40 41 43 44 56 47 49 410 54

SLIDE UP DOORS		A	B	F
COMPOUND SLIDE UP LABELLED CORRUGATED STEEL DOORS	V	6	5'	
COMPOUND SLIDE UP TIN CLAD-KALOMINE OR HOLLOW METAL DOORS	A	1		
SINGLE SLIDE UP DOOR	E	3 3/4	2 1/4	

A-DIMENSION VARIES ACCORDING TO WIDTH OF OPENING. WRITE FOR THIS DIMENSION.

DIMENSIONS FOR LABELLED DOORS	
C	60 63 66 69 70 73 76 79 80 83 86 89 90 100
D	34 35 37 38 310 311 41 42 44 45 47 48 410 415 51 52 54 510
E	94 96 101 105 110 112 117 118 124 126 131 135 138 154

DIMENSIONS SHOWN ON THIS SHEET ARE FOR LABELLED DOORS
DIMENSIONS FOR NON-LABELLED DOORS ARE SLIGHTLY LESS

THE SYKES COMPANY

Manufacturers of Hollow Metal Doors and Trim, and Metal Moldings

2302 West 58th Street

CHICAGO, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

HOLLOW METAL FIRE RESISTING DOORS; INTEGRAL STEEL DOOR BUCK and TRIM; and DRAWN, PRESSED and ROLLED METAL MOLDINGS.

Sykes Hollow Metal Doors for Every Purpose

Sykes Hollow Metal Doors are made in all sizes, styles and finishes to suit the most exacting conditions where appearance, sanitation, and fire resisting qualities are of prime consideration. There are thousands in use on stairways and elevator enclosures, corridors, rooms and offices, in office buildings, hotels, hospitals, apartments, schools, dormitories, clubs, and other buildings.

Sykes Hollow Metal Doors are made of satin finish, cold rolled steel, welded in all joints to form a rigid unit that will not warp or sag under any atmospheric conditions, or under any abuse to which they may be subjected.

All Sykes Fire Resisting Doors are insulated with asbestos and deadened with cork. When fire resisting qualities are not necessary, insulation and deadening material may be eliminated.

Each Sykes Door is thoroughly examined before leaving our factory and every fireproof door carries the underwriter's label.



Sykes Hollow Metal Door

Sykes Integral Steel Door Buck and Trim

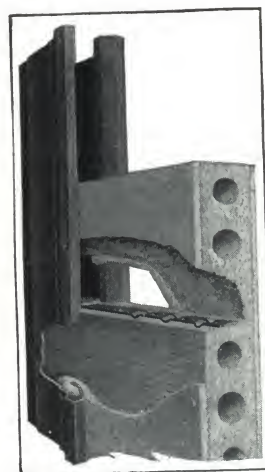
The Sykes Steel Door Buck and Trim is made in all sizes from a single piece of steel, formed through roller dies, and drawn into shape from the flat metal with one operation.

The material used is No. 16 gauge ($\frac{1}{16}$ in.) thick, cold rolled, drawn steel, with smooth finished surface which is sufficiently strong to resist damage by abuse. The miters are butt-welded so that the outside surface is always true and smooth; being of steel, they do not sag, shrink or warp. Dampness does not affect them. They are sanitary, fireproof, and do not become distorted by the weight of masonry. The standard finish is a shop coat of paint, air dried. Special finish can be furnished, consisting of a primary coat baked on as a base, followed by any finishing coat required.

The door bucks are set up and fastened in the partition by insertion of tile or macolite clear into the back of the jamb. Adjustable anchors are provided so as to be inserted at intervals in the points of the tile, thereby insuring a permanent rigid installation. Special designs to conform with other trim can be made if desired, although we have many standard designs which conform to architectural practice.

Economy—We claim a great saving of field labor over the practice followed in the installation of wood jambs, buck and trim. When the steel buck is satisfactorily built in, all work in connection with the door opening is completed.

Sykes Integral Door Buck and Trim costs approximately 20% less to install. It is cheaper than wood, more easily installed, fireproof, sanitary, rigidly built, made in one piece, no molding or strips to attach.



Sykes Integral Steel Door Buck and Trim

Sykes Cold Drawn Steel Moldings and Shapes

Sykes Cold Drawn Steel Moldings and Shapes are manufactured for a variety of purposes, and used by the metal and building trades, as well as by manufacturers of metal specialties.

Sykes Moldings are cold drawn from high grade steel, being either sharp or rounded. The surfaces have a bright and smooth finish that will accept paint or enamel coats perfectly.

Our factories are equipped to furnish mullion, pilaster, window and miscellaneous casings, panel and stop moldings, coves, base or foot molds, picture moldings, cornices, cornice friezes, chair rails, sills and in fact, we produce a metal trim for building purposes that takes the place of wood, being more sanitary, substantial and fireproof.

Special shapes and moldings can be manufactured, and drawings will be submitted to architects and others interested for their approval, from any rough sketches furnished to us. Quotations furnished upon request.

Service

THE SYKES COMPANY has representatives in the principal cities. Wherever an architect may be located, the Sykes Engineering Department is always glad to be of service in the way of details, drawings and suggestions. Send for bulletins specially designed for your files.

ARCHITECTURAL METAL PRODUCTS, INC.

FORMERLY THE PROBERT SHEET METAL CO.

Manufacturers of "Leedor" and A.M.P. Metal Covered Doors

FACTORY AND MAIN OFFICE

COVINGTON, KY.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

METAL COVERED DOORS, FRAMES and TRIM.

BRONZE and COPPER COVERED DOORS.

HOLLOW METAL FRAMES.

Also Elevator Doors, Metal Covered Partitions and Smoke Screens.

For Marquise, see page A744.

"Leedor" (Pat. applied for), an Improved Metal Covered Door

The "Leedor" is an innovation in metal covered door construction and has been pronounced one of the greatest improvements made since the inception of metal covered doors. Note illustration below showing stile covering and panel moulding formed from one piece of metal—the whole being so formed that when it is slipped over the wood core the moulding is forced tightly against the panel.

Specifications—The metal covered doors shall be "Leedor" as manufactured by the ARCHITECTURAL METAL PRODUCTS, INC., Covington, Ky.

Cores—The wood core shall be of the best grade white pine, thoroughly seasoned and free from loose

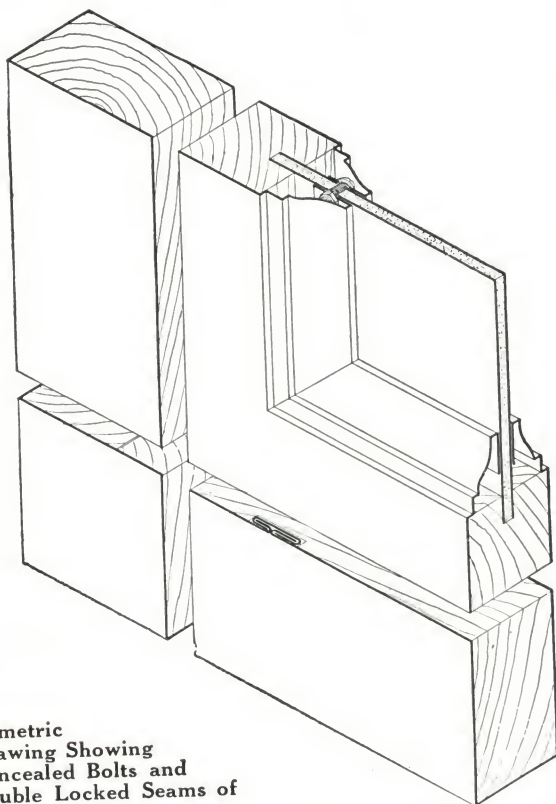
knots, resin, shakes and dry rot. All core members to be run through a size moulder to insure absolute uniformity. The core members shall then be assembled with the rails offset into the stiles and all members shall be securely fastened together in such a way as to eliminate the possibility of the core warping or twisting.

Metal Coverings—The metal covering shall be of No. 26 gauge galvanized iron sheets. The stile and rail coverings shall be formed with the panel moulding as an integral part thereof. These coverings shall then be neatly fitted over the cores and the panel moulding shall be securely fastened to the panel by means of bolts concealed under the face of the moulding. No fastenings, such as nails, screws, etc., shall appear on the face of the panel moulding.

Gluing—After assembling the cores they shall be thoroughly covered with special glue before the metal covering is applied. After applying the metal covering the doors shall be put under heavy pressure, which is to be maintained for at least eight hours, so that all surfaces of the finished door will be absolutely free of buckles, blisters or waves. All finished doors to have perfectly flat and smooth surfaces and the metal covering must adhere securely and permanently to the cores.

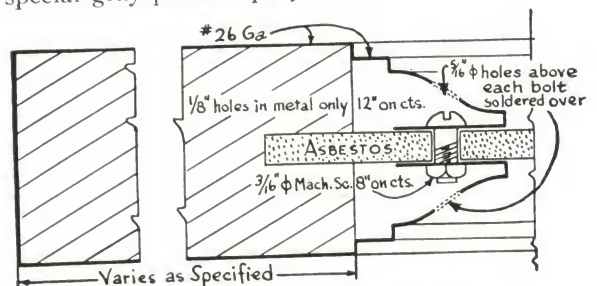
Seams—Metal covering to be securely fastened together at the joints by flat locked seams, sweated with solder and scraped smooth to a flat even surface. In no case shall a seam in the metal occur over a joint in the core.

Painting—All finished doors to receive a shop coat of special gray primer sprayed on.



Isometric Drawing Showing Concealed Bolts and Double Locked Seams of "Leedor"

Bolts are inserted in holes drilled through face of the moulding and afterward soldered over and scraped smooth to the contour of the moulding. This process produces a door neat in appearance and eliminates all visible panel moulding fastenings



SECTION OF STILE WITH A SOLID PANEL

Construction of the "Leedor"

Patent applied for
This detail shows construction of the "Leedor." In case of fire, the air space in the moulding permits gases from the burning core to expand and escape through holes in the moulding after solder has melted away

Underwriters' Label Service—The "Leedor" can be furnished either with or without the Underwriters' Label.

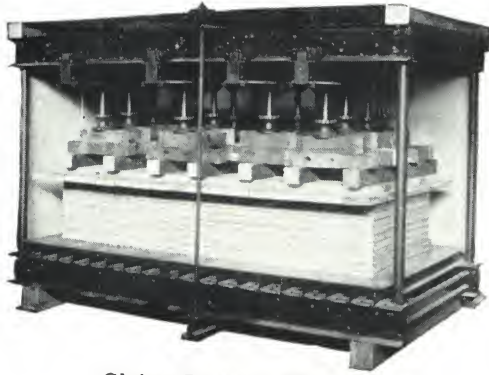
A. M. P. Doors

We also manufacture the A.M.P. Door which has the drawn kalamein moulding applied to the panels with nails or screws. These can be supplied when so specified, but we recommend the "Leedor" as it makes for better appearance.

Continued on next page

Our Gluing Process

A special casein glue has been made for us which makes a perfect bonding agent between the metal covering and the wood core. All metal coverings are glued to the cores under a pressure of over 2000 lb. per sq. ft. maintained for at least 8 hours. This insures perfectly smooth flat surfaces, free from buckles, blisters or waves.



Gluing Press in Operation

Copper and Bronze Covered Doors

We are especially equipped to produce copper and bronze covered doors of the highest grade.

Intelligent and careful workmen are in charge of this department and they take pride in producing excellent products. These men are thoroughly experienced in the handling and fabricating of copper and bronze with the result that only the finest finished products are produced.

We have manufactured many entrance doors for some of the finest buildings to the complete satisfaction of the most particular architects.

Hollow Metal Frames

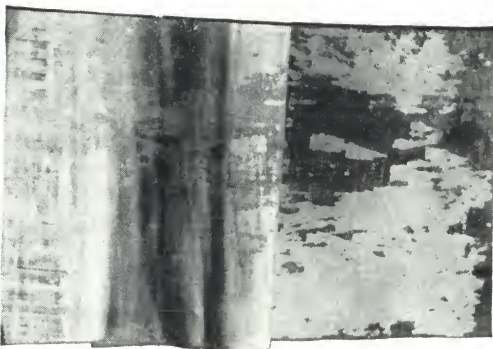
We are producing formed steel frames and can supply them in connection with our doors when required. These can be furnished either with or without the Underwriters' labels.

Estimates

Estimates will be cheerfully and promptly given upon receipt of proper information. Special designs will be given particular and careful attention.

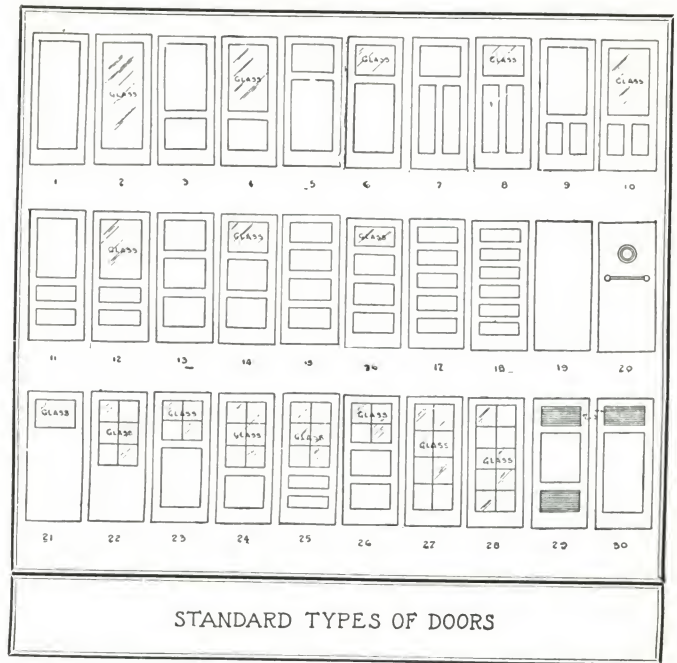
Engineering Service

We maintain an efficient engineering department which will prepare drawings for approval on all orders.



An Unretouched Photograph

Showing metal covering pulled away from core. Note the perfect bond accomplished by our exclusive gluing process. The light spots are the galvanizing which has been pulled from the metal. The dark spots are pieces of the wood core pulled away.



Some Recent Installations

Office and Store Buildings

Equitable Building, Philadelphia, Pa.
Amarillo Office Building, Amarillo, Tex.
Whitehead Building, Atlanta, Ga.
A. B. Frank Building, San Antonio, Tex.
Barrone Realty Company Building, New Orleans, La.
Brown Mercantile Building, Louisville, Ky.
Globe Building, Des Moines, Iowa

University, School and Library Buildings

Anatomy Building (University of Tennessee), Memphis, Tenn.
Wildwood High School, Wildwood, N. J.
St. Hedwig's School, Philadelphia, Pa.
Girls' Catholic High School, Philadelphia, Pa.
Senior High School, Marshalltown, Iowa
Library Building, Topeka, Kan.
Chemical Laboratory, Tuscaloosa, Ala.
Brookfield High School, Brookfield, Ohio

City and County Buildings

St. Joseph's City Hall, St. Joseph, Mo.
Cherokee County Courthouse, Murphy, N. C.
Surrogate's Office and Courthouse, Mays Landing, N. J.

Lodge and Hotel Buildings

Scottish Rite Temple, Montgomery, Ala.
Masonic Pavilion, Charlottesville, Va.
Roosevelt Hotel, St. Louis, Mo.
Chipola Hotel, Marianna, Fla.

Hospitals

U. S. Veterans Hospital, Sunmount, N. Y.
U. S. Veterans Hospital, Fort Snelling, Minn.
U. S. Veterans Hospital, Augusta, Ga.
U. S. Veterans Hospital, North Chicago, Ill.
Christ Hospital, Topeka, Kan.
St. Joseph's Hospital, Phoenix, Ariz.

Miscellaneous Buildings

American National Bank, Sarasota, Fla.
Monongahela City Trust Co., Pittsburgh, Pa.
Keith-Albee Theater, Youngstown, Ohio
Central Square Garage, Youngstown, Ohio
Alabama Power Company, Birmingham, Ala.
New Forest Theater, Philadelphia, Pa.
Waverly Theater, Philadelphia, Pa.
Manor Theater, Philadelphia, Pa.

A. C. CHESLEY CO.

Manufacturers of Standardized Fireproof Metal Covered Doors

MAIN OFFICE AND FACTORY

704 East 133rd Street
NEW YORK, N. Y.

TELEPHONE

LUDLOW 1321, 1322

Products

CHESLEY STANDARDIZED FIREPROOF METAL COVERED DOORS, DOOR TRIM, DOOR FRAMES and CHESLEY BUCK.

Also, Metal Covered Work of the Highest Quality in Bronze, Brass, Copper, Long Terne (Kalamein) and Galvanized Iron; Tin Clad Fire Doors.

Chesley Standardized Fireproof Doors

Shipped from Stock—These doors are produced in large quantities, thus cutting cost to a minimum. Large stocks are carried in various distributing points throughout the country, giving the advantage of *immediate delivery*.

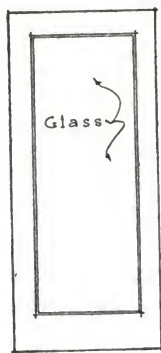
Standardized—Chesley fireproof doors are standardized as to construction, sizes and styles.

Construction—Cores are made of well seasoned, kiln dried white pine with stiles and rails mortised and tenoned and glued together. Solid panels are lined with asbestos compo. Panel moulds are integral with the

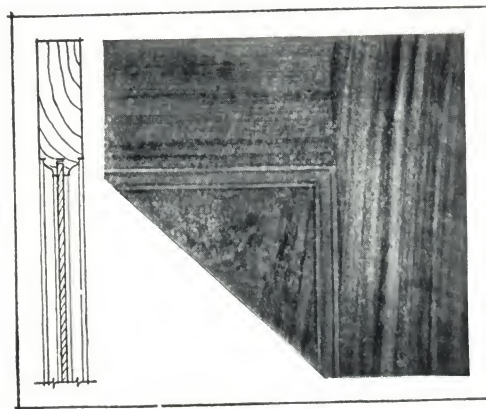
stiles and rails. All joints are *lock joints* with no bolts, rivets or screws (excepting for muntins) used in the construction. Every part of the wood core is covered, and there is no possibility of water or moisture getting into contact with the wood to cause swelling. In glazed construction the glazing strips are placed on the interior with the integral mouldings on the exterior, thus preventing mouldings becoming loose due to exposure. Joints between stiles and rails are *lock joints* with the surface joint soldered and smoothed off, producing practically an invisible connection (see detail showing the superiority of the Chesley lock joint over the ordinary method of construction). The mouldings are clean cut, producing a neat, light, strong door.

Uses and Approval—Chesley doors are for use wherever fireproof doors are required for the following locations: From corridors to rooms; staircase enclosures; elevator shafts. When required, the Underwriters' Laboratory, Inc. label can be furnished.

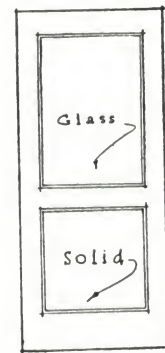
These doors have been extensively used in office



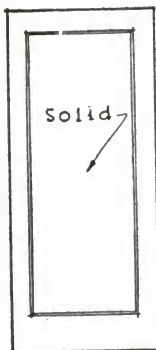
TYPE AS



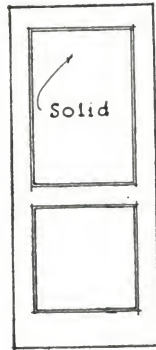
DETAIL OF CHESLEY FIREPROOF DOOR



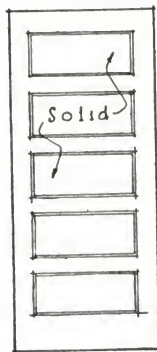
TYPE BS



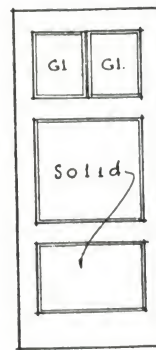
TYPE A



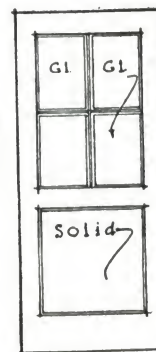
TYPE B



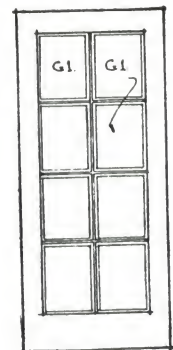
TYPE D



TYPE CS



TYPE ES



TYPE FS

CHESLEY STANDARD FIREPROOF (METAL COVERED) DOORS

buildings, apartment houses, hospitals, schools, industrial plants, etc..

Appearance—In appearance, Chesley doors when painted or grained differ hardly at all from wood doors but afford the absolute fire protection of solid steel doors. Cost less than one-third more than the common wood door and from 50% to 100% less than hollow metal doors.

Types—Made in 8 standard types (see illustrations). Detached astragals which can be easily applied at the job are furnished for double doors (see detail).

Sizes—Made in 8 standard sizes as indicated in the following table. The dimensions given are the actual out and out sizes of the door. *Allowance should be made for saddles in setting door frames.*

Door size 2 ft. 6 in. x 6 ft. 8 in. or 7 ft. x 1 $\frac{3}{4}$ in.

Door size 2 ft. 8 in. x 6 ft. 8 in. or 7 ft. x 1 $\frac{3}{4}$ in.

Door size 2 ft. 10 in. x 6 ft. 8 in. or 7 ft. x 1 $\frac{3}{4}$ in.

Door size 3 ft. 0 in. x 6 ft. 8 in. or 7 ft. x 1 $\frac{3}{4}$ in.

Material of Covering—Chesley doors are covered with No. 26 gauge long terne plate (commonly known as kalamein iron) or with No. 26 gauge galvanized iron. Galvanized iron work is recommended for exterior work only.

Hardware and Glazing—Any type of hardware can be easily fitted at the job by any competent carpenter.

No glass is furnished by the Chesley Co. Any type of glass can, of course, be easily set at the job.

Priming—Chesley doors (also stock trim and door frames) are primed at the factory with the best quality metallic priming coat.

Chesley Buck

This is a new metal covered, standardized one-piece

fireproof buck, that saves time and money. It is carried in stock in sizes to fit the Chesley standardized fireproof doors, sizes of which are listed in opposite column.

The Chesley buck is sealed by machinery in a sheathing of laminated metal—no nails in its one-piece construction. Highly rated by the National Board of Fire Underwriters and built to conform to requirements of all building laws.

A non-corrosive metal of 26 gauge is used over a white pine core. Metal takes any kind of paint and saves at least one coat.

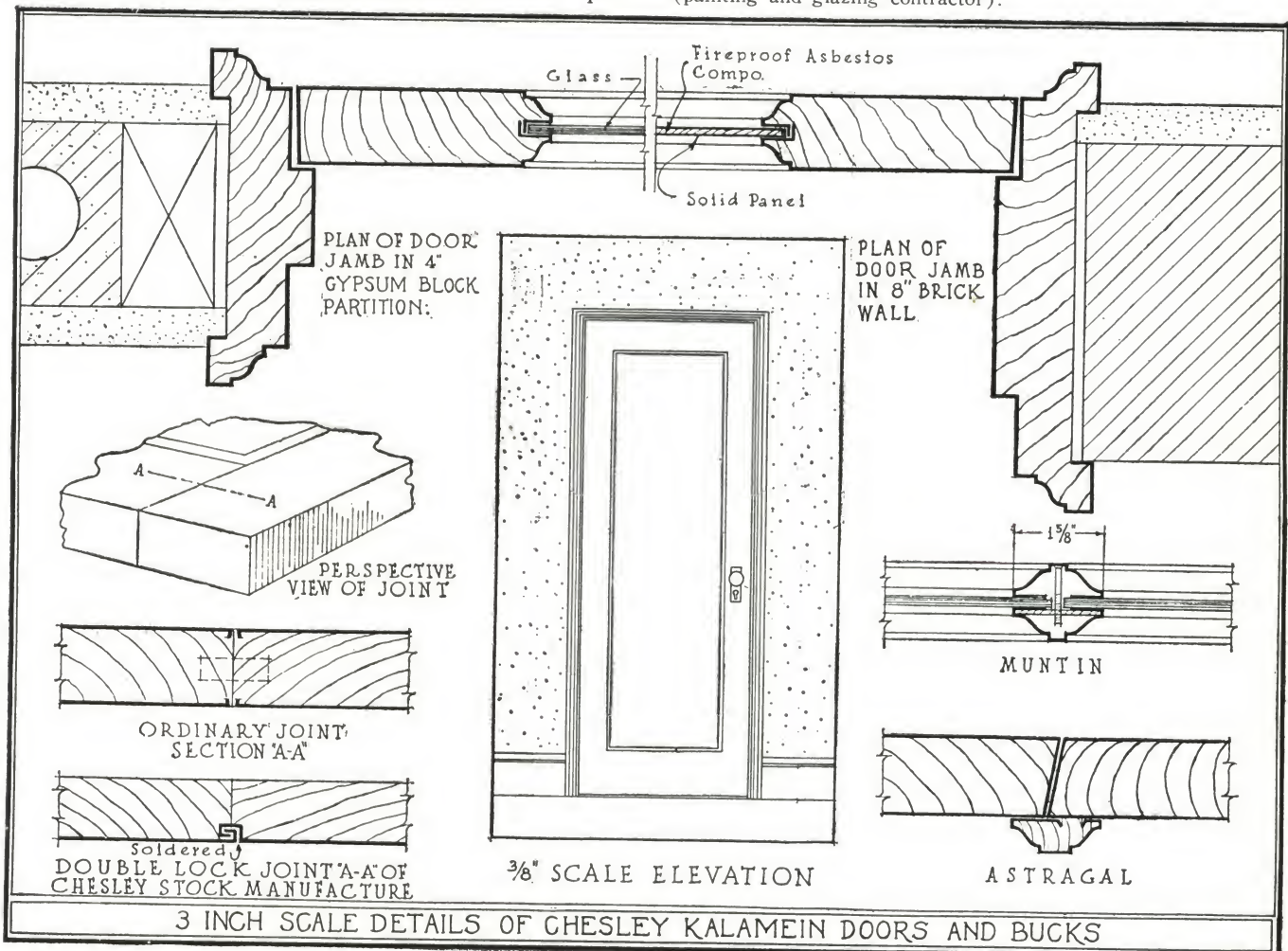
Chesley buck has reduced building costs tremendously. It is handled and set as one piece. It saves time in delivery, handling, cutting and mitering and assembling.

It makes a better job and costs considerably less. Open miters are avoided as miters are welded at factory. Costs about the same as wood frames. Every stock size immediately available. It is used throughout the building in place of wood frames as wood doors may be hung to same as easily as metal door.

A variety of unusual attractive patterns. Special patterns to architects' specifications.

Specifications

Fireproof Doors—All fireproof doors throughout (mention location) (or marked "FP" on drawings) shall be metal covered doors as manufactured by A. C. CHESLEY Co., 704 East 133rd Street, New York, N. Y., of dimensions indicated on the drawings. (Architect should refer to table for stock sizes.) Doors marked "GL" on drawings shall be Type (mention type). Solid doors shall be Type (mention type). Interior doors shall be covered with long terne plate. Exterior doors shall be covered with galvanized iron. Doors to be hung by and all hardware to be furnished and fitted by the (carpenter contractor). All glazing and painting, excepting priming coat, to be done by the (painting and glazing contractor).



EMPIRE FIREPROOF DOOR CO.

EMPIRE KALAMEIN CO., INC., SUBSIDIARY

Metal Covered Doors, Windows and Trim; Steel Clad Portable Office Partitions

Southern Boulevard at 145th Street
NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 3727 Northwestern Avenue

CLEVELAND, OHIO, 308 Euclid Building

Write to Home Office for Address of Nearest Representative

Products

METAL COVERED KALAMEIN DOORS (Underwriters' Labeled), WINDOWS, DOOR FRAMES and TRIM, ELEVATOR FRONTS, SMOKE SCREENS; STEEL CLAD PORTABLE OFFICE PARTITIONS.

Also manufacturers of Underwriters' Labeled Tin Clad Fire Doors.



"Empire Commercial" Metal Covered Doors

Through years of specialization in the manufacture of metal covered work, we have evolved a product in which we take just pride—the "Empire Commercial" metal covered door, suitable for any class of fireproof work.

Details—Cores—Sound kiln dried white pine milled in one piece, sanded and finished accurately, for cores of stiles and rails.

Covering—Long terne or galvanized or furniture steel of No. 24 gauge. Drawn on through steel dies; sharp angles and arrises; tight and free from waves and buckles.

Panels—To be three-ply laminated pine meeting requirements of all city and state building departments.

Assembly—Doors are mortised and tenoned, wedged and glued or doweled. Seams soldered and scraped by our own process, producing a perfect and smooth surface. Under ordinary use seams are guaranteed not to split.

Finish—All material receives one coat of special metallic primer.

Underwriters' Labeled Doors

Paneled metal clad swinging doors may be used for openings in vertical shafts, corridor or room partitions, exterior walls, and fire escape exits when provided with special hardware. Size when mounted singly, not exceeding 4 ft. x 8 ft. In pairs, not exceeding 7x8 ft. Doors must be hung to angle iron, channel iron or hollow metal jambs.

Empire Metal Covered Windows

Double hung or casement type windows are made in our standard design, or they will be manufactured to meet special conditions. The construction follows, in general, the strictest standard requirements. Great care is taken to secure tight seams and joints to counteract the natural effects of exposure.

Empire Integro Window—Details are the same as described for the standard window, with the addition of special interlocking features which combine to produce all the effect of a weatherstripped window.

Empire Bronze Doors

Bronze doors are now built in a more substantial and more attractive manner by using extruded bronze panel mouldings and edge pieces. These solid bronze pieces, which are 1/8 in. thick, are used around both sides, the top and bottom of the door and for all panels, both solid and glass. They are put on with concealed brass screws in all places except the moulding on the removable side.

The stiles and rails of the doors, which are kiln dried white pine 1 1/4 in. thick, are covered with No. 18 gauge bronze. The cores of the panels are 3-ply laminated pine. The seams between the stiles and rails are invisible.

Empire Copper Doors

It is wise to use an "Empire Copper Kalamein Door" for exterior openings as the chemical composition of copper is such that will enable it to withstand the elements far better than iron or steel.

Empire Metal Covered Smoke Screens

For enclosing stair halls, and corridors, we manufacture in any design to meet any condition.

Empire Metal Covered Elevator Fronts

Kalamein elevator fronts are being used more extensively now than ever before, because the solid core feature makes it practically the only fireproof elevator door which can be operated quietly.

The tinny metallic rattling sound so common in metal sliding doors is absent in kalamein as the wood core acts as a sound deadener.

Empire Steel Clad Portable Office Partitions

Made of standardized interchangeable units, assembled with screws and adjustable to meet ceiling conditions. It is portable, and can be readily taken down and relocated by a carpenter or maintenance man.

It is sold knocked down or completely erected.

Details and specifications on request.

Empire Service

"We can duplicate in kalamein any door that can be designed in wood."

This company is always ready to co-operate with the architectural profession.

We are ready at all times to suggest details or to furnish technical information in relation to our products.

Catalogues sent on request.

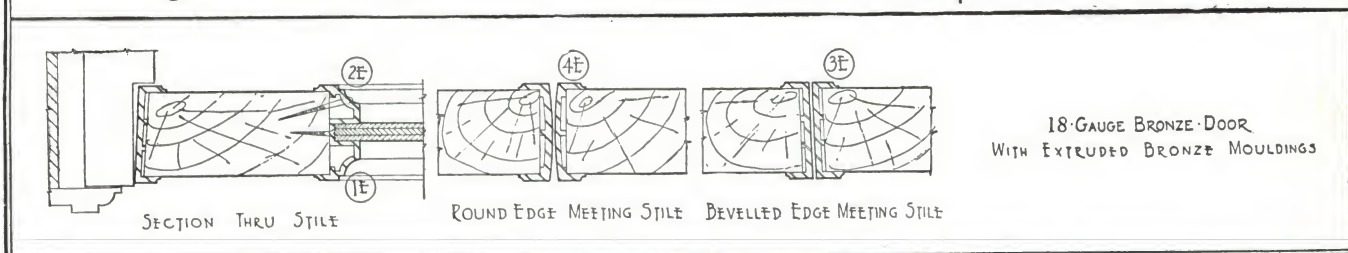
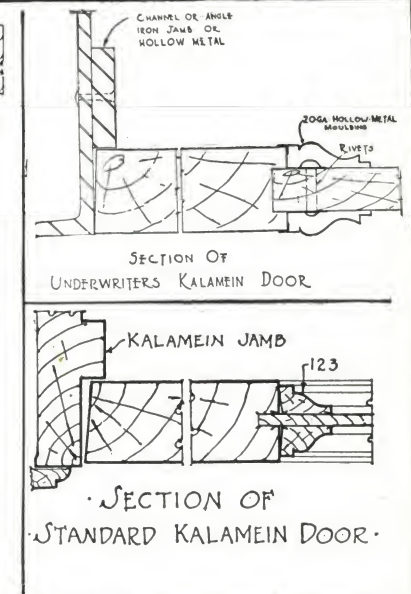
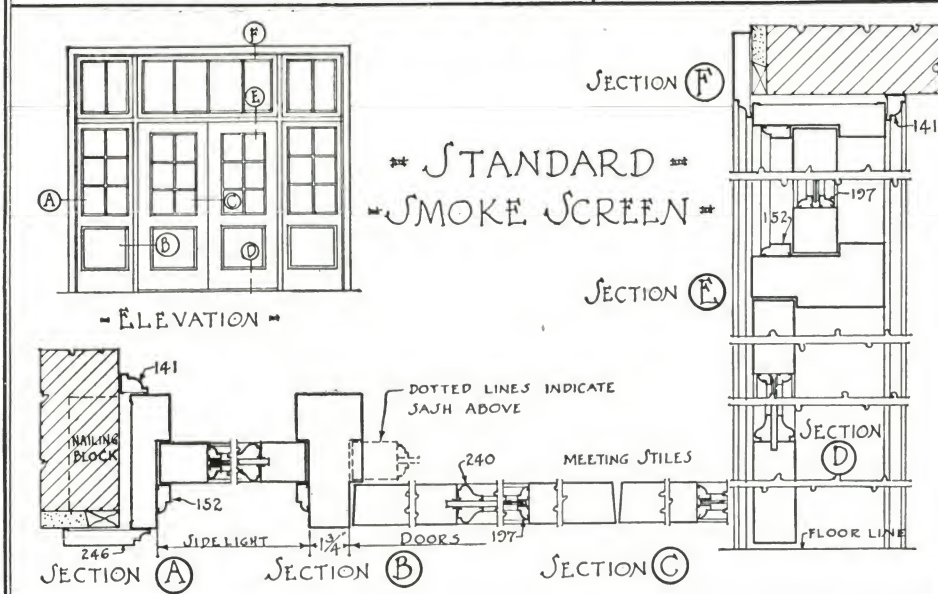
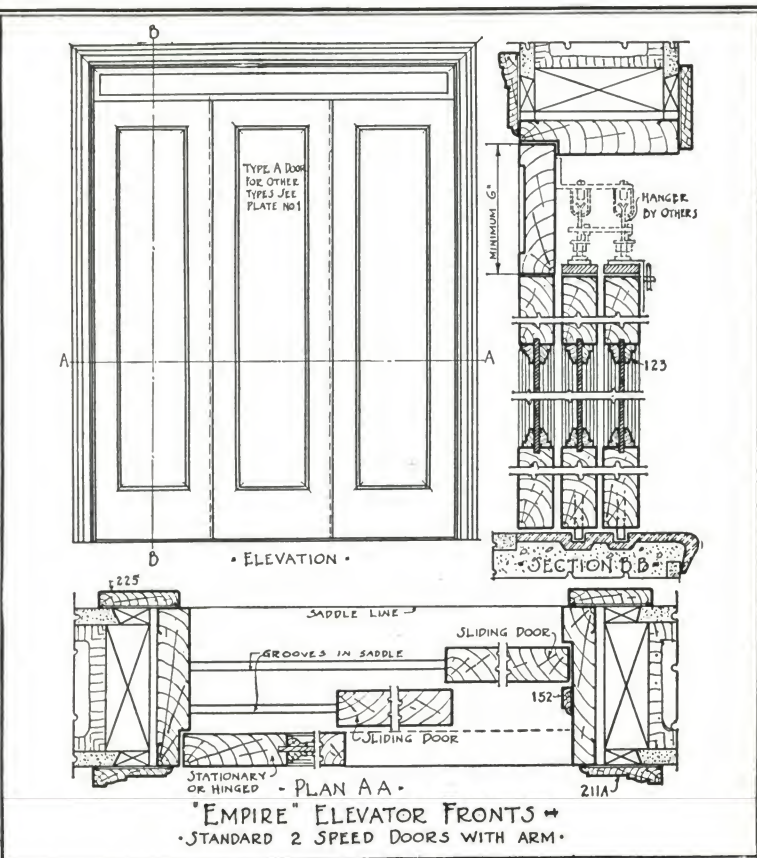
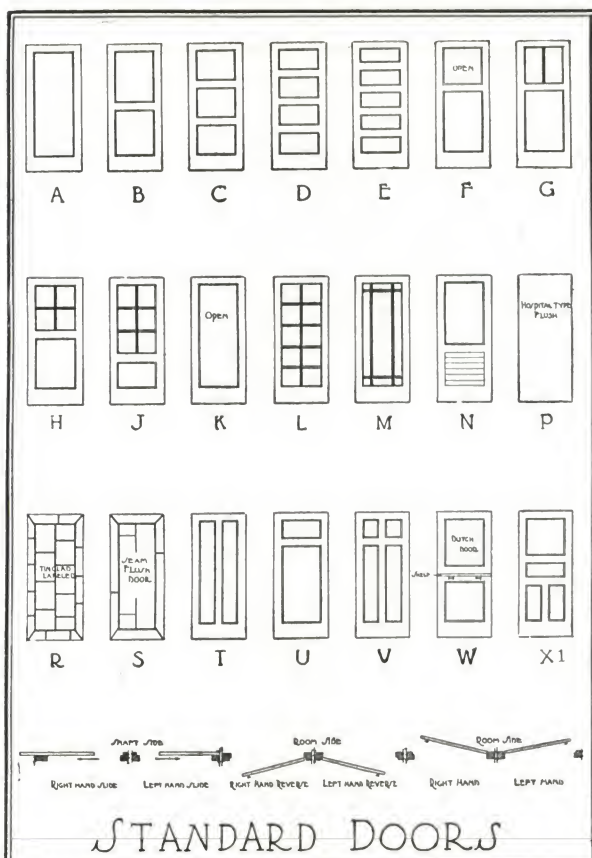


Doors in Dutch Reformed Church, Brooklyn, N. Y.

MEYER & MATHIEU, Architects
WALTER KIDDE CO., Builders

References

E. Gerli & Co., New York, N. Y.
Washington National Bank, Washington, Ind.
Vermilion County Courthouse, Newport, Ind.
Butler Savings & Trust Bank, Butler, Pa.
Monongahela National Bank, Brownsville, Pa.
Fourth National Bank, Atlanta, Ga.
State Bank of Carthage, Carthage, Ind.
Logansport City Hall, Logansport, Ind.
Junior High School, Camden, N. J.
Peoples Bank of Potsdam, Potsdam, N. Y.
National Reserve Life Insurance Co., Topeka, Kan.
Paseo High School, Kansas City, Mo.
Central Junior High School, Kansas City, Mo.
Northport Trust Co., Northport, L. I., N. Y.
Falls National Bank, Niagara Falls, N. Y.
First National Bank, Wytheville, Va.
Galena Signal Oil Co., Galena, Tex.
Y. M. C. A., Asheville, N. C.
Jerome High School, Phoenix, Ariz.
University of Wyoming, Casper, Wyo.
Adams School, Youngstown, Ohio
James Madison High School, Brooklyn, N. Y.
James Monroe High School, New York, N. Y.
Girls Commercial High School, Brooklyn, N. Y.
Julia Richman High School, New York, N. Y.



DRAWN BY EMPIRE FIREPROOF DOOR CO., INC.	STANDARD DETAILS EMPIRE FIREPROOF DOOR CO., INC.	SCALE 1 1/2" & 3"	DRWG.
		EQUALS 1 FT.	1
		DATE JUNE 25	

FIRECRAFT CORPORATION

TELEPHONES
SEELEY 6490, 10082

Manufacturers of Fireproof Doors

2229-2233 South Ogden Avenue, CHICAGO, ILL.

Products

We manufacture a complete line of FIREPROOF DOORS of every description.

All doors are approved by the National Board of Fire Underwriters' and Factory Mutuals. All doors are labeled by the Underwriters' Laboratories, Inc.

"Firecraft" Type Numbers

Hollow metal doors, Nos. 100 to 199.
Kalamein doors, Nos. 200 to 299.
Steel fire doors, Nos. 300 to 500.
Freight elevator doors, Nos. FB1 to FB50.
Dumbwaiter doors, Nos. FDW1 to FDW10.
Passenger elevator doors, No. PE1 to PE99.
Tin clad doors, Nos. 550 to 599.
Steel plate doors, Nos. 600 to 650.
Storeroom doors, No. 900.

Various Types of "Firecraft" Hollow Metal Doors

Type No. 100, single panel door with "C" finish.

Type No. 195, two raised center octagon panels with corner and side depressed panels. Finish "D" weathered English oak, ornamented with flowers in depressed side panels.

Type No. 136, hollow metal entrance doors to school; has raised panels and recessed mouldings.

Type PE88A, passenger elevator door; single sliding 8 glass panel. We make these doors in all types and designs.



Type No. 136 "Firecraft" Door



Type No. 100 "Firecraft" Door



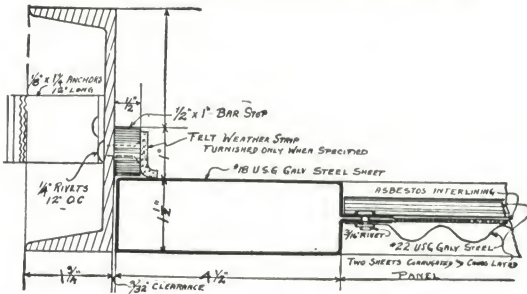
Type 195 "Firecraft" Door



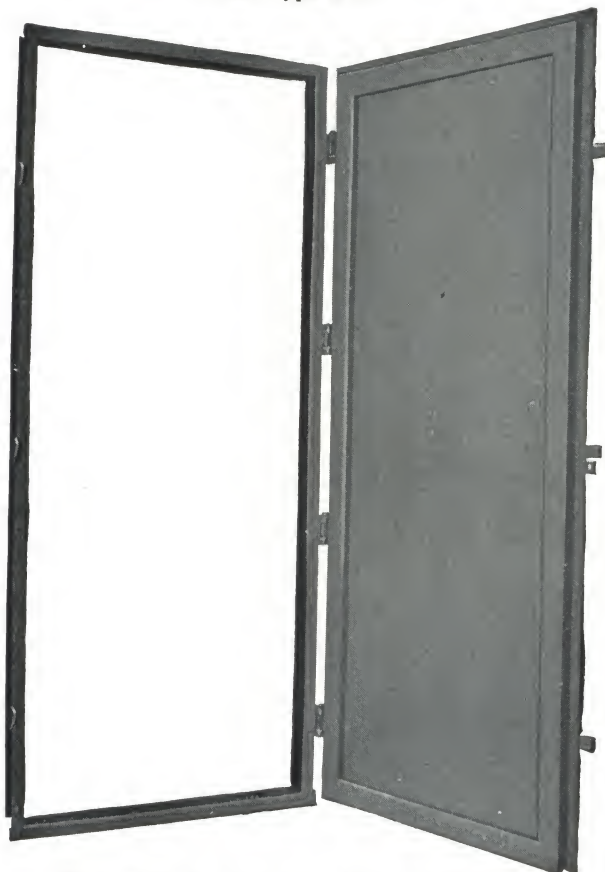
Type PE88A "Firecraft" Door



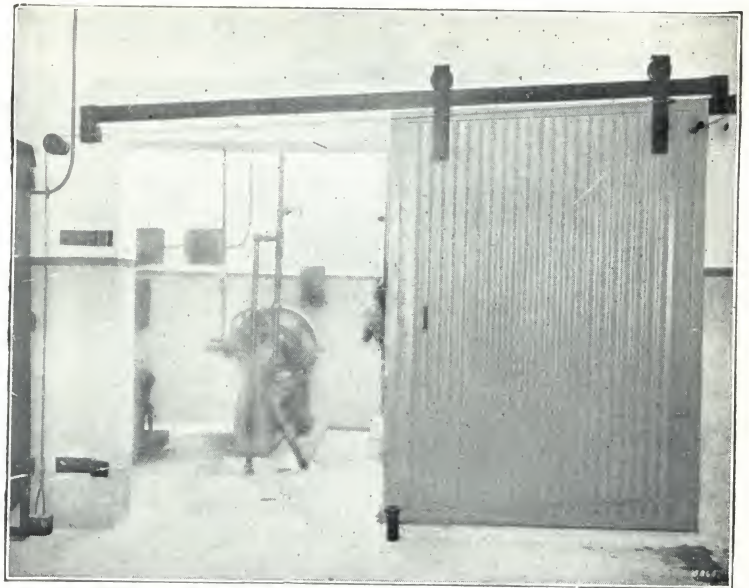
"Firecraft" Type No. 500 Stair Door
Made of galvanized steel with mortised hardware



Section Through Door and Jamb, "Firecraft"
Door Type 500



"Firecraft" No. 900 Door Open, Inside View
Note clear, smooth, easily cleaned surfaces



"Firecraft" Single Sliding Gravity Type Door No. 400
Overlapping wall 4 in. at sides and top. Automatic hardware

"Firecraft" Type Nos. 300 to 500 Doors (Patented)

Construction—Doors are constructed of two layers of cross-layed steel sheets, galvanized and corrugated, interlined with asbestos. The edges are riveted to heavy galvanized steel stiles and rails. Made in all types—swinging, sliding, slide-up and turn-over, etc.

Advantages—"Firecraft" 300 to 500 doors are fireproof, strong, rigid, and comparatively light in weight, and as easily operated as ordinary wood doors.

Not subject to dry rot, as in case of tin clad doors.

"Firecraft" Type No. 900 Doors Underwriters' Labeled

"Firecraft" Type No. 900 doors are designed particularly for storerooms of storage warehouse, but may be used for penthouse and exterior openings. They are a distinct departure from the customary storeroom doors as they are rigid and yet not unwieldy. The outside is ruggedly protected with heavy strap hinges, butts, latches, etc., while the inside surface is clear and easily cleaned with no projecting cross bars to catch dust.



**"Firecraft" No. 900 Door Closed
Outside View**
Note strong hinges, etc.

E. H. FRIEDRICH COMPANY

Manufacturers of Metal Covered Doors, Windows, Partitions and Trim
HOLYOKE, MASS.

REPRESENTATIVES

BOSTON, MASS., RUBIN-BURKE Co., 333 Washington Street
NEW HAVEN, CONN., A. R. KIRSCHNER Co., Plymouth Building
NEW YORK, HAEFNER & HARDING, 562 Broadway, ALBANY, N. Y.
BALTIMORE, MD., CONSOLIDATED SUPPLY Co., 10 West Chase Street
PHILADELPHIA, PA., CONSOLIDATED SUPPLY Co., 1519 Diamond Street
WASHINGTON, D. C., CONSOLIDATED SUPPLY Co., Bond Building
SCRANTON, PA., LEBAR EVANS & ALLEN, 807 Board of Trade Building

Products

High grade KALAMEIN (METAL COVERED) WOODWORK for fireproof and sanitary purposes, including Doors and Trim, Windows, Partitions, etc., in Kalamein, Copper, Bronze and Steel; FIREPROOF HOLLOW METAL WINDOWS with Underwriters' label.

Also manufacturers of a general line of Building Sheet Metal Work.

Facilities and Workmanship

Our factory is especially well equipped to produce any design in high grade metal covered woodwork or hollow metal windows, suitable for buildings such as banks, public office and school buildings.

This work can be executed promptly and efficiently.

High Grade Metal Covered Entrance Doors

The manufacturing of highest grade metal covered entrance doors is our specialty. They are made in copper or commercial bronze.

Finish

All bronze and copper work is properly cleaned with acid and oiled or oxydized before it leaves the factory to prevent corrosion, or finished to comply with architect's requirements.



TRADE-MARK

Kalamein products are cleaned and painted with one coat of special metal primer.

Metal Covered Mouldings

In order to economize in designing metal covered work, a number of standard stock mouldings for panels, trim, etc., have been shown at the scale of 3 in. to the foot.

By using these mouldings the cost of special dies is saved.

Kalamein Elevator Doors

We make a specialty of metal covered elevator doors in kalamein, copper or bronze.

These are furnished in three types: swing, slide, or combination slide and swing, and in any design. Mouldings to be standard to fit our dies.

Doors can be furnished complete with hardware.

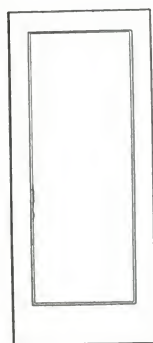
Specifications for Kalamein Doors and Smoke Screens

Where indicated on plans, doors, jambs, trim, side lights, transoms, etc., shall be kalamein.

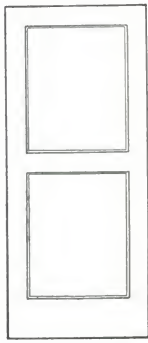
All metal used for covering shall be "Keystone" copper steel. No. 26 gauge to be used for stiles, rails, jambs and panels, and for all sash and trim, and No. 28 for all moulding.



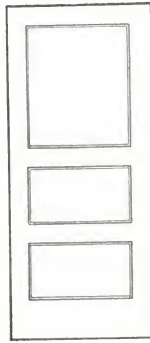
A Friedrich Metal Covered Door
Hardware applied at factory



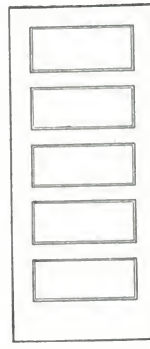
1 PANEL



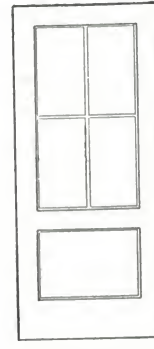
2 PANEL



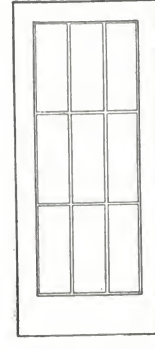
1 LIGHT 2 PANEL



5 PANEL



4 LIGHT, 1 PANEL



9 LIGHT

Note:--Special Designs made to order

DETAILS SHOWING STOCK KALAMEIN DOOR DESIGNS

All cores shall be made up from clear kiln dried white pine, free from loose knots, sap and shakes.

All cores shall be milled true to form. All stiles over 6 in. wide shall be built up of small strips glued together. All door stiles and rails shall be mortised, tenoned, and glued together.

All door stiles, sash, jambs, mouldings, muntins and trim shall be drawn through steel dies. All mouldings and edges shall be clean, sharp and true to detail with metal fitting closely to wood cores.

Special care must be used in assembling to avoid bench marks as much as possible.

All joints between metal shall be filled with solder and scraped flush.

After work is assembled all metal surfaces shall be thoroughly cleaned, with oxide of iron, of grease and all foreign substances, and given one coat of special metallic primer sprayed on even and smooth.

Hollow Metal Windows

A complete line of hollow metal windows, underwriters' label, of all types is manufactured by this company.

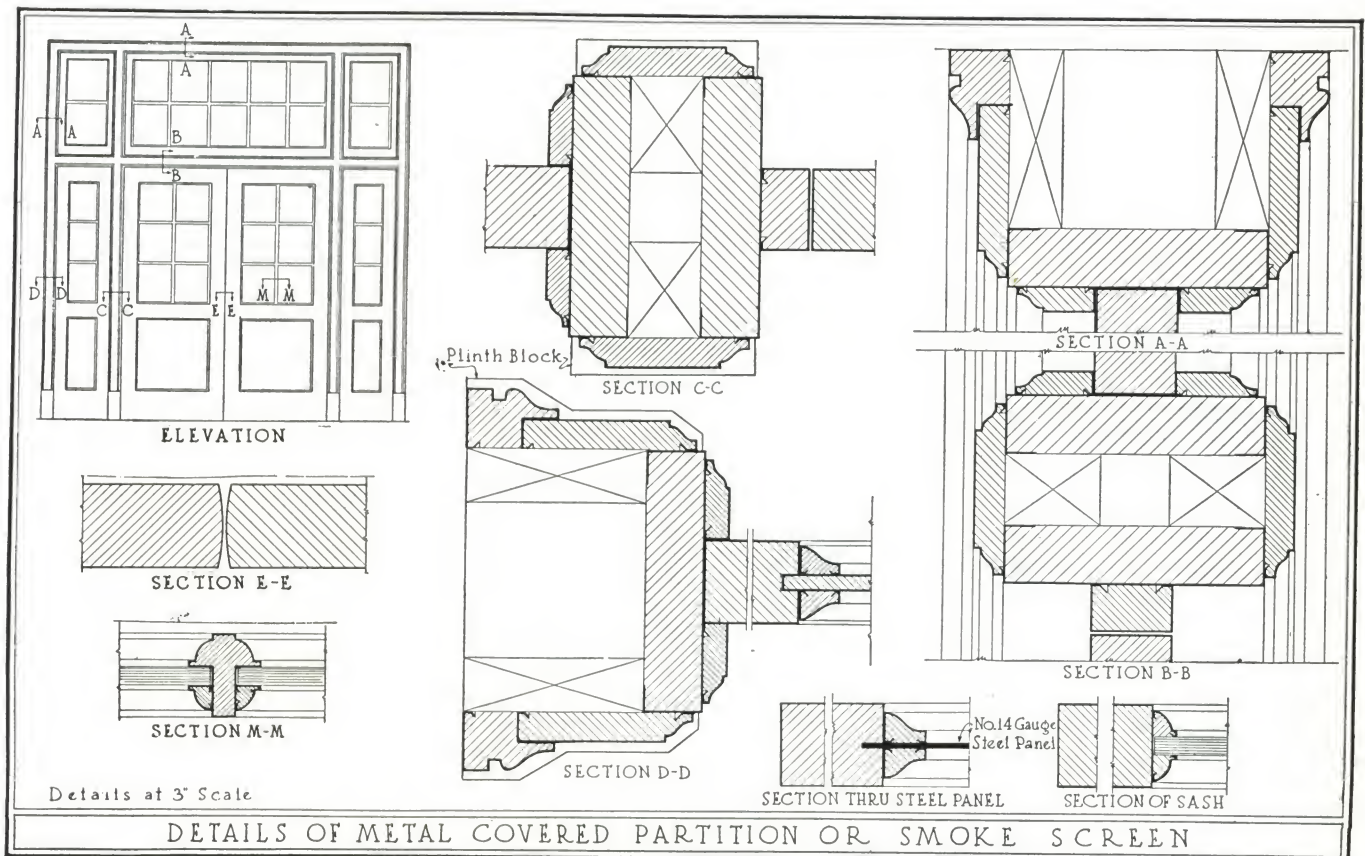
This includes double hung stationary, pivoted, and combinations of these types.

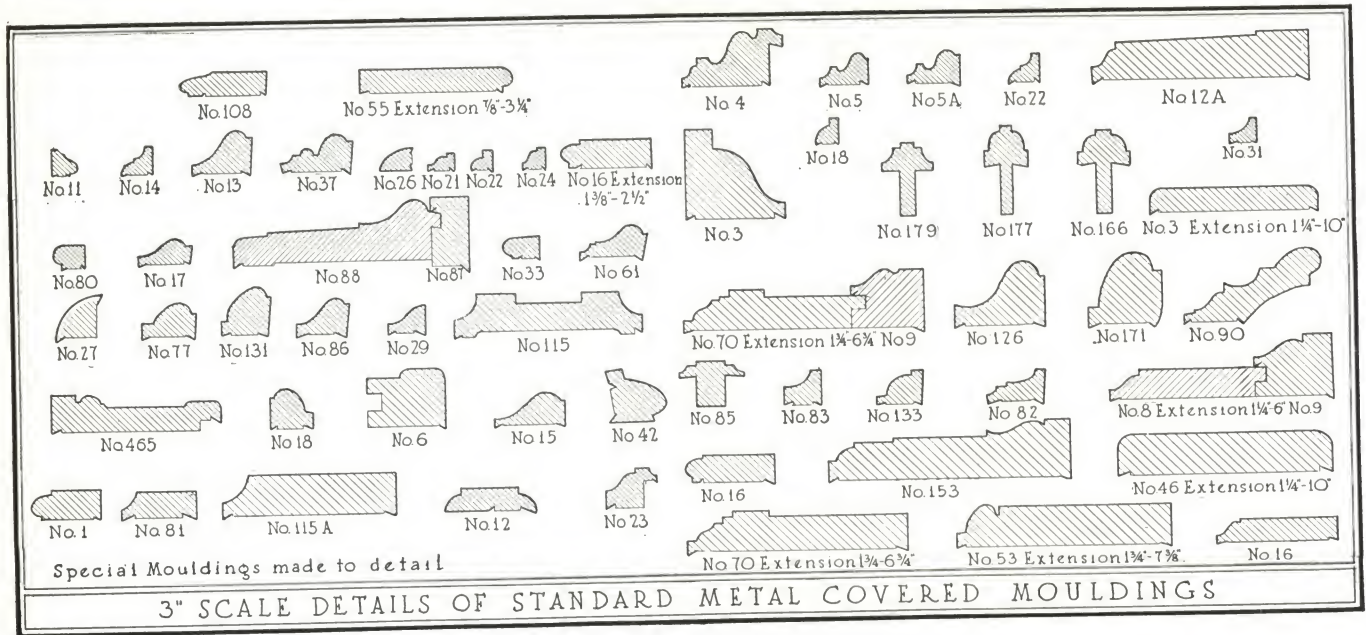
All windows are made with cutting and forming dies which insure the fitting of every member when assembled and a perfect operating window. Made in standard No. 24 gauge, also Heavy Type No. 20 gauge.

Specifications and details sent on request.

Recent Contracts

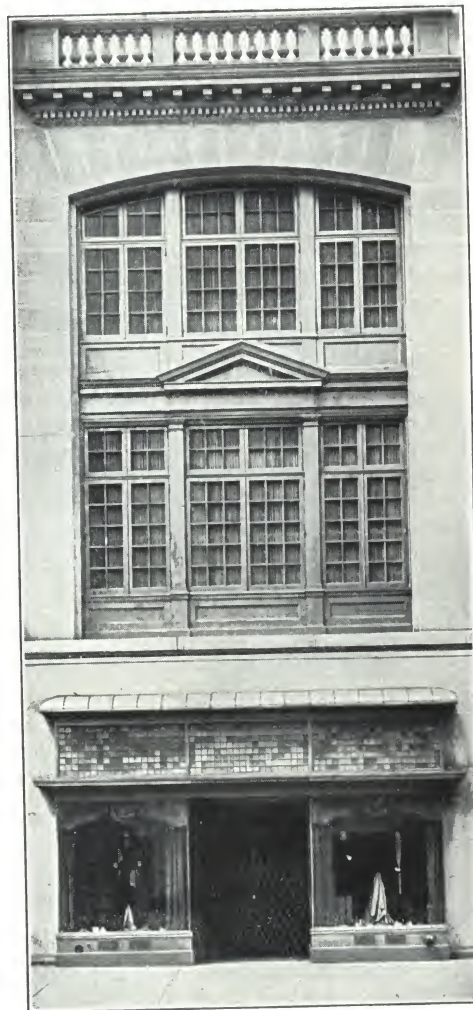
Vanderbilt University Hospital, Nashville, Tenn.
Auditorium and Market House, Memphis, Tenn.
Meyers Department Store, Greensboro, N. C.
Daily News Building, Greensboro, N. C.
Homeopathic Hospital, Providence, R. I.
Fire Alarm Signal Station, Boston, Mass.
Insurance Exchange Building, Boston, Mass.
West Roxbury Courthouse, Boston, Mass.
Peabody Museum, Yale University, New Haven, Conn.
Lapham Field Club House, Yale University, New Haven, Conn.
Sage School of Forestry, Yale University, New Haven, Conn.
Powell Building, New Haven, Conn.
Augusta Louise Troupe School, New Haven, Conn.
Albany Police Headquarters, Albany, N. Y.
Public School No. 20, Albany, N. Y.
Thirteenth Ward School, Albany, N. Y.
City Bank Trust Co., Syracuse, N. Y.
Fort Plain National Bank, Fort Plain, N. Y.
Besse Security Building, Springfield, Mass.
Tarbell Watters Building, Springfield, Mass.
Hudson River Connecting R. R., Selkirk, N. Y.
Berkshire County Savings Bank, Pittsfield, Mass.
County Building, Canton, N. Y.
Enfield High School, Enfield, Conn.
Morris Plan Bank, Schenectady, N. Y.
Hudson River Hospital, Poughkeepsie, N. Y.
Smith College Dormitory, Northampton, Mass.
Library and York Dormitory, Yale University, New Haven, Conn.
Masonic Temple, Springfield, Mass.
Masonic Temple, Poughkeepsie, N. Y.
Maple Grove School, Des Moines, Iowa
New Willard Hotel, Washington, D. C.
Mutual Life Insurance Building, Baltimore, Md.
Wilder Building, Charlotte, N. C.
Y. M. C. A., Greensboro, N. C.
Hyman & Hess Building, Albany, N. Y.
Baltimore Commercial Bank, Baltimore, Md.
Roger Sherman Theater, New Haven, Conn.
Proctors' Theater, Schenectady, N. Y.





Baltimore Commercial Bank,
Baltimore, Md.

PARKER, THOMAS & RICE, Architects



Bronze Kalamein Windows, Doors and
Store Front, Kurzrok Building,
Albany, N. Y.

MARCUS REYNOLDS, Architect



Masonic Temple, Springfield,
Mass.

McCLINTOCK & CRAIG, Architects

THE R. C. MAHON COMPANY

Manufacturers of Kalamein Doors

8650 Mt. Elliott Avenue
DETROIT, MICH.

Products

KALAMEIN DOORS.

For Mahon Roof Sumps, see page C2338.

Underwriters' Labeled Doors

Mahon Underwriters' Labeled Doors are manufactured from the finest selected kiln-dried white pine, covered with No. 24 gauge sheet steel. All joints are welded, making a sturdy, fire-safe fine appearing door.

Each Mahon Underwriters' Labeled Door must pass the rigid inspection conducted by a representative of the Underwriters' Laboratories, Inc., in addition to the regular shop inspection. This double O. K. insures permanence and absolute fire safety.



Mahon Type 1
Kalamein Door

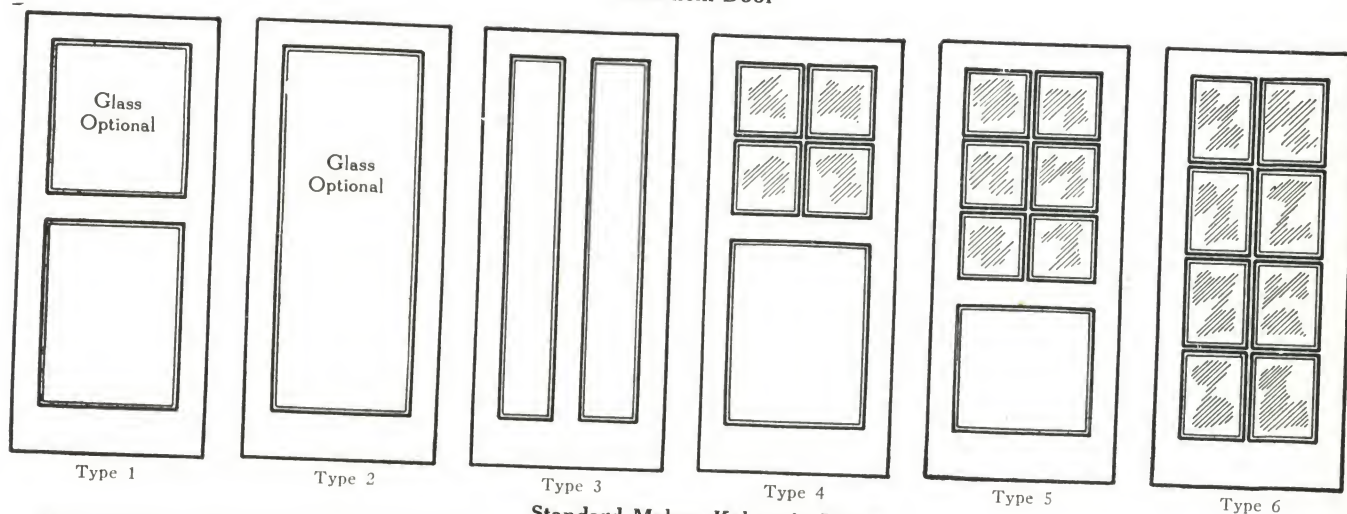
Standard Fireproof Doors

Mahon Standard Fireproof Doors are of the same general design and high quality as Mahon Underwriters' labeled doors. The standard door is a satisfactory fire door but should not be used where labeled doors are specified.

Standardization of sizes and facilities for quantity production in the Mahon plant make it possible to quote unusually low prices on this type of door.

Service

Mahon designers are available at all times to co-operate on special conditions where standard doors can not be used. They will gladly give the benefit of their specialized experience.



Standard Mahon Kalamein Doors

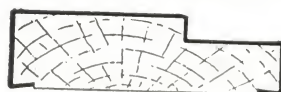
Mahon Kalamein Doors are manufactured in the following sizes. Type 1 is carried in stock for immediate delivery in sizes marked * only

2'0"x6' 6"	2'2"x6' 6"	2'4"x6' 6"	2'6"x6' 6"	2'8"x6' 6"	2'10"x6' 6"	3'0"x6' 6"
2'0"x6' 8"	2'2"x6' 8"	2'4"x6' 8"	* 2'6"x6' 10"	* 2'8"x6' 8"	* 2'10"x6' 8"	* 3'0"x6' 8"
2'0"x6' 10"	2'2"x6' 10"	2'4"x6' 10"	* 2'6"x6' 8"	* 2'8"x6' 10"	* 2'10"x6' 10"	* 3'0"x6' 10"
2'0"x7' 0"	2'2"x7' 0"	2'4"x7' 0"	* 2'6"x7' 0"	* 2'8"x7' 0"	* 2'10"x7' 0"	* 3'0"x7' 0"

Fireproofed Jambs, Trim and Moulding

Several standard jambs, trim and moulding sections in attractive designs, manufactured from the same high

grade white pine, and fireproofed in the same manner as Mahon Kalamein Doors, are carried in stock ready for immediate delivery.



No. 100

Std. 5 1/2 in. Jamb



No. 200



No. 201



No. 202

Standard Trim Sections



No. 301



No. 303



No. 304

Std. Mouldings

HOWELL, FIELD & GODDARD, INC.

Hollow Steel and Metal Covered Doors and Windows, Steel Bucks and Interior Trim, Steel Unit Partitions

Review Avenue, Young and Gilbert Streets
LONG ISLAND CITY, N. Y.

TELEPHONES: OFFICE AND FACTORY, HUNTERS POINT 8300, 8301, 8302, 8303

Products

STANDWELL METAL COVERED DOORS.

ALL STEEL COMBINATION BUCKS, JAMBS and TRIM, plain or moulded.

ELEVATOR FRONTS, all-steel and metal covered.

ALL-STEEL and METAL COVERED JAMBS and TRIM.

Also manufacturers of Metal Covered and Steel Base Picture and Wire Moulding; Tubular Steel Elevator Doors; Metal Covered Doors of bronze and copper; Hollow Steel Doors; Standwell Steel Unit Partitions.

Standwell Metal Covered Doors (Patented)

In the Standwell construction, the metal covering is of Nos. 22 and 24 gauge selected steel, made in tubular form entirely covering the wood cores. The metal is joined together and to the panels by welding, making the basic construction of the door one piece, which insures effective fire retardation.

The joints between stiles and rails are locked by a patented process (section AA below). This method makes the strongest joint possible to produce, also insuring that the metal surfaces of stiles and rails are flush and smooth without the use of a plastic filler. The joints, being filled with solder in the process, are polished over and are practically invisible.

The white pine cores used in the Standwell door serve a double purpose: making an absolute sound deadener (there being no metallic rattle to a Standwell door), also preventing any warping if door is subjected to fire. It also makes the application of hardware a simple matter, as templates are not required in advance as on all-steel doors.

Standwell doors are particularly suited for vertical shaft protection such as stairs and elevators where Underwriters' labels are required.

Doors of types 1, 3 and 4, will be carried in stock for immediate delivery in sizes as shown by schedule.

When ordering by schedule, note that jamb opening size is between jambs and from head jamb to finished floor. Allowance on finished door size is made for joint and for saddle.

Architects can, by using Standwell doors of sizes and designs shown, make a distinct saving for their clients, and owing to the H. F. G. standardized methods of manufacture be assured always of a uniform high quality and quick delivery.

STANDWELL DOOR SIZES FOR SWING DOORS

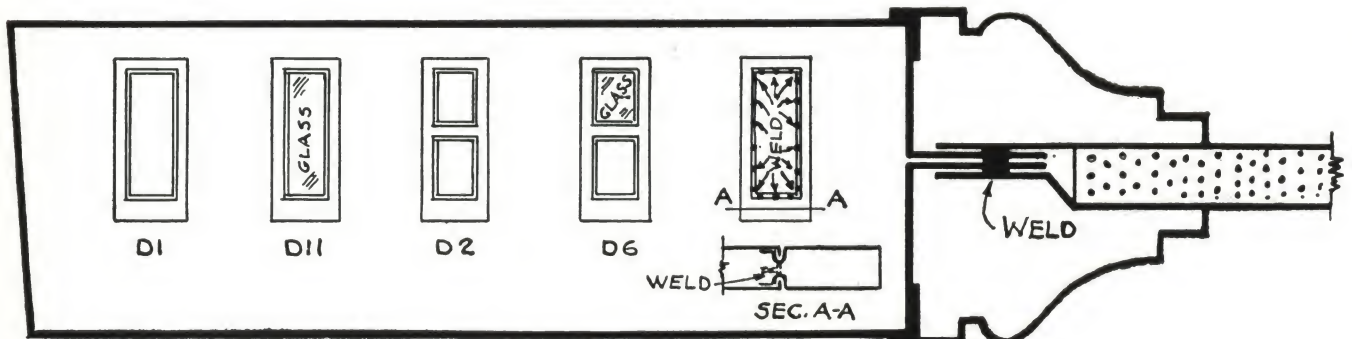
Widths

Single Doors			Pairs of Doors			
Jamb ft.	opening in.	Finished door, ft. in.	Jamb opening, ft. in.	Each finished door, ft. in.	Jamb opening, ft. in.	Each finished door, ft. in.
*2	6	2 5 ¹³ / ₁₆	*5	0	2	5 ¹³ / ₁₆
2	7	2 6 ¹³ / ₁₆	5	2	2	6 ¹³ / ₁₆
*2	8	2 7 ¹³ / ₁₆	*5	4	2	7 ¹³ / ₁₆
2	9	2 8 ¹³ / ₁₆	5	6	2	8 ¹³ / ₁₆
*2	10	2 9 ¹³ / ₁₆	*5	8	2	9 ¹³ / ₁₆
2	11	2 10 ¹³ / ₁₆	5	10	2	10 ¹³ / ₁₆
*3	0	2 11 ¹³ / ₁₆	*6	0	2	11 ¹³ / ₁₆
3	1	3 0 ¹³ / ₁₆	6	2	3	0 ¹³ / ₁₆
*3	2	3 1 ¹³ / ₁₆	*6	4	3	1 ¹³ / ₁₆
3	3	3 2 ¹³ / ₁₆	6	6	3	2 ¹³ / ₁₆
*3	4	3 3 ¹³ / ₁₆	*6	8	3	3 ¹³ / ₁₆
3	5	3 4 ¹³ / ₁₆	6	10	3	4 ¹³ / ₁₆
*3	6	3 5 ¹³ / ₁₆	*7	0	3	5 ¹³ / ₁₆
3	7	3 6 ¹³ / ₁₆	7	2	3	6 ¹³ / ₁₆
3	8	3 7 ¹³ / ₁₆	7	4	3	7 ¹³ / ₁₆

Heights

Jamb opening, ft. in.	Finished door, ft. in.	Jamb opening, ft. in.	Finished door, ft. in.
6 8	6 7 ⁵ / ₁₆	7 2	7 1 ⁵ / ₁₆
6 9	6 8 ⁵ / ₁₆	7 3	7 2 ⁵ / ₁₆
*6 10	6 9 ⁵ / ₁₆	7 4	7 3 ⁵ / ₁₆
6 11	6 10 ⁵ / ₁₆	7 5	7 4 ⁵ / ₁₆
*7 0	6 11 ⁵ / ₁₆	7 6	7 5 ⁵ / ₁₆
7 1	7 0 ⁵ / ₁₆		

*Carried in stock.



Standard Designs for Standwell Doors

All-steel Combined Bucks, Jambs and Trim

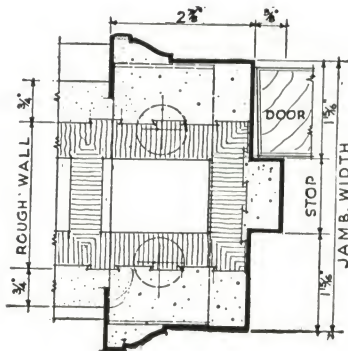
Bucks of Design 26, 27DT, 27DF, 28 and 29, made from No. 16 gauge steel, are suitable for all interior openings in the best types of buildings. Being of steel they are fireproof, and when used for fireproof openings, in conjunction with Standwell Steel Covered Doors, procure the lowest insurance rate.

They are suitable for non-fireproof openings where wood doors are used, being more economical than wood jambs and trim. The steel buck being erected as a unit, eliminates the extra cost of erecting separate bucks, jamb and trim.

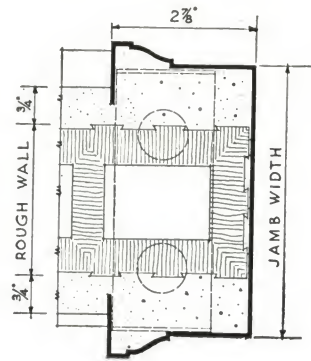
All trim miters are welded, which eliminates the shrinkage and opening of miters found in wood trim.

All trimmed members are formed with sharp, clean corners, that for architectural beauty can not be excelled.

Note: In order to produce the best results in all-steel bucks, architects should specify that when partition blocks are laid, all open spaces between the end and sides of partition blocks and the steel buck should be slushed with mortar. If this is done there will never be any cracking of plaster around the buck.

**DESIGN 26**

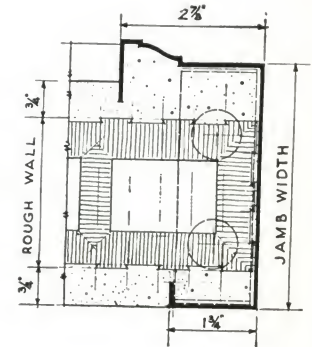
Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2605 $\frac{3}{8}$	3	5 $\frac{3}{8}$	1 $\frac{1}{2}$
2606 $\frac{3}{8}$	4	6 $\frac{3}{8}$	2 $\frac{1}{2}$
2608 $\frac{3}{8}$	6	8 $\frac{3}{8}$	4 $\frac{1}{2}$

**DESIGN 28**

Type No.	Rough wall, in.	Jamb width, in.
2805 $\frac{3}{8}$	3	5 $\frac{3}{8}$
2806 $\frac{3}{8}$	4	6 $\frac{3}{8}$
2808 $\frac{3}{8}$	6	8 $\frac{3}{8}$

DESIGN 29

Type No.	Rough wall, in.	Jamb width, in.
2904 $\frac{7}{8}$	3	4 $\frac{7}{8}$
2905 $\frac{7}{8}$	4	5 $\frac{7}{8}$
2907 $\frac{7}{8}$	6	7 $\frac{7}{8}$

**Buck Sizes**

All-steel bucks, also metal covered jambs, are made to jamb opening sizes as shown on Standwell door schedule.

Complete Elevator Fronts

All-steel combination elevator bucks and complete elevator fronts, including saddles, bucks and doors and hardware, furnished and erected.

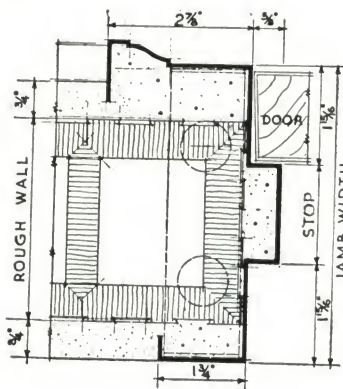
We will send on request complete information and specifications showing standard types of installation, covering wall and shaft conditions, for both metal covered and all-steel elevator door openings.

Noteworthy H. F. G. Door and Buck Installations—1926

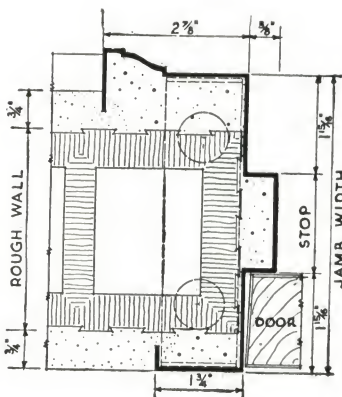
- 35-story Park Central Hotel, 7th Avenue, 55th-56th Streets, New York, N. Y., Gronenberg & Leuchtag, Architects
- Half Moon Hotel, Coney Island, New York, N. Y., George B. Post & Sons, Architects
- Fidelity Mutual Life Insurance Company Building, Parkway and Fairmount Avenue, Philadelphia, Pa., Zantlinger & Borie & Medary, Architects
- 40-story Graybar Building, 44th Street and Lexington Avenue, New York, N. Y., Sloane & Robertson, Architects
- Corn Exchange Bank, 1-3 East 42nd Street, New York, N. Y., Fellheimer & Wagner, Architects
- Mount Sinai Nurses Home, 5-17 East 98th Street, New York, N. Y., Kahn & Butler, Architects
- 35-story Office Building, Court and Montague Streets, Brooklyn, N. Y., H. Craig Severance, Architect
- 35-story Park Murray Building, 9-15 Park Place, New York, N. Y., Buchman & Kahn, Architects
- Harvard Medical School, Boston, Mass., Coolidge, Shepley, Bullfinch & Abbott, Architects
- 34-story Warwick Hotel, 54th Street and 6th Avenue, New York, N. Y., George B. Post & Emery Roth, Architects
- 45-story Ritz Towers, Park Avenue and 57th Street, New York, N. Y., Emery Roth, Architect
- Office Building and Hotel, Montauk Point, Long Island, N. Y., Schultz & Weaver, Architects
- Barclay Hotel, 49th Street and Lexington Avenue, New York, N. Y.
- Scottish Rite Temple, Philadelphia, Pa., Horace W. Castor, Architect
- One Hundred and Fifty-two (152), one and two-family houses, City Housing Corporation, Sunnyside, Long Island, N. Y.
- 30-story Office Building, 50 Broadway, New York, N. Y., H. Craig Severance, Architect

DESIGN 27DT

Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2704 $\frac{7}{8}$	3	4 $\frac{7}{8}$	1
2705 $\frac{7}{8}$	4	5 $\frac{7}{8}$	2
2707 $\frac{7}{8}$	6	7 $\frac{7}{8}$	4

**DESIGN 27DF**

Type No.	Rough wall, in.	Jamb width, in.	Stop, in.
2704 $\frac{7}{8}$	3	4 $\frac{7}{8}$	1
2705 $\frac{7}{8}$	4	5 $\frac{7}{8}$	2
2707 $\frac{7}{8}$	6	7 $\frac{7}{8}$	4



METAL CLAD DOORS, INC.

685 Concord Avenue, CAMBRIDGE, MASS.

Products

METCLA METAL COVERED DOORS, FRAMES, TRIM, ENTRANCES and WINDOWS; TIN CLAD FIRE DOORS and SHUTTERS.

Kalamein and Tinclad Doors are furnished either with or without Underwriters' label.

Metcla Metal Covered Doors, Frames and Trim

Made by drawing sheet metal through steel dies over a wood core of white pine. This process practically welds the metal covering to its core, eliminates buckles and brings out all moulding members in clear relief.

Made in kalamein iron, galvanized steel, copper or low brass; in sections, tongued, grooved and pinned together, and finished with a priming coat of paint. Glass is not furnished by us.

Standard styles in kalamein iron are illustrated below. Special styles and sizes will be furnished on short notice.

Metcla metal covered doors, frames and trim are approved by leading architects and engineers, and have been used under the most severe conditions. In specifying Metcla doors, frames and trim the architect is assured of the utmost in quality, workmanship and durability, upheld by continuous service and a high reputation for materials and workmanship.



No. 102G
Metcla Metal
Covered Door

types and sizes, either from our own or architects' details and to conform with special requirements.

Furnished glazed or unglazed, with or without hardware, as required.

Metcla Metal Covered Entrances of Copper, Bronze or Kalamein

Metcla entrances are made in accordance with the architect's details to meet every requirement. They are a striking feature of many prominent public and private buildings and have all the advantages and the appearance of cast metal doors, without their extreme weight or cost.



Mill Entrance
Metcla Copper Kalamein

Metcla Kalamein Elevator Fronts

Metcla kalamein elevator fronts are specified for durability, ease of operation and appearance, where sheet steel doors are not desired, or where hollow metal doors would be too expensive.

DETAILS OF METCLA KALAMEIN DOORS

DIRECTIONS FOR ORDERING

State style and type of door
Give sketch showing swing.
Size of doors - net width of opening in jamb and height from finished fl.
Give height of Thresholds if any.
State kind of glass if any.
Give finished thickness of walls & partitions.
State whether casings or staff mouldings are desired for one or both sides, width and whether with or without plinths.
State location of all Hardware and if by others send full line of samples.

101 P

102 P

105 P

103 G

102 G

103 P

STANDARD STYLES OF METCLA KALAMEIN DOORS

Tin Clad Doors and Shutters

These are made in any style and size, and are furnished with or without hardware f.o.b. Boston or installed with or without Underwriters' labels.



Storage Warehouse Equipment
Tin Clad Doors, Iron Frames, Special Hardware

Metcla Metal Covered Windows

The outstanding qualities of Metcla windows are their simple construction, ease of operation, fire retarding qualities, and the unusually high standard maintained in regard to the materials used in their construction.

They combine safety, economy, durability and weatherproofness.

Made for all classes of buildings in all required

ESTABLISHED 1910

RELIANCE FIREPROOF DOOR CO.

Manufacturers of Fire Retardant Products and Architectural Ornamental Bronze
73 to 103 Dobbin Street and 80 to 110 Banker Street
BROOKLYN, N. Y.

REPRESENTATIVES

ATLANTA, GA., LUKE SEAWELL, 58 Cone Street
BALTIMORE, MD., BRAUNS & GRAHAM, 509 N. Charles Street
BILLINGS, MONT., F. W. RICHARDSON, Electric Building
BOSTON, MASS., H. A. SEELEY Co., 73 Tremont Street
CHARLOTTE, N. C., LUKE SEAWELL, 804 Realty Building
CINCINNATI, OHIO, L. O. ZELLNER Co., Mercantile Library Building

DENVER, COLO., BUILDERS SERVICE BUREAU, 1729 Champa Street
JACKSONVILLE, FLA., LUKE SEAWELL, 49 St. James Building
OKLAHOMA CITY, OKLA., BISSELL BUILDERS SUPPLY Co., Colcord Building
PHILADELPHIA, PA., F. J. WILSON, 1600 Walnut Street
ROCHESTER, N. Y., BUILDING SPECIALTIES Co., 61 Mill Street
ST. LOUIS, MO., H. C. UULENHOUT, Railway Exchange Building

Products

DRAWN METAL COVERED DOORS, WINDOWS, PARTITIONS and TRIM.

FURNITURE SHEET DOORS.

COMBINATION SHEET BUCKS.

ALLWELD DOORS.

ELEVATOR ENCLOSURES.

ARCHITECTURAL and ORNAMENTAL BRONZE of every description executed in Heavy Cast, Drawn and Extruded Material.

Facilities

Our new and modern manufacturing plant, containing 50,000 sq. ft. of working space and 25,000 sq. ft. of storage space, is equipped with the latest and most improved metal and wood working machinery, most of which has been specially designed to meet every requirement of producing only the highest standards of quality in all-metal fireproof products. All orders, large or small, can be promptly executed.

Prices furnished on receipt of schedule covering the following data (unless plans and specifications are furnished to us):

Doors: Size and style of each.

Jambs: Width and thickness required.

Casings: Moulded or flat; state width and whether one or both sides of opening, with or without plinths.

Specifications for Metal Covered Doors, Jambs and Trim

Metal Covering—All wood forming parts of doors, jambs and trim to be covered with metal as follows:

Kalamein Iron Covered—Doors and jambs, Nos. 22 to 26 gauge and trim No. 26 gauge.

Furniture Steel Covered—Doors and jambs, Nos. 20 to 24 gauge and trim No. 26 gauge.

Copper Covered—Doors and jambs, 16 to 32 oz.; mouldings and trim, 14 or 16 oz.

Bronze Covered—Doors and jambs, 14 to 20 gauge; mouldings and trim, No. 23 gauge.

Cores—All wood in doors, jambs and trim shall be clear white pine and shall be thoroughly seasoned, kiln dried and free from shakes, sap, loose or large knots, or any defects impairing strength or durability. Doors to be made, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $2\frac{1}{4}$ in., or heavier, if required. If doors are either $1\frac{1}{8}$ or $2\frac{1}{4}$ in. thick, stiles, top and cross rails are to be 5 in. wide and bottom rail is to be 10 in. high.

Jambs to be made $1\frac{1}{8}$ or $1\frac{1}{4}$ in. thick, by width shown on drawings, if rabbeted; or $\frac{7}{8}$ or $1\frac{1}{8}$ in. with loose stop applied.

Trim moulded or plain as shown.

Finishing—All kalamein or galvanized iron material to receive a priming coat of paint in our shop before delivery.

If finish painting is desired, finish to be solid or grained in colors as selected, in air dried enamel finish.

Bronze and copper work to receive an oxidized finish of color as selected.

Underwriters' Labels—Underwriters' labels can be secured for doors leading to stairways, corridors and partitions, fire escapes and fire tower openings, which, when installed in accordance with the following specifications, will procure minimum insurance rate for building and contents.

Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 96 in. wide; made with solid panels hung on channel iron or combination steel frames with 5x5-in. full surface butts, mortise cylinder locks with $\frac{3}{4}$ -in.

throw bolt; stair doors should be made self-closing either by coil spring or door check.

Fire Escape and Tower Doors—Labeled for the same size openings as stair and elevator doors, and can be constructed to receive wire glass, not exceeding 5 sq. ft.; hung in the same manner as stair doors.

Corridor and Partition Doors—Constructed to receive 8 sq. ft. of wire glass and bearing the Underwriters' label; may be hung to metal covered jambs when stair and elevator doors are labeled.

Specifications for Metal Covered Frames and Sash

Metal Covering—All wood forming parts of window frames and sash to be covered with metal. Each member covered with metal is to be drawn through steel dies before assembling and all mouldings and edges are to be sharp and true as detailed.

Kalamein Iron Covered—No. 28 gauge for glass mouldings; No. 26 gauge for all other parts of frame and sash, except sill which will be No. 24 gauge.

Copper Covered—14 oz. for glass mouldings; 16 oz. for all other parts of frame and sash, except sill which will be 20 oz.

Bronze Covered—No. 27 gauge for glass mouldings; No. 23 gauge for all other parts of frame and sash, except sills, which will be No. 20 gauge.

Wood Cores—Cores of all window frames and sash shall be thoroughly seasoned dry white pine, free from loose or large knots.

Cores shall be milled and constructed in the best manner, built up in strict accordance with the details, all mouldings shown on drawings being accurately followed.

Members of Window Frames—Unless otherwise shown on drawings, sizes of different members shall be as follows:

Sills, $2\frac{3}{8}$ in. in thickness; pulley stiles and outside casings, $1\frac{1}{8}$ in.; inside casings, $\frac{7}{8}$ in.; back linings, $\frac{3}{4}$ in.; parting strips $\frac{3}{4}$ x $1\frac{1}{8}$ in.; staff beads, sizes vary. Sills shall be double rabbeted. Inside stops shall be $\frac{1}{2}$ in. by width desired. Sections of pulley stiles to be removable to give access to weights.

Frames for double hung sash to be box frames provided with weight separators. Sills to be plowed out on underside and provided with $\frac{1}{2}$ x2 in. galvanized iron water bar.

Note: All of our windows are equipped with our integral weather strips, which are made part of the construction.

Members of Sash—Unless otherwise shown on drawings, sizes shall be as follows: Stiles and top rails, $1\frac{1}{8}$ x $2\frac{3}{8}$ in. Bottom rails, $1\frac{1}{8}$ x $3\frac{3}{4}$ in. Meeting rails, $1\frac{1}{4}$ in. thick. Rails shall be coped to stiles and screwed together with 5-in. screws for sash up to 4 ft. wide and with 6-in. screws for sash over 4 ft. Joints to be well filled with solder and filed smooth.

Specifications for Furniture Steel Door Frames

Frames to be made of furniture steel of not lighter than No. 16 gauge U. S. Standard with all miters and joints to be welded and made smooth. Reinforcement for application of necessary hardware to be electrically welded and of proper size to insure rigid construction. Wall anchors to be provided and spaced approximately 2 ft. apart to insure rigidity. Each frame to be provided with spreaders for parallel alignment. Templates for all hardware will be furnished in reasonable time prior to the manufacture of these frames.

All frames to receive one shop-coat of the best metallic primer and applied in a first-class workmanlike manner to ensure a complete covering on all surfaces, inside and outside.

Note: If required, Underwriters' labels can be secured for openings in vertical shafts, exterior walls; and for openings in corridor and room partitions.

Architectural Bronze Products

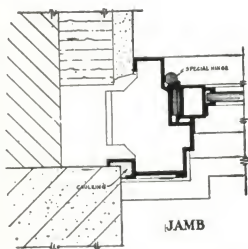
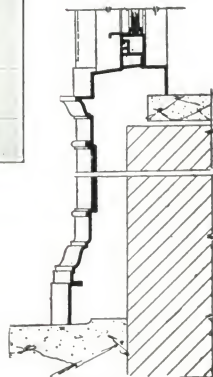
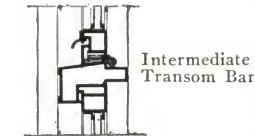
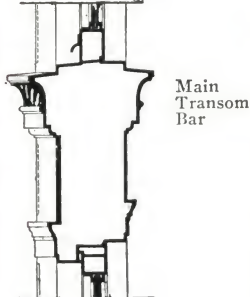
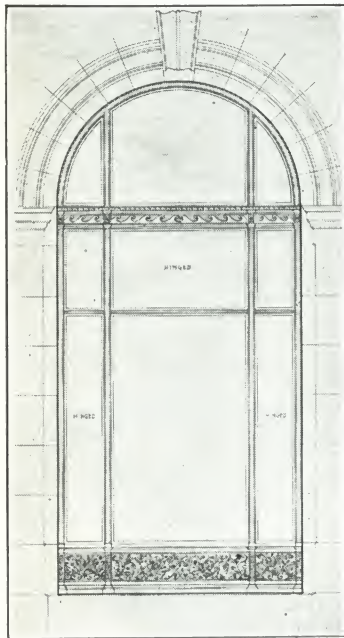
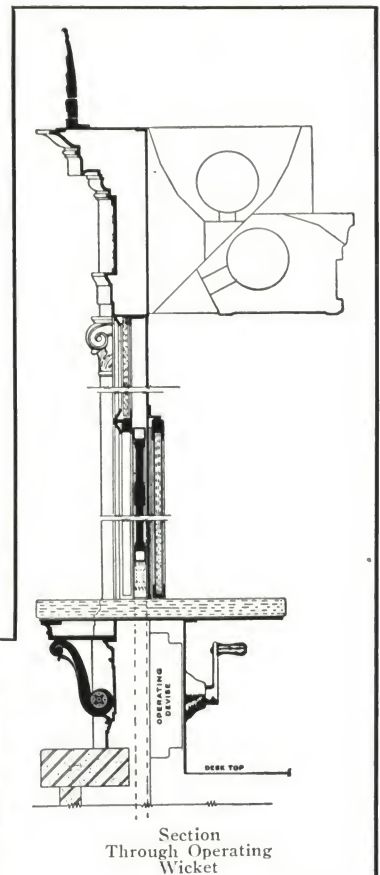
We have ample facilities to produce all items of architectural and ornamental bronze work required in the building and allied industries. We have a sales and engineering force competent to handle work in this line of any scope, and our products are built by a force of skilled artisans. Our castings are produced in French sand from highly chased metal patterns or in the lost wax process, reproducing in minute detail ornament from models approved by architects; and we use drawn and extruded sections of heavy gauges only in the working of our architectural bronze products.

We have developed over a period of years types of windows, doors and store fronts, which we manufacture in heavy gauges of bronze and extruded metal and we specialize in the production of the following items:

"Reliance" Extruded Double Hung Windows "Reliance" Extruded Doors and Frames
 "Reliance" Extruded Casement Windows "Reliance" Extruded Store Fronts
 "Reliance" Complete Elevator Enclosure Units

Partial List of Installations

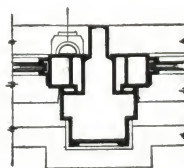
BUILDING	CONTRACTOR	ARCHITECT
Public Ledger Building, Philadelphia, Pa.	Doyle & Co.	H. Trumbauer
Free Public Library, Philadelphia, Pa.	P. H. Kelly Construction Co.	H. Trumbauer
J. B. Duke Residence, Newport News, R. I.	G. F. Payne Co.	H. Trumbauer
Manufacturers Trust Co., 407 Broadway, New York, N. Y.	H. A. Harris, Inc.	A. F. Gilbert
Manufacturers Trust Co., 774 Broadway, Brooklyn, N. Y.	H. A. Harris, Inc.	E. A. Klein
Boardwalk National Bank, Atlantic City, N. J.	G. A. Fuller Co.	Lockwood, Greene & Co.
Park Royal Hotel, 73rd Street, New York, N. Y.	Lapidus Engineering Co.	Geo. F. Pelham
Beekman Apartment, 561 Park Avenue, New York, N. Y.	Lapidus Engineering Co.	Geo. F. Pelham
Overbrook Sunday School, Overbrook, Pa.	F. V. Warren Co.	Simon & Simon



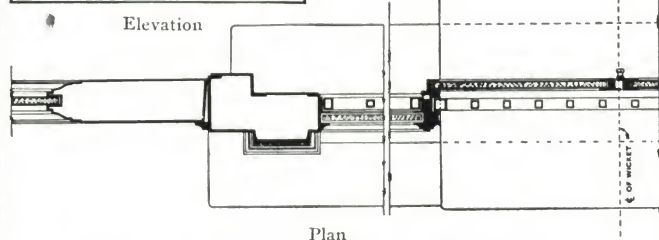
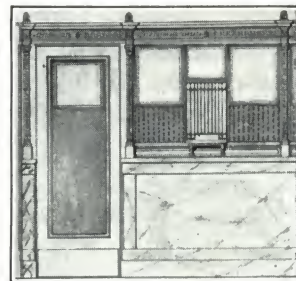
Note Positive Three-point Contact

"Reliance" Extruded Bronze Casement Window

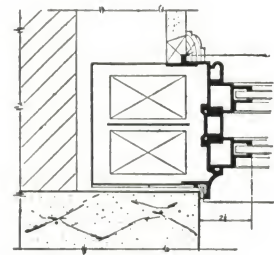
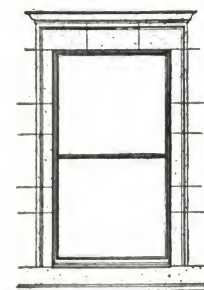
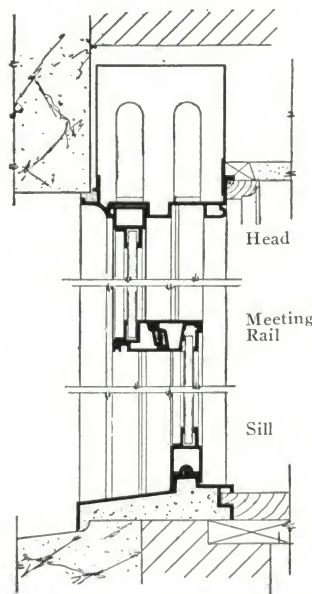
Installed in the Philadelphia Ledger Building and The New York Evening Post Building



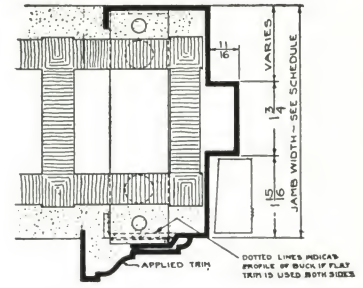
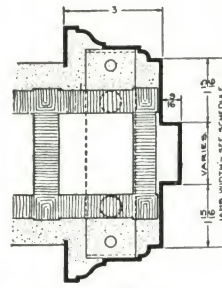
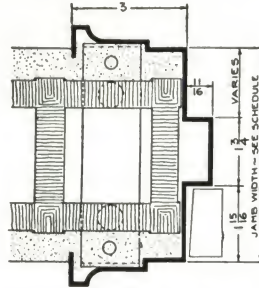
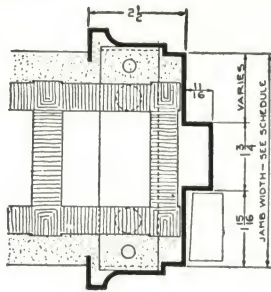
Patent Applied For



"Reliance" Architectural Bronze Bank Screen



Detail of "Reliance" Double Hung Window



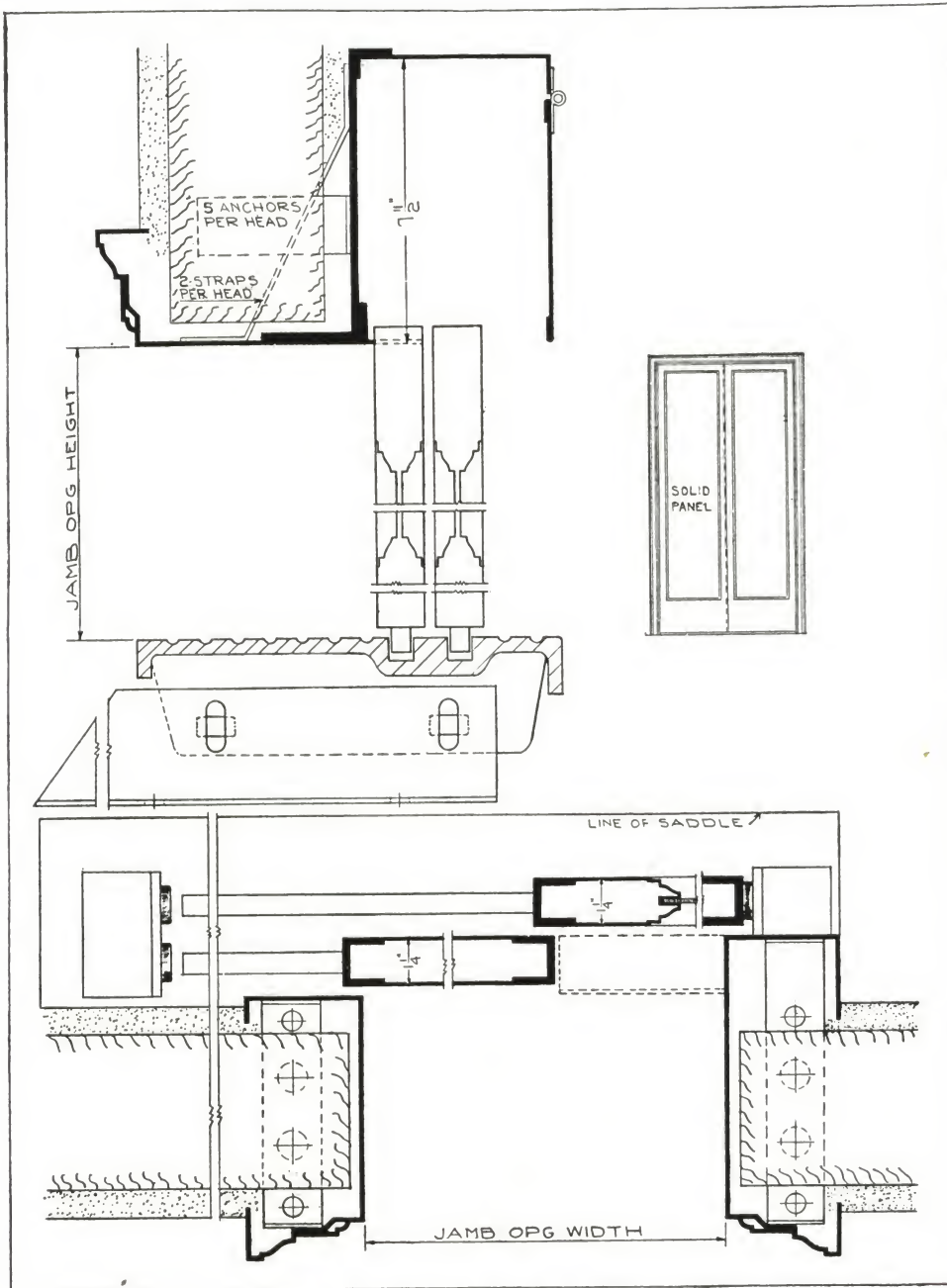
Combination Steel Buck and Trim

Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.
110	3	4 1/2	1 3/16
120	4	5 1/2	1 13/16
130	6	7 1/2	3 13/16

Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.
210	3	4 1/2	1 3/16
220	4	5 1/2	1 13/16
230	6	7 1/2	3 13/16

Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.
310	3	4 3/4	7/8
320	4	5 3/4	1 7/8
330	6	7 3/4	3 7/8

Type No.	Rough wall, in.	Jamb widths, in.	Variable diam., in.
410	3	4 1/2	1 3/16
420	4	5 1/2	1 13/16
430	6	7 1/2	3 13/16



Detail of a Hollow Metal Elevator Front

Elevator Fronts, Hollow Metal

Frames—No. 12, 14 or 16 gauge steel combination buck and jamb trim, either pressed or rolled and applied by means of spot-welding. Dust covers and struts to ceiling where so specified.

Saddles—Cast iron or bronze provided with cast stiffener ribs, grooves milled, so as to provide perfect, noiseless operating of doors.

Doors—Furniture steel of No. 18 gauge for stiles and rails. The stiles on front and back are reinforced with No. 16 gauge bumper channels full height of door.

Mouldings No. 20 gauge cold rolled strip steel formed so as to interlock with stile. Intersections of stiles and rails are welded.

Panels of No. 12 gauge furniture steel are inserted in groove of moulding. Reinforcements are provided for door closer and hangers.

Painting—All work is finished in our standard primer, ready to receive final finish at the building after erection.

Erection—We have a staff of competent men engaged in erection of elevator fronts.

Special Service Department—We are prepared to furnish and design elevator fronts in all metals and finishes.

NEW YORK KALAMEIN CO.

Manufacturers of Metal Covered Wood Work

800 Humbolt Street, BROOKLYN, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

DRAWN METAL COVERED WOOD DOORS, WINDOWS, ELEVATOR FRONTS, PARTITIONS and TRIM in Steel, Copper and Bronze.

Sound Construction

In the manufacture of our products we follow old established methods, which have been found through long use to be the most satisfactory. Doors are of mortise and tenon construction. No dowels or corrugated fasteners are used. No parts are covered by hand, the doors are strictly a machine made product.

All parts of doors, windows and trim are separately kalameined before assembly. This not only produces the highest class of work, but places us in a position to render a very wide service to users of all classes of metal covered woodwork.

Specification Data for Standard Metal Covered Doors

Cores, Stiles and Rails—Wood used in cores, stiles and rails is sound, kiln dried white pine, milled solid, and free from large and loose knots and sap.

Covering—All parts are covered with No. 24 gauge furniture steel, No. 24 gauge terne plate or No. 26 gauge galvanized iron by die process before assembly.

If doors are to be covered with copper, 16 oz. is



recommended; if bronze is used, 20 gauge is recommended.

Panels—Panels are built up as in veneer process, under pressure of 2 sheets of metal, cemented on to approved board.

Assembly—Stiles are mortised and rails blind tenoned. Panel is inset into stiles and rails. Surface seams are soldered and scraped smooth. The top and bottom edge seams have underlaid strips of metal making the joints practically waterproof.

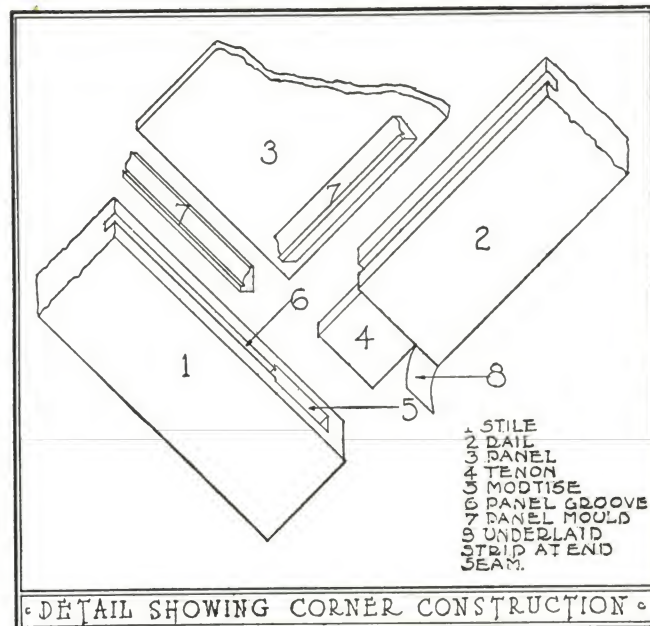
Painting—All material is given a priming coat of paint before leaving the factory.

Metal Covered Windows

Metal covered windows of double hung or casement type can be furnished in our own standard designs, or we will build them to specifications. Other types of windows will be manufactured to meet special conditions. All windows are of sturdy construction. Special care is taken to have the joints and seams tight to withstand the action of the weather.

Service

We are prepared to design special metal covered woodwork to fit openings with unusual contours. Upon receipt of drawings or sketches we shall be glad to submit for approval designs for filling any shape or size window opening.



Some Recent Installations

Windsor Power Station, Pittsburgh, Pa., Foundation Co., Builders, Sanderson & Porter, Engineers

Mountain Station School, Orange, N. J., Bogota Grade School, Guilbert & Bettele, Architects

Elks Club No. 2, Philadelphia, Pa., Andrew A. Sauer, Architect
Varsity Boat Club, State College, Pa., F. L. Hoover & Son, Contractors

Standard Oil Plant No. 2, Cleveland, Ohio, James Stewart & Co., Builders

Greenwich High School, Greenwich, Conn., Guilbert & Bettele, Architects

Stanley Theater, Atlantic City, N. J., Hoffmann, Hess & Berger Co., Architects

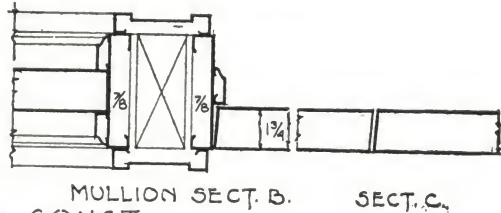
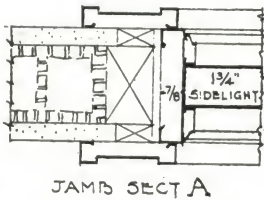
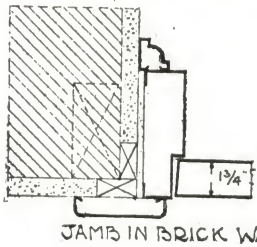
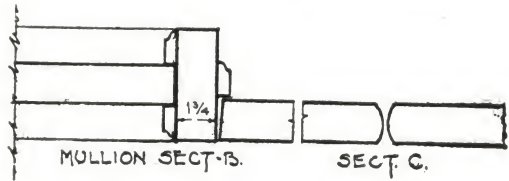
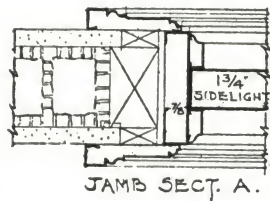
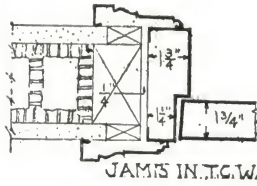
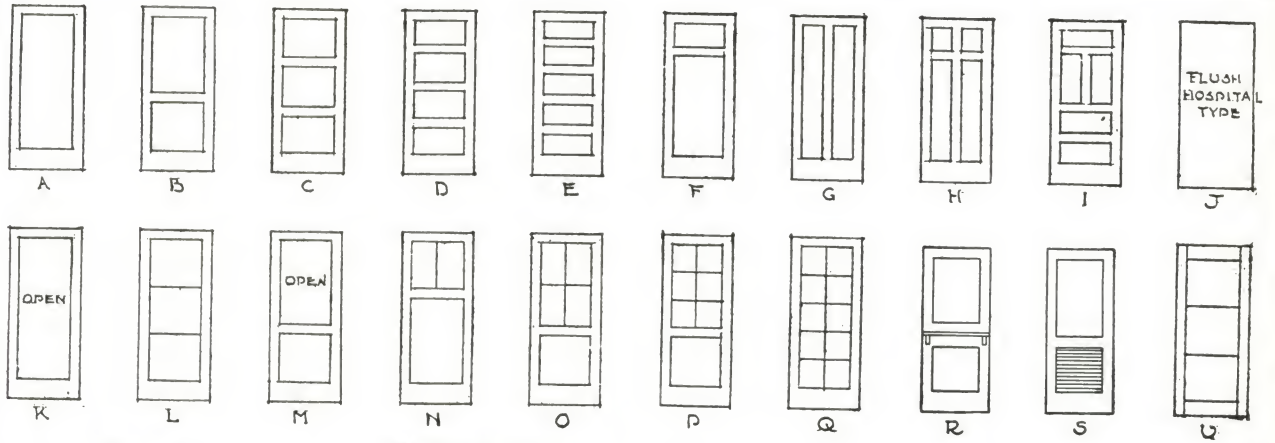
School, Boston, Mass., Ritchie, Parsons & Taylor, Architects

Empresa Guatemalteca De Electricidad, Inc., Guatemala City, C. A., Phoenix Utility Co. for the Electric Bond & Share Co., Engineers

Methodist Book Concern Building, Dobbs Ferry, N. Y., Theodore Vischer & James Burley, Architects; United Fireproofing Co., Contractors

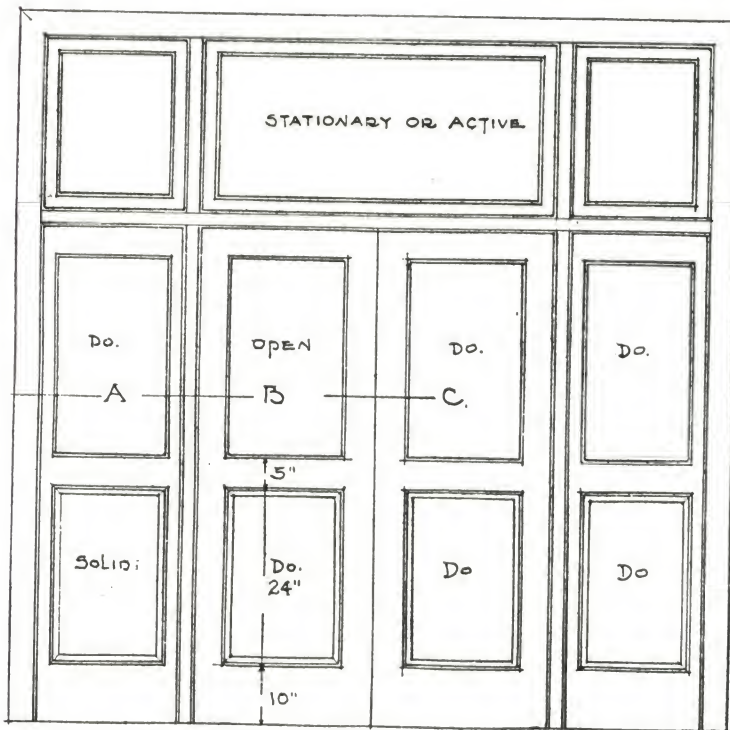
Apartment House, 1165 Fifth Avenue, New York, N. Y., J. E. R. Carpenter, Architect; Dwight P. Robinson & Co., Contractors

Pere Marquette Hotel, Peoria, Ill., Horace Trumbauer & Hewitt & Emerson, Architects; V. Jobst & Sons, Contractors

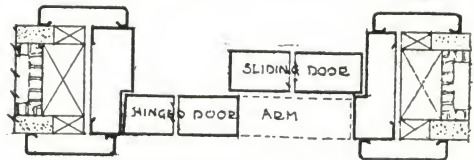
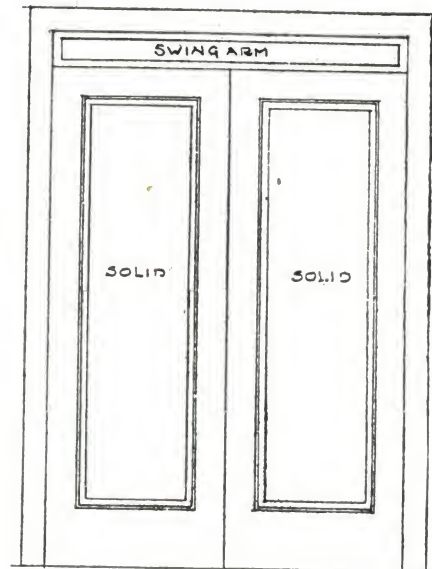


SMOKE SCREEN DETAILS

ALTERNATE CONST.



ELEVATION STANDARD SMOKE SCREEN



COMB. SLIDE & SWING ELEV.

N.Y. KALAMEIN

STANDARD TYPES- SMOKE SCREEN- ELEVATOR OPNG

SEPT-1-26

THE PHILIPP MANUFACTURING COMPANY

Manufacturers of Kalamein Doors, Sliding Door Hardware and Hardware Specialties

EAST HAMPTON, MASS.

Products

METAL COVERED KALAMEIN DOORS, WINDOWS, DOOR FRAMES, TRIM, UNDERWRITERS' LABELED KALAMEIN DOORS; SMOKE SCREENS; ELEVATOR FRONTS; DUMBWAITER DOORS; BRONZE and COPPER KALAMEIN DOORS.

Metal Covered Doors

Wood cores are made of No. 1 sound, kiln dried white pine, free from loose or large knots, dry rot, sap or shake. Machine sized to accurate dimensions.

Stiles and rails mortised and tenoned, are glued with waterproof glue, doweled and wedged, grooved to receive panels.

Metal covering for stiles, rails and panels is 26 gauge galvanized or kalamein 16 to 32 oz. copper, No. 20 gauge bronze. Floor mouldings and trim, 26 gauge kalamein, 14 oz. copper or 24 gauge bronze.

Panels are composition board with metal glued to surfaces with waterproof glue, under pressure.

Special care is taken in assembling to avoid bench marks as much as possible.

All joints between metal filled with solder and scraped smooth. All material has shop coat of special metal primer.

Underwriters' Labeled Kalamein Door

Our Underwriters' labeled kalamein doors are built to requirements of National Board of Fire Underwriters and bear their labels. Single doors not to exceed 4x8 ft., pairs not to exceed 8x8 ft. These must be hung in channel, angle or hollow metal frames. We recommend consulting your local requirements to obtain minimum rates on building and contents.

Hardware

We are in position to fit for all mortised hardware on receipt of hardware schedule and samples.

Metal Covered Windows

Double hung or casement type windows are made in our standard design. All metal drawn on core to give neat and serviceable window.

Kalamein Elevator Fronts

Combined slide and swing, two-speed and three-speed, and standard swing elevator doors are serviceable and noiseless and are extensively used.

Kalamein Smoke Screens

We manufacture kalamein covered smoke screens of all types and for all conditions. Note one of our standard construction on next page.

Bronze and Copper Kalamein Doors

We also manufacture a high grade line of bronze and copper kalamein doors, etc., for entrances in banks, theaters, public buildings, etc.

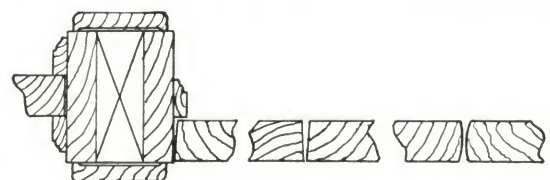
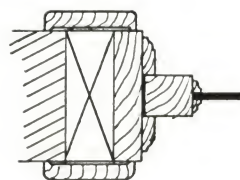
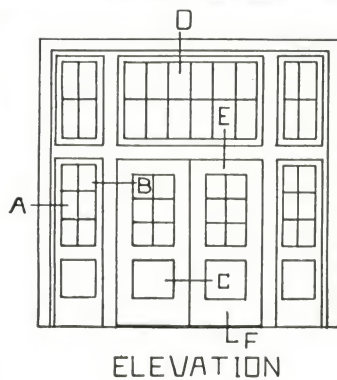
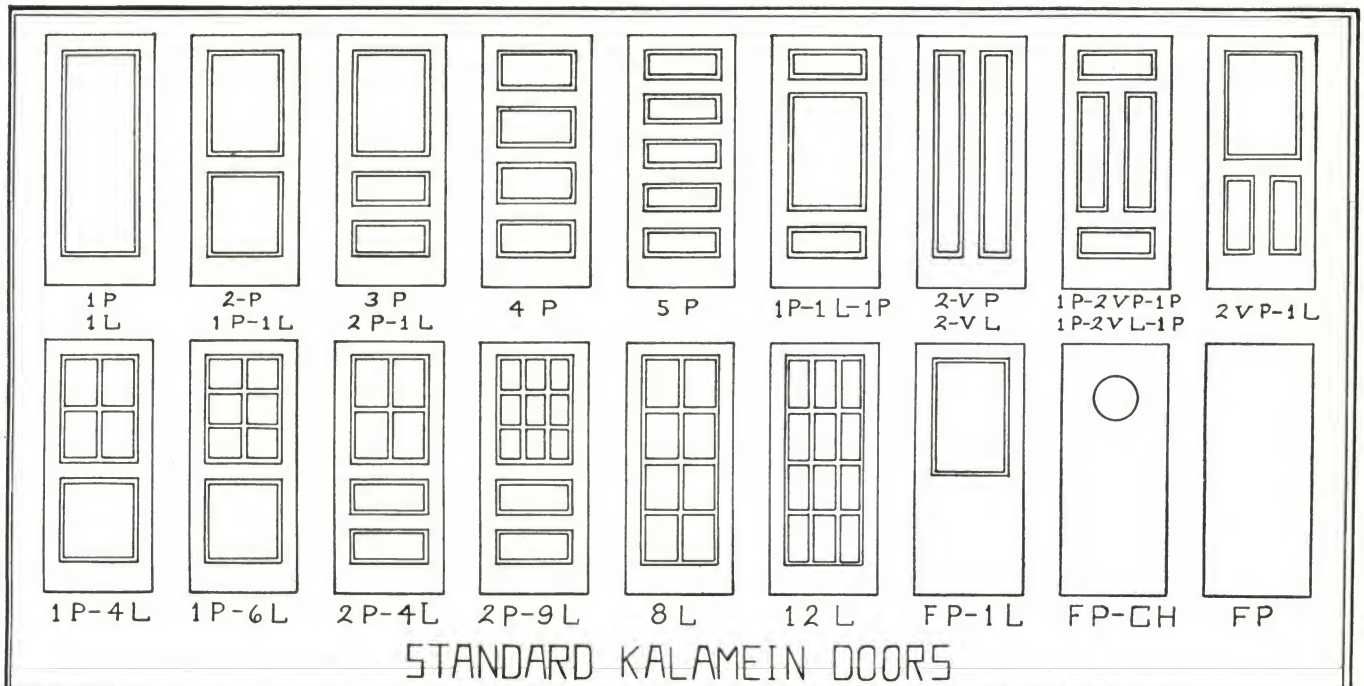
Service

Estimates will be furnished from the architect's plans and specifications. Suggestions and shop drawings will be furnished whenever desired. We solicit your inquiries.

Blue Prints of Mouldings and Casings—We have a series of blue prints of our various stock designs of panel mouldings, stop mouldings, and casings which we will be glad to mail upon request.

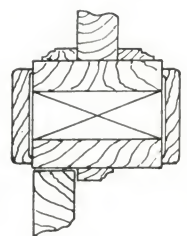
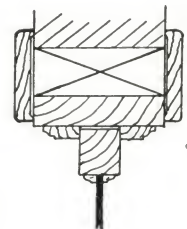
References

Gardner High School, Gardner, Mass.
 Maple Street School, Easthampton, Mass.
 Sacred Heart School, Springfield, Mass.
 Annunciation School, Florence, Mass.
 Leonard Memorial Hospital, Natick, Mass.
 Ward 4 School, Revere, Mass.
 Female Infirmary, Northampton, Mass.
 Granite Street School, Worcester, Mass.
 Nelson Place School, Worcester, Mass.
 Mary Hunt Home, Nashua, N. H.
 Nurses' Home, Bristol, Conn.
 Jefferson School, Meriden, Conn.
 Trumbull Grade School, Meriden, Conn.
 River Street School, Red Bank, N. J.
 Cosmopolitan Club, Atlantic City, N. J.
 Bala Cynwyd Theater, Bala, Pa.
 First Presbyterian Church, Pottsville, Pa.
 Theater, Bryn Mawr, Pa.
 Clevedon Apartments, Philadelphia, Pa.
 Newark Hospital, Rochester, N. Y.
 St. Ann's Home for Aged, Rochester, N. Y.
 Public School No. 15, Rochester, N. Y.
 Empire Theater, Birmingham, Ala.
 Ritz Theater, Birmingham, Ala.
 School No. 20, Scranton, Pa.
 West Side Theater, Scranton, Pa.
 Harris Theater, Tarentum, Pa.
 McFarland Junior High School, Washington, D. C.
 St. Joseph's Home, Washington, D. C.
 Washington City Orphan Asylum, Washington, D. C.
 Semmes Garage, Washington, D. C.
 Hillside School, Hillside, N. J.
 East High School, Youngstown, Ohio
 Washington School, Niles, Ohio
 Cedar Lee Theater, Cleveland, Ohio
 Stark School, Canton, Ohio
 St. Andrews Church, Cleveland, Ohio
 Telephone Building, Ashtabula, Ohio



SECTION - C

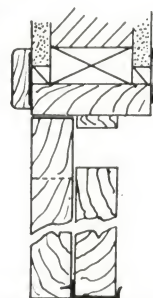
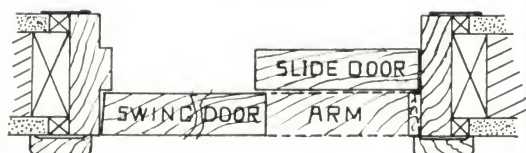
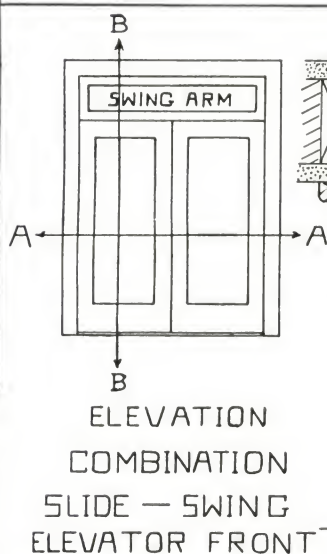
STANDARD
SMOKE SCREEN



SECTION - D

SECTION - E

SECTION - F



SECTION - BB

THE PHILIPP
MFG. CO.-DWG-1

STANDARD KALAMEIN DETAILS FROM
THE PHILIPP MFG. CO.

SCALE - 1½" = 1'-0"
MARCH-'27

SYRACUSE FIRE DOOR CORPORATION

INC.

Manufacturers of Metal Covered Doors and Trim and Tin Clad Fire Doors

900 Canal Street
SYRACUSE, N. Y.

Products

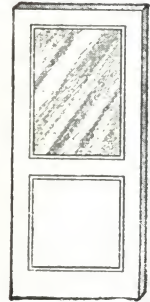
UNDERWRITERS' LABELED and NON-LABELED KALAMEIN DOORS, covered with copper, bronze, or kalamein steel, long terne or galvanized; UNDERWRITERS' LABELED TIN CLAD FIRE DOORS and FIRE DOOR HARDWARE.

Also manufacturers of Metal Covered Frames, Trim, Mouldings, etc.; Metal Covered Window Units, Dumbwaiter Units, Elevator Fronts, Smoke Screens, Partitions, Channel and Angle Iron Frames; Hollow Metal Jams, Bucks, etc.

Syracuse Kalamein Doors

These doors are made in a variety of standard designs for use in office buildings, public buildings, schools, theaters, stores, hospitals, etc.

The wood used in the cores is thoroughly seasoned and air dried before going through the factory. Panels are carefully built up and covered with metal, both sides glued, and placed under heavy pressure to insure good contact and eliminate any buckling. Mouldings are drawn true and accurately mitered. All joints are welded and scraped to smooth surface.



Standard thicknesses for metal covered doors are either $1\frac{3}{4}$ or $2\frac{1}{4}$ in.

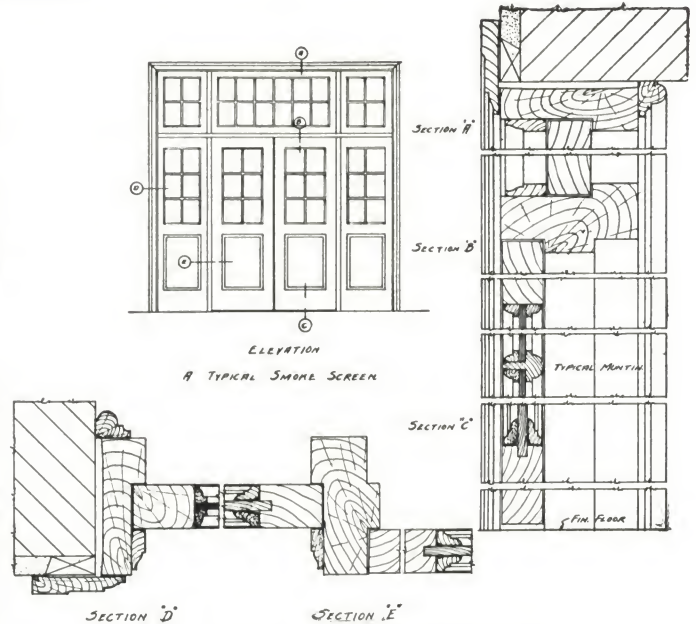
Unless otherwise advised, our doors, etc., are given one shop coat of special metallic primer.

Whenever practical, the metal covering on our kalamein jams, casings, mouldings, etc., is carefully drawn on the wood cores through steel dies.

Labeled Kalamein Doors

We specialize in labeled kalamein doors.

All doors shown below can be labeled excepting doors marked "B," "W" and "X."

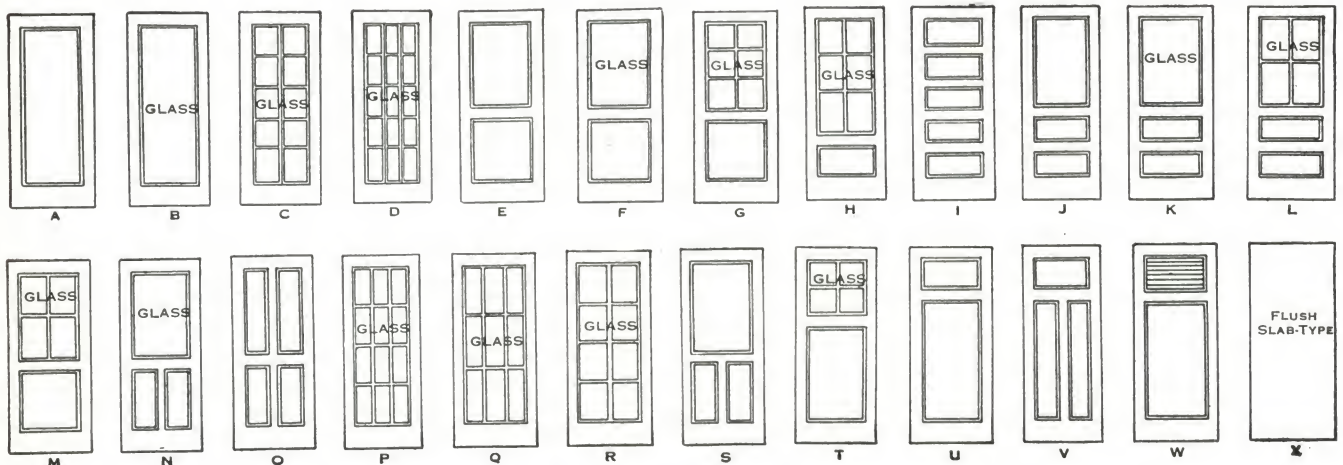
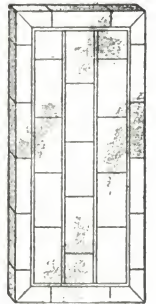


A Typical Smoke Screen Detail

Tin Clad Fire Doors and Shutters

All types of labeled and unlabeled, two-ply and three-ply tin clad fire doors and shutters to fill conditions imposed by insurance and building requirements. First class materials, careful workmanship developed by many years of experience and the most modern and efficient machinery serve to make these fire-proof units of most approved design.

Doors and hardware bearing the label of the National Board of Fire Underwriters' are inspected by their representative at our shop. This is an additional warranty of their worth as fire retardants.



Syracuse Standard Kalamein Doors and Units

THORP FIRE PROOF DOOR CO.

1600-1610 Central Avenue
MINNEAPOLIS, MINN.

Products

THORP METAL COVERED DOORS, FRAMES and TRIM.
THORP SMOKE SCREENS.
THORP No. 14 GAUGE TUBULAR ELEVATOR DOORS.
THORP BRONZE and COPPER COVERED ENTRANCES.
THORP HOLLOW METAL FRAMES.

Facilities

All products are made in our new plant which is equipped with the most modern machinery made to suit our individual requirements and fully capable of handling any size order.

Details

Full size and scale details are submitted by our Drafting Department for architects' checking and approval. The requisite number of copies is furnished the general contractor.

Construction and Materials

Thorp Kalamein Doors are made on the basis of the Underwriters' requirements of 3-ply built-up pine core, heavily lined with asbestos and thoroughly nailed with cement-coated nails. All mortises in the core are made and reinforced for hardware at this point.

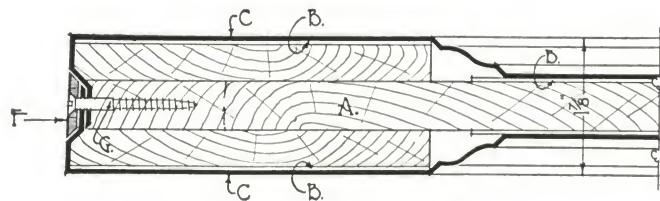
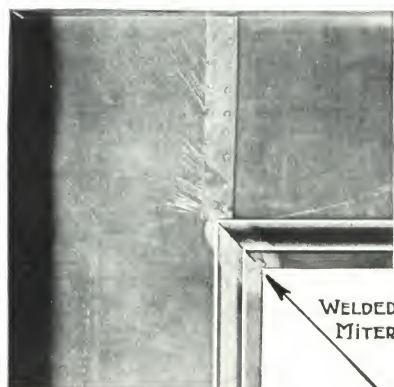


Fig. 1. Section Through Door

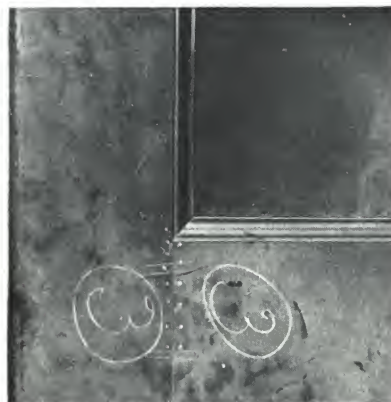
A—Wood core. B—Asbestos paper lining. C—Steel sheet. F—Beveled edge band. G—2-in. wood screw

Metal—The steel covering used is No. 1 furniture steel with 24 gauge for stile and rails, and 20 gauge for panels. If desired, 20 gauge may be specified for stiles and rails as well. The panel mouldings are an integral part of the stiles and rails and formed with them, and are not a separate nailed-in mould.



Back of sheet showing the reinforcement at the butt joint of the stiles and rail, and the welded miter joint of the moulding.

Fig. 2. This System of Welding Avoids All Possibility of Breakage and Looseness



Face of the sheet ready for the polishing.

Welding—All stiles, rails, panels, and panel moulds are electrically welded into one sheet. The two sheets thus formed are lapped on all four edges, formed into a groove and held in place by a steel band. No dependence is placed on mortise and tenon joints or (lag) screws to hold the doors together. No solder is used at all, since the door is welded throughout.

Mouldings—We have a large number of dies for both solid panel and glass panel moulding. Since it is more economical to use standard dies, we make our quotations on this basis unless specifically stated otherwise.

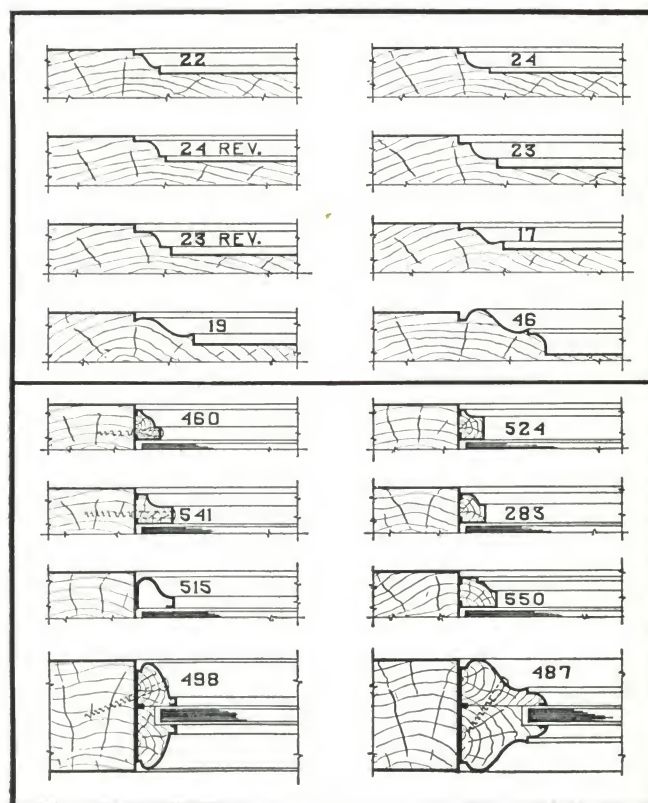


Fig. 3. A Few of Our Many Styles of Casings and Mouldings for Divided Light Panels

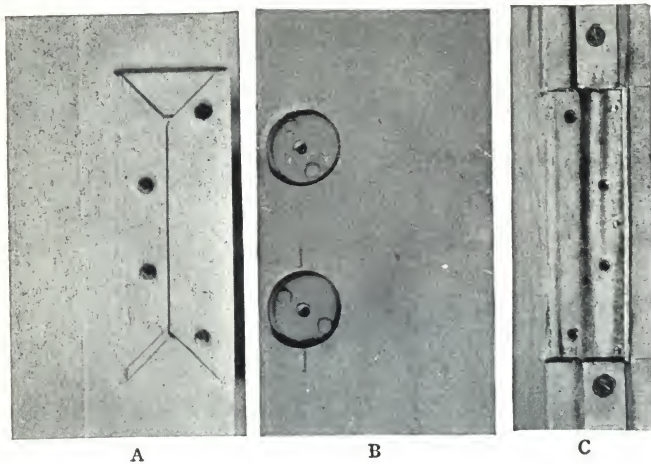


Fig. 4. Details of Hardware Reinforcement

A and B—Photographic section of the jamb at the butt seat, showing the sinkage of the washer nut on the back of the jamb.

C—Section of the back edge of a door showing butt sinkage

These methods are typical of the great care exercised by this organization that all details shall be as strong as possible to resist the action of hard usage and fire. Note that the metal is formed in under the butts

Hardware—All hardware, except checks, is fitted at the factory, provided it is delivered to us with all charges prepaid. In making the mortise seat for the hinge, the metal is not cut away, but formed into the mortise to protect the wood core on both the door and frame. The hinge jambs are suitably reinforced at all hinges to carry the door without any sagging. Necessary reinforcements are placed in the door.

Munt Bars—Our Munt Bar construction is the strongest possible, and the smallest. It consists of

$\frac{1}{8}$ -in. steel bar of door thickness to which the mouldings are machine screwed. When hollow mouldings are used, they are made up in framed, welded units for each glass light opening.

Finish—All grained or enameled finishes are baked and are of the very best seven-coat type. We follow the architect's requirements for each individual order. Unless specifically stated otherwise, all work is primed. Copper-plated finish is electro-copper on steel and may be finished in the various shades of statutory copper. This is practical only for interior use.

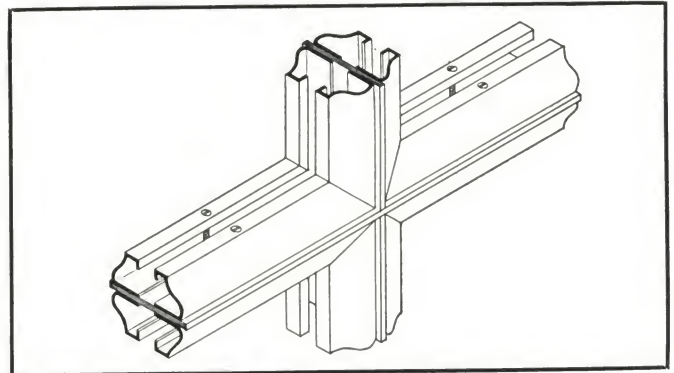


Fig. 6. The Thorp Method of Munt Bar Reinforcement
Insures complete and lasting rigidity in all divided light panels

Hollow Frames

Our frames are adaptable to any type of building or partition construction. They are either 16 or 14 gauge welded joints fully reinforced and fitted for hardware.

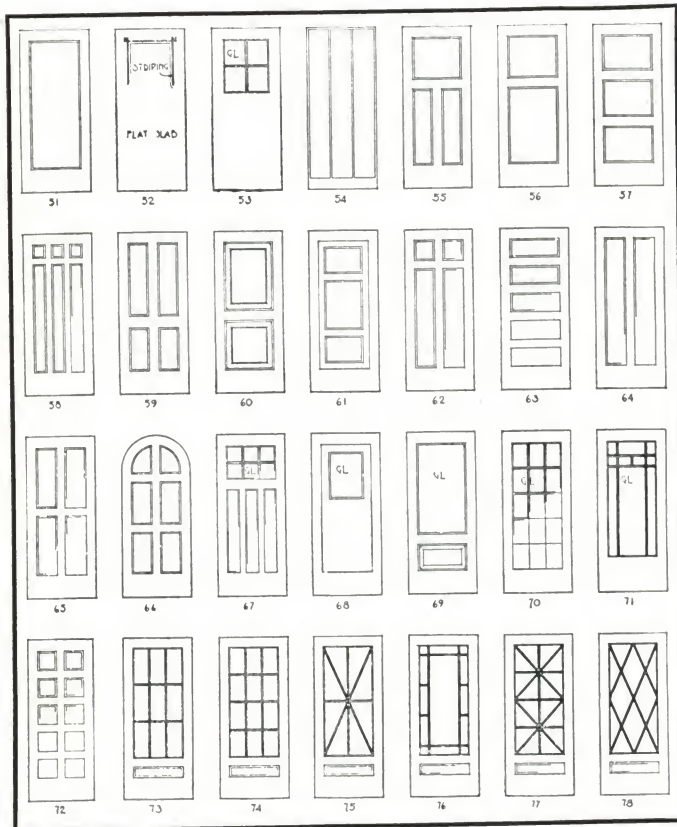


Fig. 5. Some of Thorp Special Panel Layouts

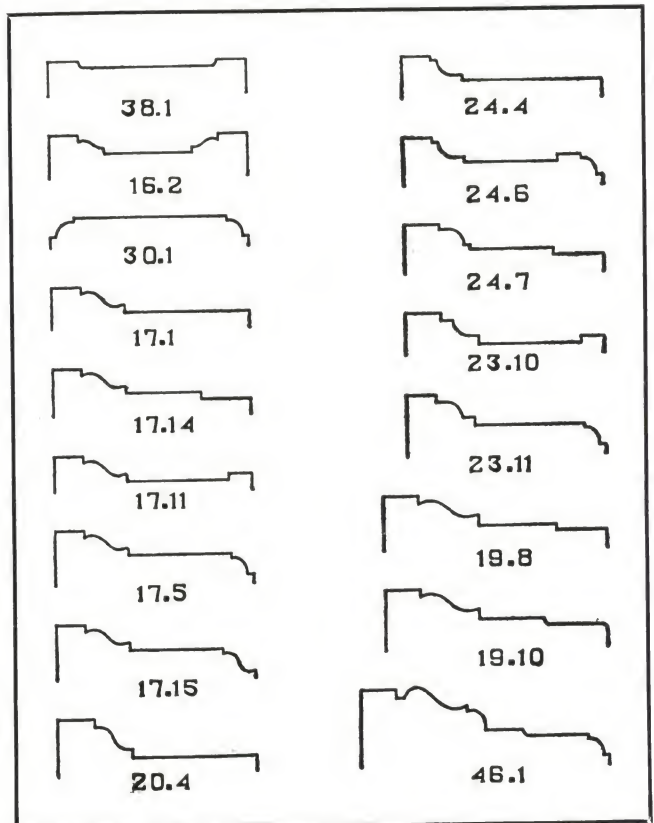


Fig. 7. These Are a Few of the Many Styles of Hollow Trim Architects May Specify

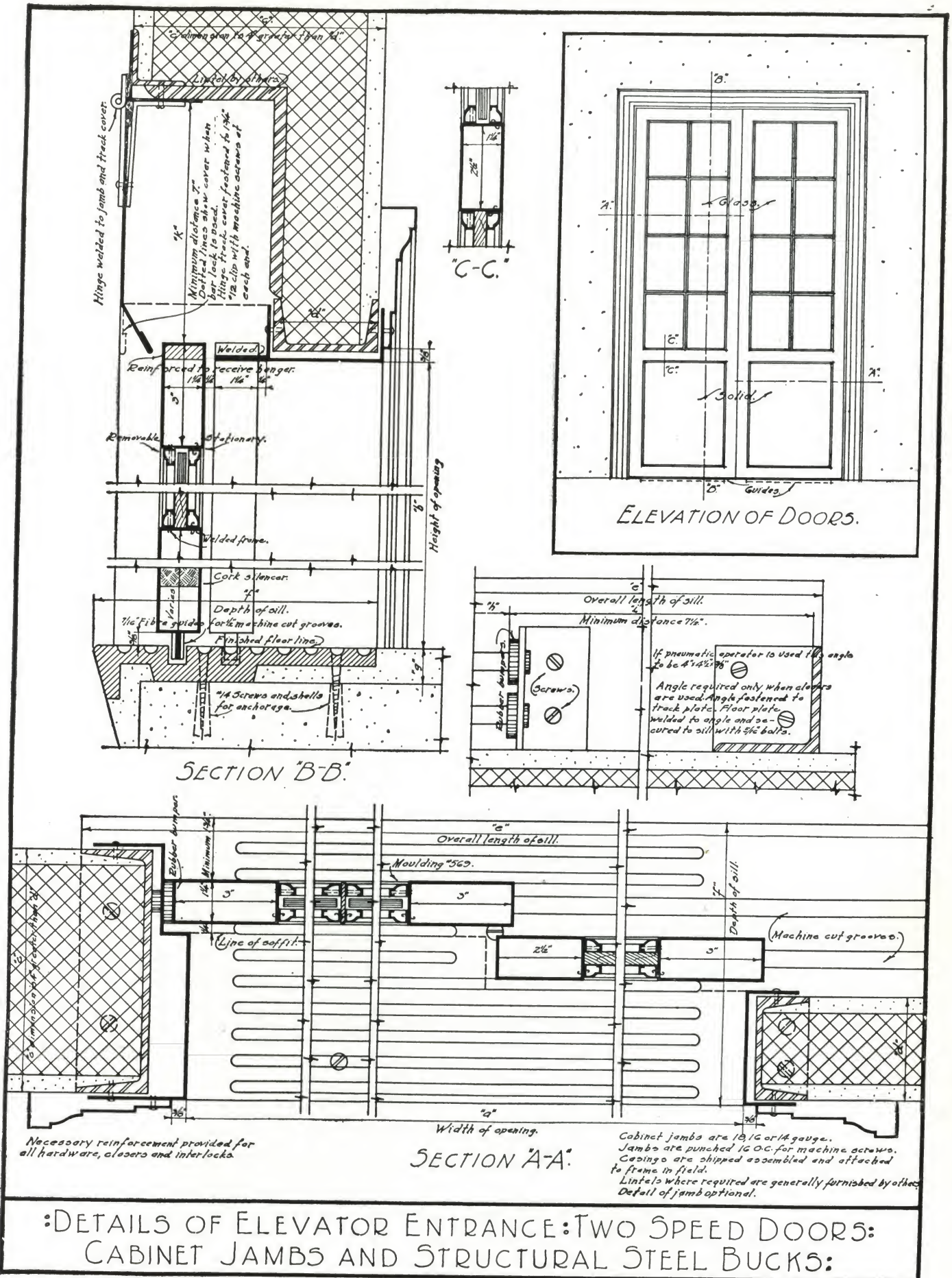


Fig. 8. Typical Detail Sheet of a Thorp Elevator Opening Installation—Note Methods of Construction

Elevator Openings

These may be of metal covered or tubular steel construction. Tubular doors are 14 gauge drawn steel tubes with all mitres and joints welded. Glass mouldings are in welded frame units. This simplifies glass

setting. The Thorp guide is the width of the bottom rail, preventing shaft drafts and light strikes.

The guide is lined both sides with a special grade of hard fibre, obviating metal-to-metal contact, adding to quietness and ease of operation.

We furnish the welded type of hollow metal frame and track cover or cabinet jamb type. Sills and hardware complete are also provided if desired. Sills should be machine grooved or of a similar construction. Elevator openings are finished in baked enamel in any desired wood grain or color. Otherwise it is factory primed.

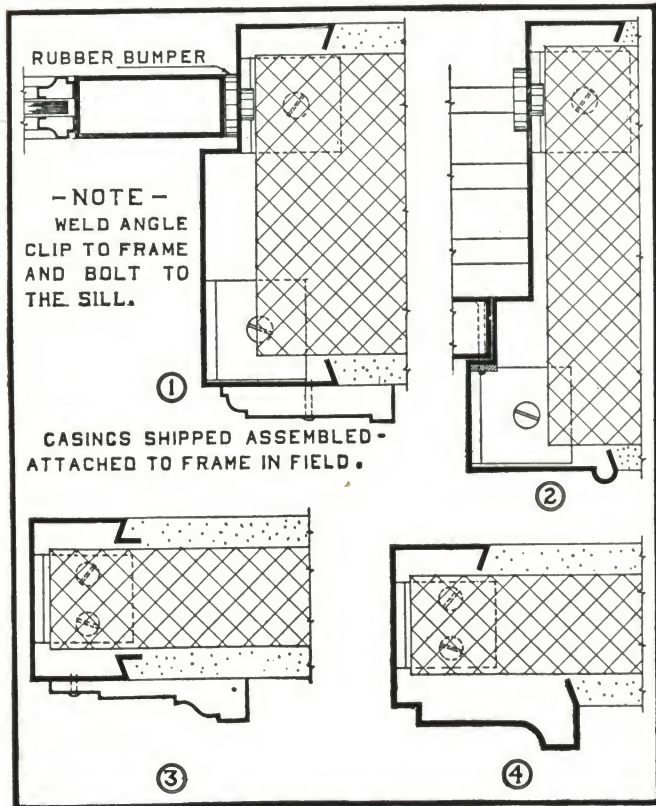


Fig. 9. Four Typical Thorp Elevator Opening Casings

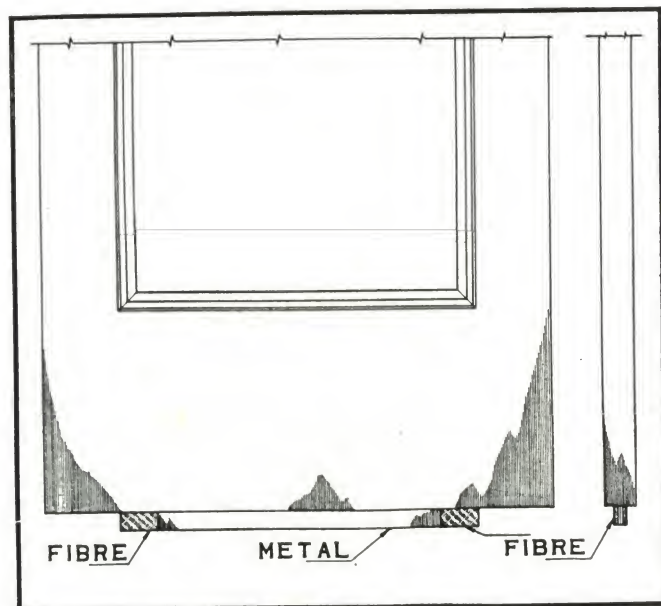


Fig. 10. This Illustrates the Thorp Method of Eliminating Light Strikes Below Elevator Doors and of Reducing Noise

Note hard fibre



Fig. 11. Thorp Elevator Doors As Installed in the New Baker Building, Minneapolis, Minn.

LARSON & McLAREN, Architects

Entrance Doors

Thorp bronze and copper entrances are especially suited to public buildings, such as office buildings, hotels, theaters, etc.

The construction is identical with Thorp steel covered doors except an inside lock seam joint is used instead of welding which is impossible in the case of bronze or copper. No solder is used.

Copper may be 18 oz. to 30 oz. Bronze may be 18 oz. (22 gauge) to 30 oz. (18 gauge). We also use 36 oz. (16 gauge) bronze in hair line joint construction as well as hollow bronze in 16 gauge.

Label Service

If called for, we label doors according to the National Board of Fire Underwriters' requirements for various types of openings. This should be specified when inquiring.

Catalogue

The reference book of Thorp Fire Proof Doors will be sent to any architect who will send for it on his firm stationery. This catalogue of 95 pages will furnish detailed and authoritative information on fire proof doors and allied products.



Fig. 13. Thorp Entrance Doors, Fayette County Courthouse, West Union, Iowa
JOHN G. RALSTON, Waterloo, Iowa, Architect



Fig. 12. Thorp Entrance Doors Were Specified by the Architects of the New Wise Community Center of Holy Congregation
FECHEIMER, IHORST & MCCOY, Cincinnati, Architects



Fig. 14. Thorp Entrance Doors, Main Vestibule Richard J. Kinsella School, Hartford, Conn.
WHITON & McMAHON, Architects

Elevator Openings

These may be of metal covered or tubular steel construction. Tubular doors are 14 gauge drawn steel tubes with all mitres and joints welded. Glass mouldings are in welded frame units. This simplifies glass

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The guide is lined both sides with a special grade of hard fibre, obviating metal-to-metal contact, adding to quietness and ease of operation.

We furnish the welded type of hollow metal frame and track cover or cabinet jamb type. Sills and hardware complete are also provided if desired. Sills should be machine grooved or of a similar construction. Elevator openings are finished in baked enamel in any desired wood grain or color. Otherwise it is factory primed.

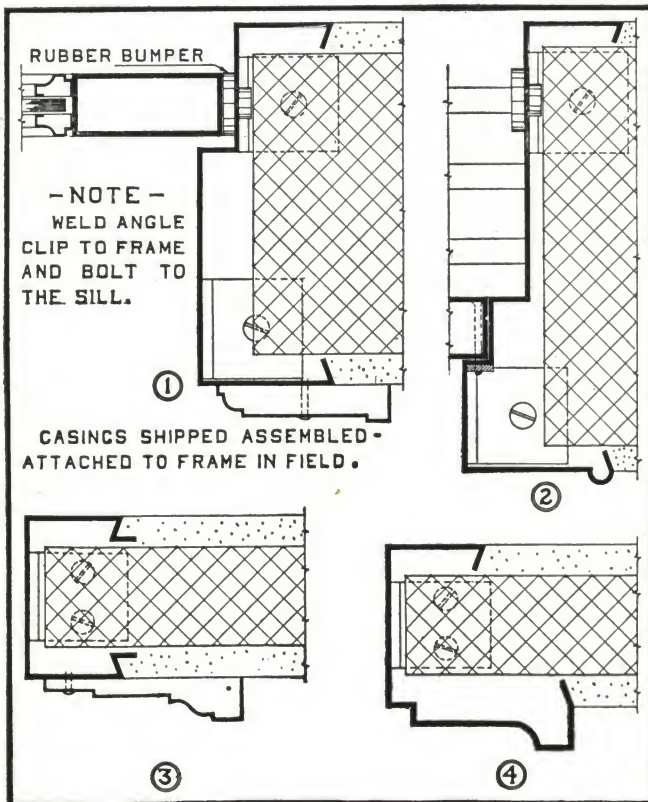


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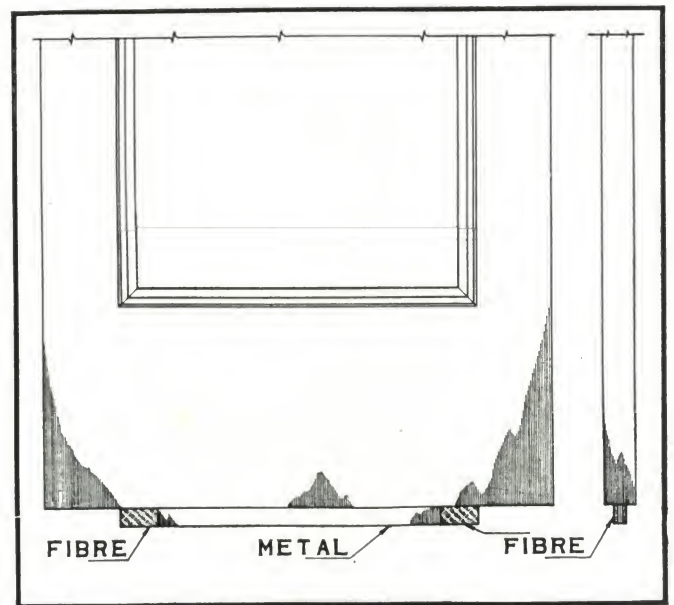


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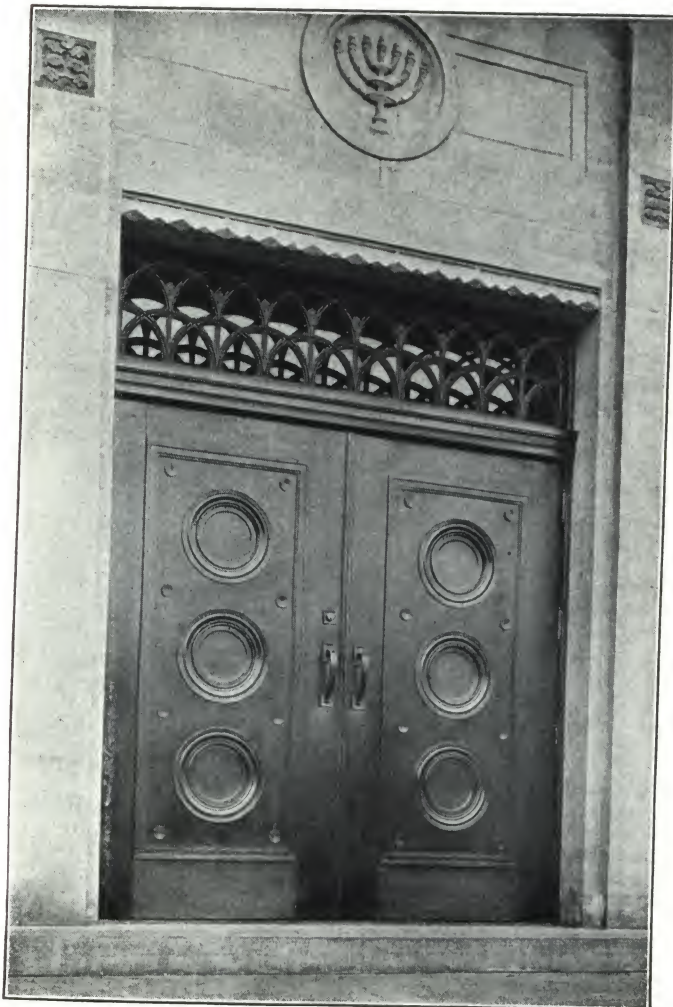


Fig. 12. Thorp Entrance Doors Were Specified by the Architects of the New Wise Community Center of Holy Congregation
FECHEIMER, IHORST & McCoy, Cincinnati, Architects



Fig. 14. Thorp Entrance Doors, Main Vestibule Richard J. Kinsella School, Hartford, Conn.
WHITON & McMAHON, Architects

VULCAN RAIL & CONSTRUCTION COMPANY

Manufacturers of Underwriters' Fire Doors

MAIN OFFICE AND WORKS

Grand Street and Garrison Avenue, MASPETH, N. Y.

BRANCH OFFICE AND SHOPS: 39th Street and A. V. R. R., PITTSBURGH, PA.

Products

VULCAN "ALL-STEEL" FIRE DOORS.

For Pipe, Stair and Bridge Railings, Steel Gratings, Pipe Bends, etc., see page A705.

Underwriters' Approval

The steel fire doors and frames manufactured by this company, and described below, are made in accordance with the specifications of Underwriters' Laboratories, Inc., are inspected by them and carry their Class "C" label.

Vulcan "All-Steel" Fire Doors

Use—These doors are designed for the protection of corridor and partition openings. They are especially suitable for installation in compartment openings in furniture storage warehouses.

Equipment—This type door is furnished with buck and hardware complete, except padlock.

Construction—The entire door, frame and hardware is of steel construction, and all material is painted one shop coat before shipping.



TRADE-MARK

The door sheet is made of blue annealed steel, securely fastened to an angle iron frame, suitable provision being made for expansion in case of fire. This angle frame is braced at intervals of not over 20 in. by cross angles riveted to the door sheet.

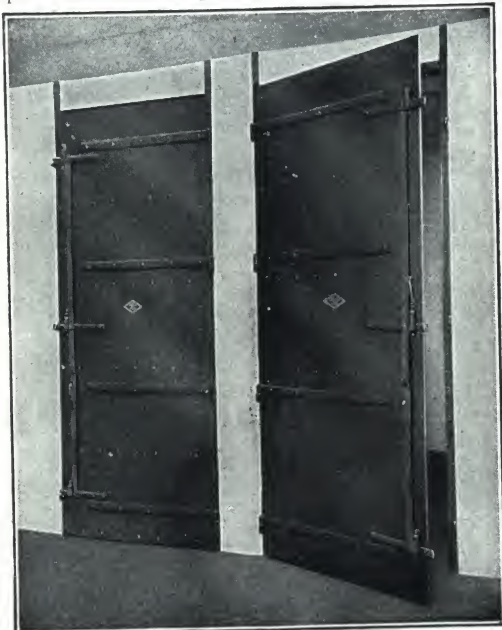
Hardware consists of four strap hinges and a three-point latch with spring to hold latches in their keepers. Latch handles extend through the door to permit opening from both sides.

Buck is made of standard rolled steel channel and is furnished 1 in. wider than partition. It runs from the finished floor to the ceiling and is securely fastened to both. Hinge pintles and latch keepers are riveted

to channel jambs in the shop. Doors are usually made 3x8 ft. 4 in. or 3 ft. 4 in. x 8 ft. 4 in. but can be furnished any size up to 4 x 10ft.

Further Information

Complete detailed drawings, together with further information and prices will be gladly sent on request.



Two Standard Vulcan Doors
One closed and the other partly open



Typical Installation of Vulcan Doors
On both sides of corridor in a furniture storage warehouse

Some Typical Installations

Metropolitan Fireproof Warehouse, New York, N. Y.
Knickerbocker Storage Warehouse Co., New York, N. Y.
Manhattan Storage & Warehouse Co., New York, N. Y.
Job De Camp, Inc., Newark, N. J.
Security Storage Co., Washington, D. C.
Thomas F. Healey & Son, Inc., Brooklyn, N. Y.
Neal Fireproof Storage Co., Cleveland, Ohio
Long Island Storage Warehouse, Brooklyn, N. Y.
Lansing Storage Co., Lansing, Mich.
George B. Holman & Co., Inc., Hackensack, N. J.
W. H. Strang Storage Warehouse, Brooklyn, N. Y.
Flushing Storage Warehouse Co., Flushing, L. I., N. Y.
Neptune Storage Warehouse Co., New Rochelle, N. Y.
O'Brien Express Co., New Rochelle, N. Y.

Eldredge Express & Storage Warehouse Co., Atlantic City, N. J.
Rochester Carting Co., Rochester, N. Y.
Estate of Orrin E. Jones, Providence, R. I.
King-Parker, Inc., New York, N. Y.
Interstate Warehouse Co., Philadelphia, Pa.
Hempstead Storage Corporation, Hempstead, N. Y.
Santini Warehouse, New York, N. Y.
Wm. H. Schaefer & Son, Inc., Stamford, Conn.
J. Kindermann & Sons, Inc., New York, N. Y.
Federal Storage Company, Washington, D. C.
Lehigh & New England Terminal Warehouse, Bethlehem, Pa.
Lincoln Safe Deposit Company, New York, N. Y.
Allport Storage Warehouse Company, Asheville, N. C.
Morgan & Brother Warehouse, New York, N. Y.

LYON-CARR FIRE DOOR COMPANY

Manufacturers of Standard Tin-clad Fire Doors

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WEST 2703

1737-1743 Walnut Street

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Products

LION STANDARD TIN-CLAD FIRE DOORS and SHUTTERS bearing Underwriters' Label.

Also Lion Kalamein Doors and Frames; Lion Standard Meeker Elevator Doors.

Fire Door Types

Designed to conform to various wall conditions, they are of many kinds—swinging (both single and double), and sliding (either gravity, level, horizontal or vertical).

Standard wood core tin-clad fire door construction is extensively used for the protection of large and small openings in fire walls of either old or new buildings.

Official Approval

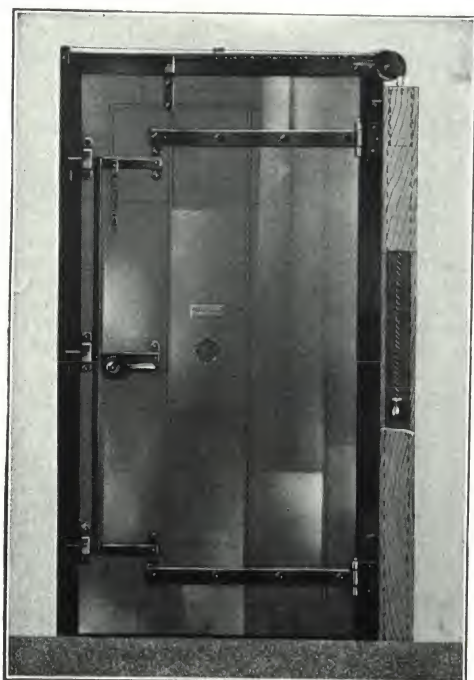
Lion standard tin-clad fire doors and shutters are approved by the National Board of Fire Underwriters, the New England Mutuals and the Associated Factory Mutuals. The doors are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc., and fully approved by local and state inspection bureaus.

Swinging Fire Doors and Shutters

In design, this type can be either single or double swing and hung either to overlap the wall opening or fit in angle frame, both flush and rabbeted.

Complete fire door hardware can be furnished with or without the fusible link automatic closing device.

Window shutters are constructed so as to close flush with the face of wall or overlap.



No. 307. Lion Standard Tin-clad Swing Fire Door

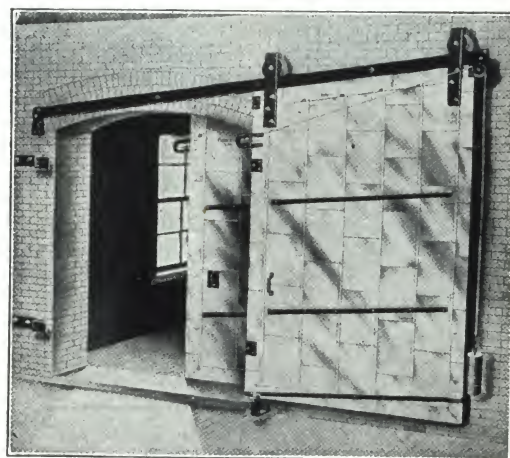
Sliding Fire Doors

Gravity fire doors are particularly adapted to fire wall openings for their easy operation. They are hung on inclined tracks which are pitched $\frac{3}{4}$ in. to the foot. The doors are held open by a counterbalance weight which is released by the melting of the fusible link when exposed to fire or excessive heat. When counterweight is released the door closes rapidly by force of gravity. It slides flush with the wall and does not take up floor space in its operation.

Split-gravity fire doors are designed to meet conditions such as insufficient wall space on either side of opening, and permit doors to slide clear of jamb, or where overhead carrier track passes through opening. Double sets of fire door hardware are required, and can be made split-slide for level track as well.

Level sliding fire doors are used where headroom is insufficient to place the track on an incline as required for gravity door. To meet varying conditions of headroom special designs of level track and hangers are provided.

Vertical slide-up fire doors are used where it is impossible to install either horizontal sliding or swinging fire doors. They are counterbalanced so as to balance the weight of the door, and are so arranged that in case of fire the fusible link releasing the weight, allows the door to descend slowly from force of gravity.



No. 301. Lion Standard Tin-clad Gravity Fire Door

Facilities and Workmanship

We make a speciality of fire door work including the manufacture of standard (non-labeled) Meeker freight elevator doors and non-labeled kalamein doors.

Special fire door hardware designed and manufactured to meet unusual conditions.

Lion fire doors and fixtures are built of the best in material and workmanship combining sturdy construction, rugged strength and promise of long service.

Catalogue

Our latest contains complete description and illustrations of Lion fire doors and fire door hardware.

ESTABLISHED 1866

MERCHANT & EVANS CO.

Manufacturers of Fire Doors and Shutters

PHILADELPHIA, PA.

OFFICES AND WAREHOUSES

PHILADELPHIA, PA. NEW YORK, N. Y. CHICAGO, ILL. WHEELING, W. VA. KANSAS CITY, MO. CLEVELAND, OHIO

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M & E "ALMETL" Labeled FIRE DOORS and SHUTTERS.

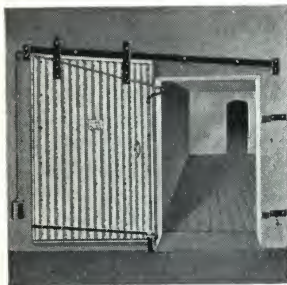
M & E "ALMETL" Unlabeled Doors, for factory and warehouse service.

For "Star" Roof Ventilators, see page A541.

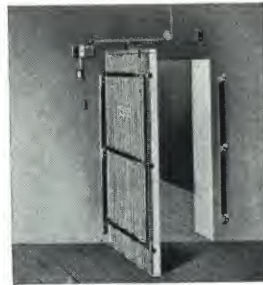
Service

We or our 300 responsible and experienced "contracting and erecting licensees" will quote on "Almetl" Doors and Shutters separately, with or without "approved" hardware and installation—for any contract anywhere.

Our centrally located plant is equipped with up-to-date machinery and skilled workmen. Our sales and engineering department is thoroughly informed and organized for advice on any unusual or complex installation problem.



Single Sliding Door



Single Swinging Door

M & E "Almetl" Labeled Fire Doors

Labeled "Almetl" Fire Doors and Shutters for all building openings under jurisdiction and control of insurance interests.

M & E "Almetl" Fire Doors are made in two thicknesses: 2 3/4 and 1 7/8 in. The 2 3/4-in. door is labeled by Underwriters' Laboratories, Inc. for fire walls (Class A), vertical shafts (Class B), corridor and room partitions (Class C), and exterior openings (Classes D and E) when type and pattern are within the prescribed opening size limits.

The 1 7/8-in. door is labeled by Underwriters' Laboratories, Inc. for Class B, C, D, and E situations when type and pattern are within the prescribed opening size limits.

Approvals—Inspected and labeled by the Underwriters' Laboratories, Inc., Chicago, Ill. and Factory Mutual Laboratories, Boston, Mass.; also approved and used by United States Government. Endorsed and recommended by over 250 National, State and Municipal fire and safety control authorities.

Types—Single sliding, pairs sliding, single swinging, pairs swinging, vertical sliding and horizontal lifting.

We also furnish "Almetl" Doors with convex heads, with panels for wire glass, with wicket gates, or recessed for overhead monorail systems.

Sliding doors made sectional for assembly at destination when occasion requires; and doors to meet special requirements.

Advantages—Aside from the maximum reduction in insurance rates for installation of M & E "Almetl" Doors, the buyer is assured of 100% value, permanence and service due to the lasting and indestructible materials used in their construction. "Almetl" Doors are all steel and asbestos.

Twenty-year guaranteed—no better value in a "labeled" fire stop obtainable.

They are lighter, and the cost of maintenance is negligible.

Description of Door Construction—A panel of transversely laid standard 2 1/2-in. corrugated galvanized steel, with

"ALMETL"
TRADE MARK REG. U. S. PAT. OFF.
**FIRE DOORS
AND
SHUTTERS**

interlining of asbestos—all securely held in a continuous frame of 2 1/2 x 3/8-in. bar steel. All joints are welded and riveted, not bolted. The frame and ends of panel sheet are protected by a cover binder of heavy galvanized sheet steel, securely riveted to the frame, thus forming an armor to protect the edges of the door from abuse.



Construction of "Almetl" Fire Door
Weight, 4 3/4 lb. per sq. ft.

Hardware—Fully approved and labeled hardware furnished with detailed erection prints.

Special hardware to meet unusual conditions when required. Lighter unlabeled hardware for unlabeled doors and panels.

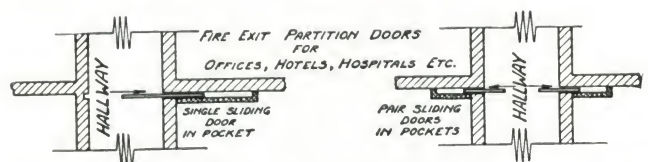
M & E "Almetl" Unlabeled Service Doors

Unlabeled "Almetl" Service Doors for all commercial purposes—to enclose openings to street, yard, loading platforms; for sheds, exterior and interior openings of all kinds not subject to insurance control. These doors are of the same sturdy construction as the labeled product, excepting slight reduction in insulation features.

The special merits and advantages of these doors are light weight, neat appearance, low cost, durability in service. They can be designed for every use and any building mechanic can install them, using standard warehouse door hardware.

Installations

Complete engineering and erecting data with blue prints for all types on request.



Labeled "Almetl" Doors as Lateral Safety and Fire Cut-off

These doors exclusively so used on office floors in new building of National Board of Fire Underwriters, John and Gold Streets, New York, N. Y.

THE PEELLE COMPANY

Manufacturers of Elevator Doors

TELEPHONE
STAGG 0366

47 Stewart Avenue

BROOKLYN, N. Y.

DISTRICT OFFICES

BOSTON, 18 Tremont Street—Telephone, Fort Hill 747
CLEVELAND, 605 Caxton Building—Telephone, Main 4053

CHICAGO, 470 Wrigley Building—Telephone, Superior 6593
DETROIT, 611 Lincoln Building—Telephone, Cadillac 4920

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Products

PEELLE TRUCKABLE ELEVATOR DOORS.

PEELLE TEL-Co-DOR (2-section Slide-up Door).

PEELLE HORIZONTAL BI-FOLD CANOPY or JACK KNIFE TYPE DOORS.

For Peelle Standard Steel Plate Counterbalanced Dumbwaiter Doors, see page C3166.

Peelle Truckable Elevator Doors

Recommended for openings in freight elevator shafts and made in two types:

Regular Type (details showing operation on the following page).

Pass Type (details showing operation on the following page).

These types are manufactured by this company under the direct supervision of the Underwriters' Laboratories, Inc., and may be had in kalamein, corrugated steel, or tin clad.

Operation—The door is opened manually; the two sections slide, one up and the other down; each section is equipped with antifriction shoes working in substantial steel guides mounted at jambs on shaft side of opening. Both sections being equal in weight, the door is self-counterbalancing; the amount of effort required for operation need be only enough to overcome the friction of the moving parts.

Construction—The door is mounted on the inside of the elevator shaft giving a clear opening for loading and unloading car. The two sections are connected by strong flexible flat link chains which travel over heavy double race ball bearing sheaves housed in malleable steel brackets. Wearing parts are all of extra heavy design.

Truckable Feature (Patented)—The top of the lower panel of the Peelle elevator door is especially reinforced. A heavy bar which serves as part of this reinforcing extends beyond the sides of the door. When the door is open, this bar rests on solid stops fastened to the guide rails, keeping it in rigid alignment with the floor of the car and building sill, completely filling the gap between and presenting a smooth surface to truck wheels. This bar can be made to carry any specified load.

Electric Interlock—The laws of most states require that all doors to elevator shafts be equipped with a safeguard against leaving the openings unprotected. For ordinary use we recommend our electric interlocking system which prevents the movement of the elevator car until all doors in the shaft are first closed. This is accomplished by means of an individual switch at each opening. An emergency switch in glass covered box can be installed in elevator car, to operate car with doors open, in an emergency.

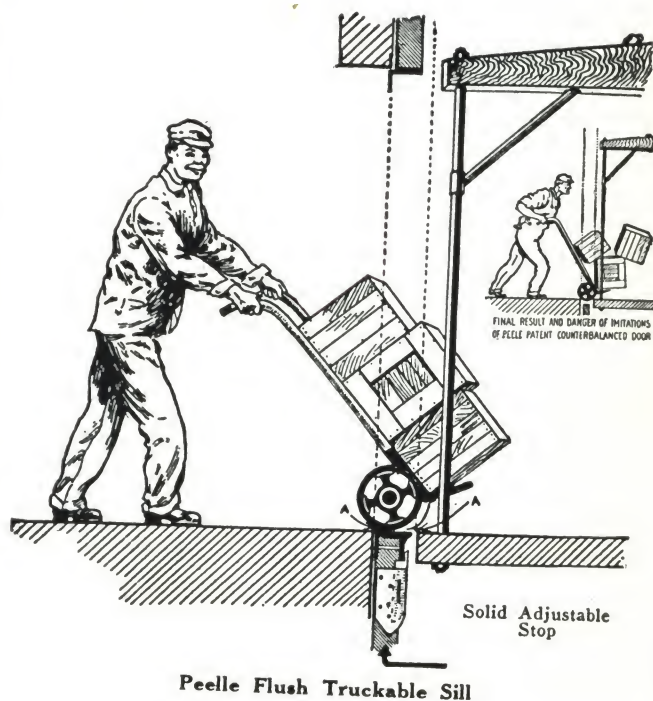
Elevator cars not having a full magnetic control are equipped with the Peelle mechanical interlock making it possible to interlock any type or make of car.

Peelle Electric Full Automatic Doors—Peelle doors may be equipped with a motor driven device located in the pent house. This device opens and closes the doors by operating a switch in the elevator cab. This switch is so arranged that if the operator removes his hand, closing of the doors stops instantly. All doors are inoperative except at the specific landing where car is located.

In case of emergency a lever is pulled which disconnects the doors from the machine. The doors may then be manually operated.

Underwriters' Label—The aforementioned two types of Peelle elevator doors, when specified, bear the label of the Underwriters' Laboratories, Inc., and the Factory Mutual Insurance Companies on doors up to 8 feet in width and 10 feet in height. Doors exceeding these dimensions can, however, be made according to label specifications and labeled by the Factory Mutual Companies only.

Metal Covered Doors—Panels are made of two thicknesses of white pine, covered with flat sheets, galvanized, and applied to form Manufacturer's R9 panel,



Peelle Flush Truckable Sill



**Peelle Elevator Door, New Process Gear Corp.,
Syracuse, N. Y.**

set and bolted into angle iron frames with reinforced corners. Tin clad panels are used when maximum strength, rigidity, durability and fire protection are required. Labeled by the Underwriters' Laboratories, Inc. up to 8 feet in width and 10 feet high. Doors exceeding these dimensions can be labeled by the Factory Mutual Companies only.

Kalamein Doors—Panels made of two thicknesses of white pine covered with smooth kalamein iron tightly drawn, set and bolted into angle iron frames with reinforced corners. Design can be made to harmonize with interior trim. Maximum amount of glass permitted by most departments is 720 square inches but exterior doors may frequently have more. Underwriters' Laboratories, Inc. label furnished on plain paneled doors not over 8 feet in width and 10 feet in height. No label can be had on glass paneled doors.

Corrugated Steel Doors (Patented)—These doors are built of No. 18 gauge corrugated steel sheets but panels of any desired thickness can be built to order. Underwriters' labeled corrugated steel paneled doors are reinforced with our patented T-bar traveling rail and binder shoe; the rail dovetails into the shoe and is the means of tying both panels of the door securely to the sill and lintel of the opening. The panels are held tightly to the wall when the door is in closed, open or partly open position.

Standard Specifications for Elevator Doors

For all openings in the freight elevator shaft furnish and install in complete working order Peelle Elevator Doors as manufactured by THE PELLE COMPANY, 47 Stewart Avenue, Brooklyn, N. Y.

The panels to be metal clad R9 [kalamein] [corrugated steel] labeled by the Underwriters' Laboratories, Inc. [the Factory Mutual Insurance Companies] (architect to choose).

The doors to be divided horizontally in the center, each half balancing the other. At the upper edge of the lower section, provide a reinforced truckable sill support on each side of the opening by adjustable stops, to carry a trucking load of pounds.

The doors to hang on heavy flat link chain running over 4½-in. double race ball bearing sheaves and operating on the inside of the shaft on malleable steel shoes working in steel guides to eliminate friction.

All doors to be manually operated and equipped with the Peelle Electric Interlocking system for a car switch [double button] [full automatic push button] controlled elevator.

These doors to be guaranteed for a period of two years

after date of completion against defects in workmanship and materials.

A Few Users Who Have Made Numerous Peelle Door Installations

Buick Motor Co.
Cadillac Motor Car Co.
B. F. Goodrich Rubber Co.
International Motor Co.
Hupp Motor Car Corp.
Dodge Brothers
Studebaker Corp.
Packard Motor Car Co.
Hudson Motor Car Co.
Ford Motor Co.
Fisher Body Corp.
Chevrolet Motor Co.
Manhattan Storage Warehouse
Reid Ice Cream Co.
Breyer Ice Cream Co.
Westinghouse Electric & Mfg. Co.
General Electric Co.
Great Atlantic & Pacific Tea Co.
H. C. Bohack Co.
F. W. Woolworth Co.
S. H. Kress
John Wanamaker
McCrory Stores Corp.
S. S. Kresge
W. T. Grant Stores
Gimbel Brothers
Bloomingdale Brothers
L. Bamberger & Co.
General Cigar Co., Inc.
R. H. Macy & Co.
Wm. Filene's Sons Co.
Frank & Seder
J. L. Hudson Store
May's Department Store
Saks & Co.
Mohawk Carpet Mills, Inc.
Stephen Sandord and Sons, Inc.
Alexander Smith & Sons Carpet Co.
American Can Co.
Ward Baking Co.
National Biscuit Co.
General Baking Co.
Carolina Baking Co.
New York Central Railroad
Baltimore & Ohio Railroad
Goodyear Tire & Rubber Co.
Fisk Rubber Co.
Firestone-Apsley Rubber Co.
Standard Oil Co.
Swift and Co.
Mergenthaler Linotype Co.
Doubleday Page & Co.
Standard Sanitary Mfg. Co.
Crane Co.
Cushman's Sons, Inc.
Dugan Brothers
New England Baking Co.
James Butler, Inc.
North East Electric Co.
Armour & Co.
E. I. du Pont de Nemours
Valentine & Co.
National Lead Co.
Patterson Sargent Co.
Pittsburgh Plate Glass Co.

Regular Type of Peelle Elevator Door

Regular Type Peelle doors, as shown in the left-hand illustration, are used except where story heights require Pass Type doors as shown in the right-hand illustration.

Peelle elevator doors are horizontally divided at the center and slide vertically, inside the elevator shaft, between the wall and the elevator. The door sections balance each other and move simultaneously up and down.

The full opening is obtained, when the doors are open, for loading and unloading. When the doors are closed, freight and loaded trucks may be placed near the doors without interfering with the operation of the door, thus speeding up the traffic and increasing the efficiency of the elevator.

Every Peelle door is especially designed and reinforced to meet the traffic of the industry in which it is to be used. THE PEELE COMPANY'S unconditional guarantee is back of every installation, which insures the user the highest degree of freight elevator efficiency.

Service to Architects—Special specifications will gladly be furnished, with a quotation, to architects who wish to specify Peelle doors.

Pass Type Peelle Elevator Door

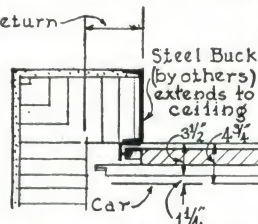
(See detail for clearances.)

This door is used in buildings having high door openings and low story heights, where the regular type can not be used. They can be installed wherever the vertical distance between openings is 12 inches or more, and require no special construction.

The operation is the same as the regular type, except that the panels are staggered and run on separate guides; by this arrangement, the upper panel when open occupies a position directly alongside of the lower panel of the door above. The lower panel likewise lapping the upper panel of the door below (see detail). The gap formed at the lintel is effectually closed by a movable lintel which operates automatically and is so constructed as to allow the lower panel of the door above to pass as required.

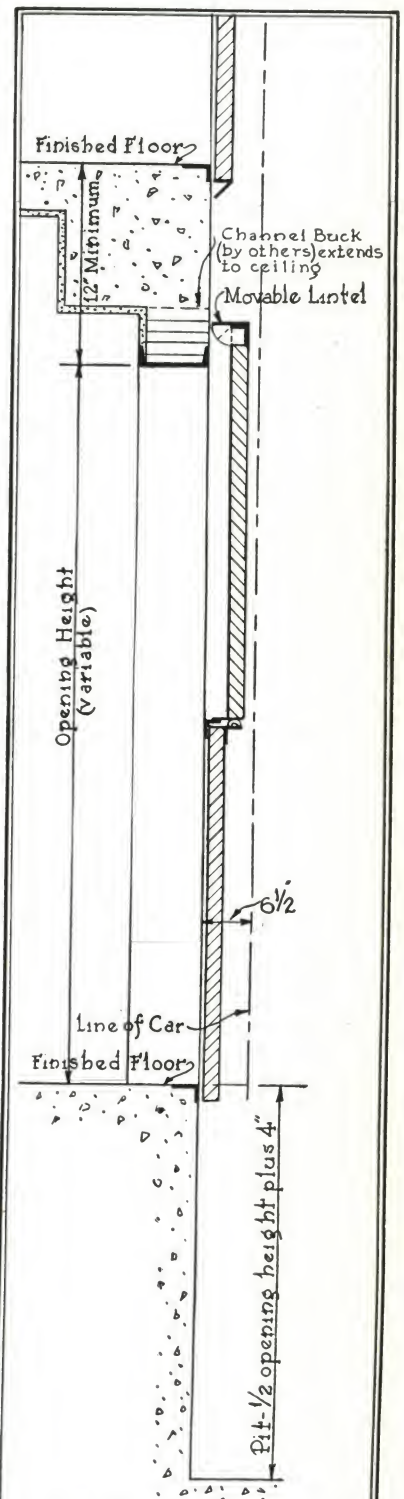
NOTE—These doors can be made in Tin Clad, Kalamein or Corrugated Steel

7" Min return



VERTICAL SECTION

PLAN SECTION AT JAMB

REGULAR TYPE
PEELLE ELEVATOR DOOR

VERTICAL SECTION

PLAN SECTION AT JAMB

PASS TYPE
PEELLE ELEVATOR DOOR

Peelle Tel-Co-Dor

(See details for clearances.)

This door is made for two distinct uses:

The small Tel-Co-Dor is built for use as an elevator door. The large Tel-Co-Dor is built for large exterior openings and is used in warehouses, loading platforms, etc.

All doors of this type are reinforced with our patented T-bar traveling rail and dovetail binder shoes—one or more to the door according to size.

This door is a counterweighted door divided horizontally in the center; the two panels thus formed, in operation travel upward, both panels arriving at the lintel simultaneously.

Tel-Co-Dor (Elevator)—This door can be made in tin clad, kalamein, or corrugated steel, but for general use corrugated steel is recommended. Labeled by the Underwriters' Laboratories, Inc., and acceptable to all State and labor departments.

Tel-Co-Dor (Warehouse)—This door can be made to any size desired and can be made in tin clad, kalamein, corrugated steel or wood. The door sections move upward simultaneously, and reach the upper limit of travel at the same time.

In this type of door the panels remain in the same vertical plane, removing all strain from the door due to opening and closing. This type of door has been made in three and four sections to meet special conditions.

Co-operative Service—Send us a sketch of your conditions and our engineering department will be glad to make our recommendations without any obligation on your part.

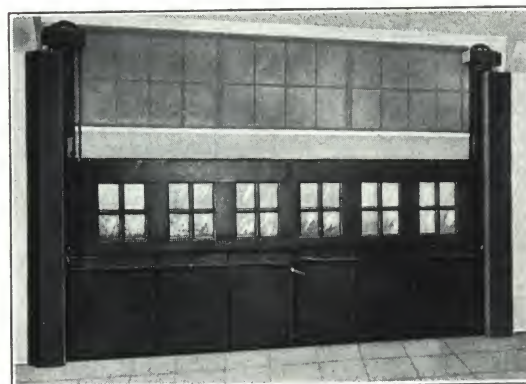
Installation

All Peelle doors are erected by mechanics experienced in the installation of our product.

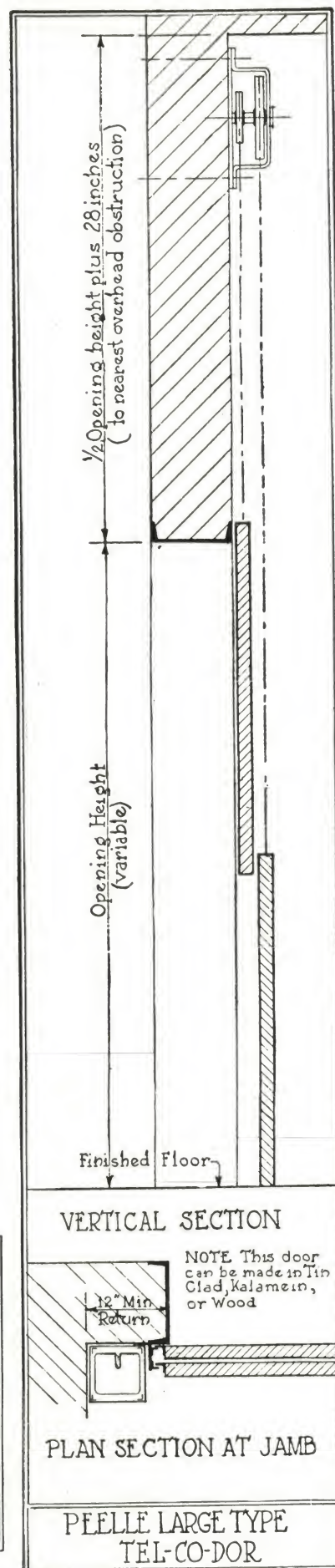
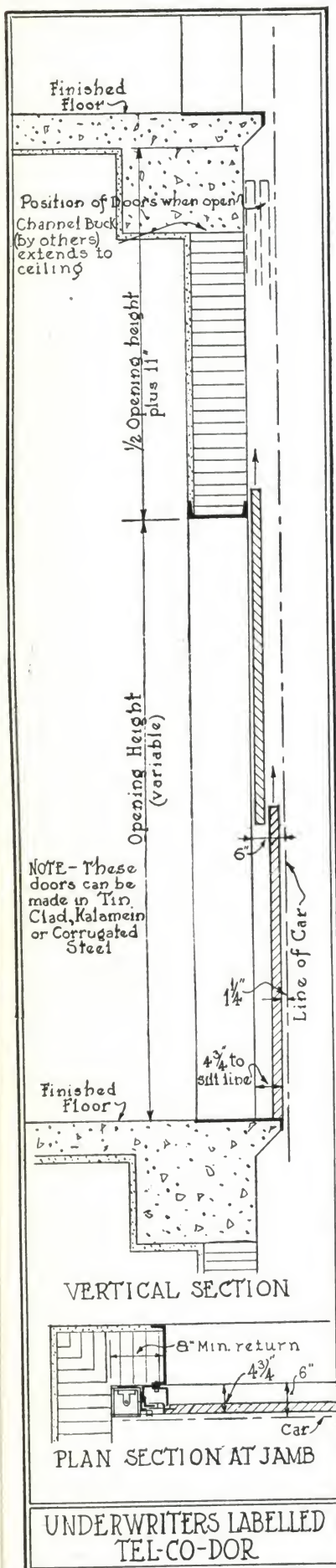
Painting

All hardware is given a heavy priming coat of metallic paint by this company before leaving the factory.

Additional coats of paint after erection should be specified to be done by painting contractor.



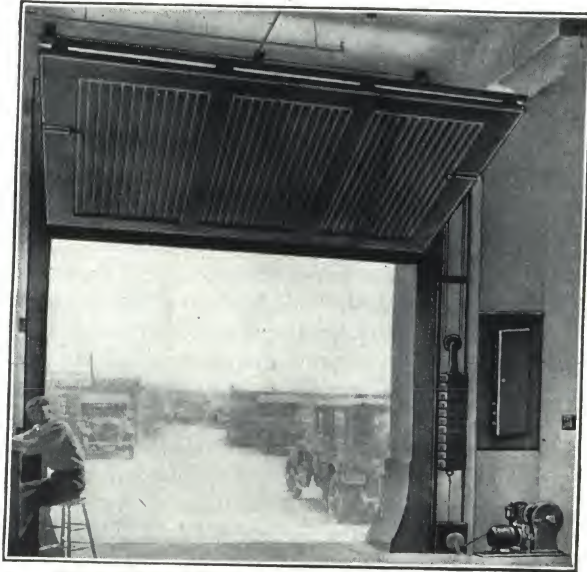
Large Type Tel-Co-Dor



Peelle Folding Canopy Doors

(See detail for clearances.)

Installed on either inside or outside of opening



Electrically Operated Folding Canopy Door

Installed in Packard Automobile Service Station, L. I. City, N. Y.

and can be operated by means of chain hoist and counterweights, electric full automatic machine, or differential geared hoist.

Panels made to any specification of design or construction. These doors can also be installed when conditions do not meet the requirements detailed below.

Co-operative Service—

Send sketch or description of conditions and our engineering department will gladly submit details showing how door can be applied.

Standard Specification—

Furnish, deliver and erect, Peelle Bi-folding doors where noted on the plans, as manufactured by THE PELLE COMPANY, 47 Stewart Avenue, Brooklyn, N. Y.

The door sections shall be constructed of 2½-in. thick selected white pine stiles and rails paneled as shown on plans. (The doors shall be covered with kalamein sheets.)

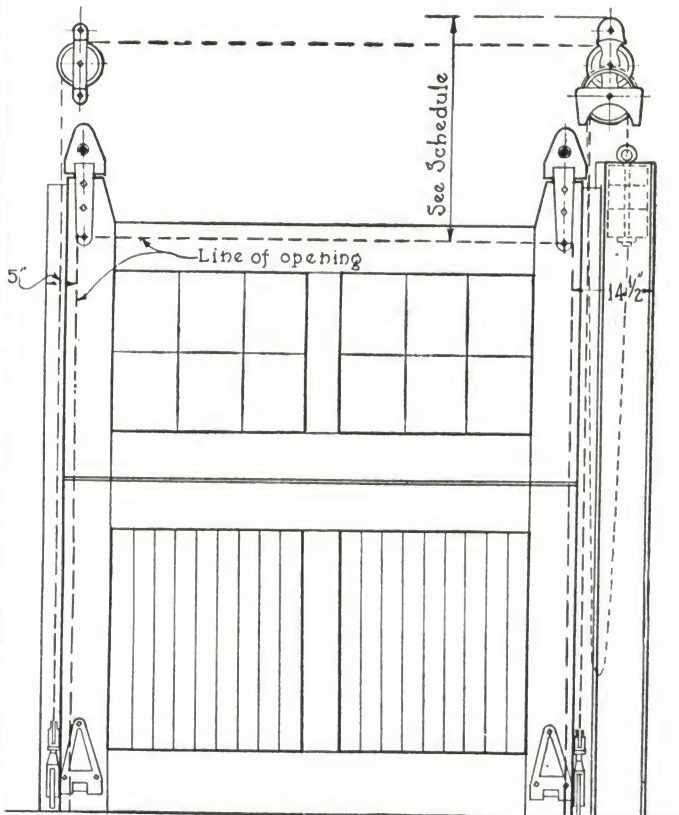
The hardware shall be of malleable and wrought steel throughout, with roller and ball bearings at all moving points.

The operation shall be by an endless hand chain operating a differential geared hoist. (The operation shall be by means of a push button, controlling a 2 hp. motor, solenoid brake, worm and gear and traction sheaves).

The doors shall close against the wall automatically in closing and break automatically in opening.

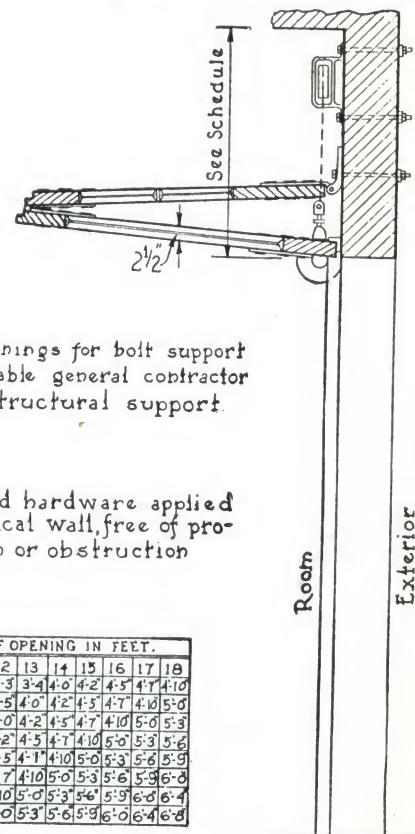
The installation shall be guaranteed two years against defects in workmanship and materials.

NOTE:—These doors can also be installed when conditions do not meet the requirements detailed below. Send sketch or description of conditions and our engineering department will gladly submit details showing how door can be applied.



ELEVATION—INTERIOR

Wire glass furnished by Peelle only
when specified
Schedule only applies to wood doors



CROSS SECTION—OPEN

When fastenings for bolt support are not available general contractor to furnish structural support

Door and hardware applied to vertical wall, free of projection or obstruction

HEIGHT FEET	10	11	12	13	14	15	16	17	18
10	3'-0"	3'-1"	3'-3"	3'-4"	4'-0"	4'-2"	4'-5"	4'-7"	4'-10"
11	3'-1"	3'-3"	3'-5"	4'-0"	4'-2"	4'-5"	4'-7"	4'-10"	5'-0"
12	3'-3"	3'-5"	4'-0"	4'-2"	4'-5"	4'-7"	4'-10"	5'-0"	5'-3"
13	3'-4"	4'-0"	4'-2"	4'-5"	4'-7"	4'-10"	5'-0"	5'-3"	5'-6"
14	4'-0"	4'-2"	4'-5"	4'-7"	4'-10"	5'-0"	5'-3"	5'-6"	5'-9"
15	4'-2"	4'-5"	4'-7"	4'-10"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"
16	4'-5"	4'-7"	4'-10"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-4"
17	4'-7"	4'-10"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-4"	6'-8"

PEELLE FOLDING CANOPY DOOR

RICHMOND FIREPROOF DOOR CO.

RICHMOND, IND.

Branch Offices and Agents with Sales, Erection and Service Facilities in 50 Principal Cities Throughout the United States, including

NEW YORK, N. Y.
CHICAGO, ILL.
BALTIMORE, MD.
TAMPA, FLA.
KANSAS CITY, MO.

LOS ANGELES, CAL.
SAN ANTONIO, TEX.
ST. LOUIS, MO.
WASHINGTON, D. C.
MILWAUKEE, WIS.

PHILADELPHIA, PA.
CLEVELAND, OHIO
BOSTON, MASS.
ATLANTA, GA.
HARRISBURG, PA.

CINCINNATI, OHIO
LOUISVILLE, KY.
MIAMI, FLA.
CHARLOTTE, N. C.
DETROIT, MICH.

MINNEAPOLIS, MINN.
SYRACUSE, N. Y.
PITTSBURGH, PA.
RICHMOND, VA.
BUFFALO, N. Y.

Products

RICHMOND FIREPROOF DOOR CO. has been engaged continuously for thirty-six years in the manufacture, sale and erection of the following products:

FIRE DOORS: Tin clad, corrugated iron, kalamein and steel plate.

COUNTERBALANCED FREIGHT ELEVATOR DOORS: Tin clad, corrugated iron, kalamein, wood and steel plate.

BI-FOLDING, SINGLE SLIDE-UP, TELESCOPING, TURN-OVER, DOUBLE and SINGLE SWINGING and SLIDING DOORS made of all the preceding materials for industrial purposes.

STORAGE ROOM UNITS.

KALAMEIN FRAMES, TRIM, CASINGS, MOULDINGS and SMOKE SCREENS.

Also Electric Interlocks; Steel Bucks.

All of the preceding products are labeled when permissible under the regulations of the Underwriters' Laboratories, Inc., Chicago.

This Company manufactures every type of **FIRE RETARDANT DOOR** except hollow metal and rolling steel curtains.

Kalamein Doors may be finished shop coat or durable baked enamel, plain color or wood grained. We use the term "kalamein" in its modern sense—metal covered. Our metal is patent leveled galvanized stock. Specify *galvanized* sheet—it lasts.

Fire Doors

The three illustrations show the swinging and sliding corrugated iron fire doors and storage room steel plate door, all being labeled by the Underwriters Laboratories, Inc.

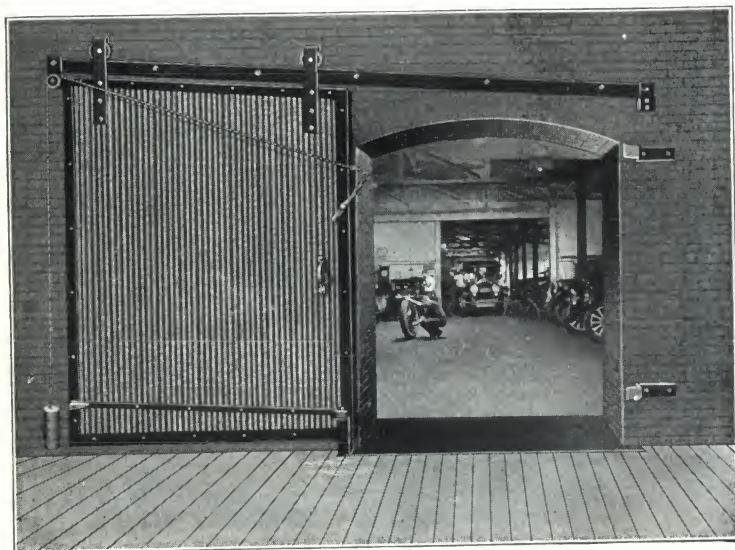
The relative appearance of the doors is clearly shown. The corrugated iron doors may have wickets. The swinging type may be single or in pairs, to lap the openings or to close into wall frames, to suit all conditions and openings, and may be labeled for all situations similar to tin clad doors. They may have glass panels for Class C and D openings.

The steel plate doors are labeled for storage room openings only.

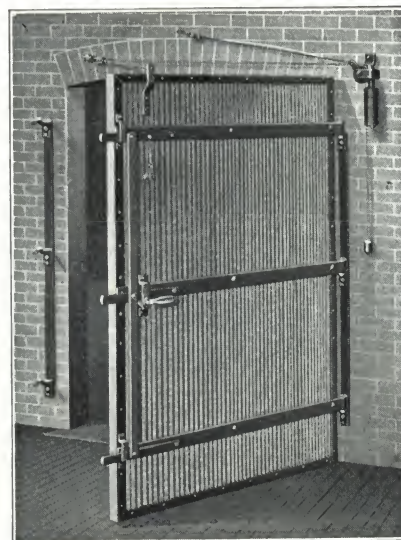
Write for catalogue—it contains a full description of the various types with useful information regarding layout and clearances.



Steel Plate Storage Room Door



Corrugated Iron Sliding Fire Door



Corrugated Iron Swinging Fire Door

Elevator and Dumbwaiter Doors

Counterbalanced elevator doors are now universally preferred for freight elevator shafts because they are installed entirely on the inside of the shaft and do not encroach either on floor space or car platform. They provide maximum clear opening.

The door is divided into two equal sections, one half sliding up and the other half sliding down. The guides are bolted to the wall or opening frame.

Vertical telescoping doors are similar in design except that both halves slide upwards, the lower section traveling twice as fast as the upper.

For these types, regular installation requires a distance from floor to floor of one and one-half times the opening height, plus 9 in. for counterbalanced, and 24 in. for vertical telescoping doors, respectively. For limited floor heights the counterbalanced door may be furnished in pass type construction.

Corrugated iron vertical telescoping and counterbalanced doors of the tin clad, kalamein or corrugated iron construction may be labeled by the Underwriters. Both types may also be made of wood for exterior openings or shipping platforms, but are not labeled.

Operation may be manual, semi-automatic closing or electric interlocking.

Vertical telescoping doors are especially adapted to use for shipping platforms or garage and similar openings.

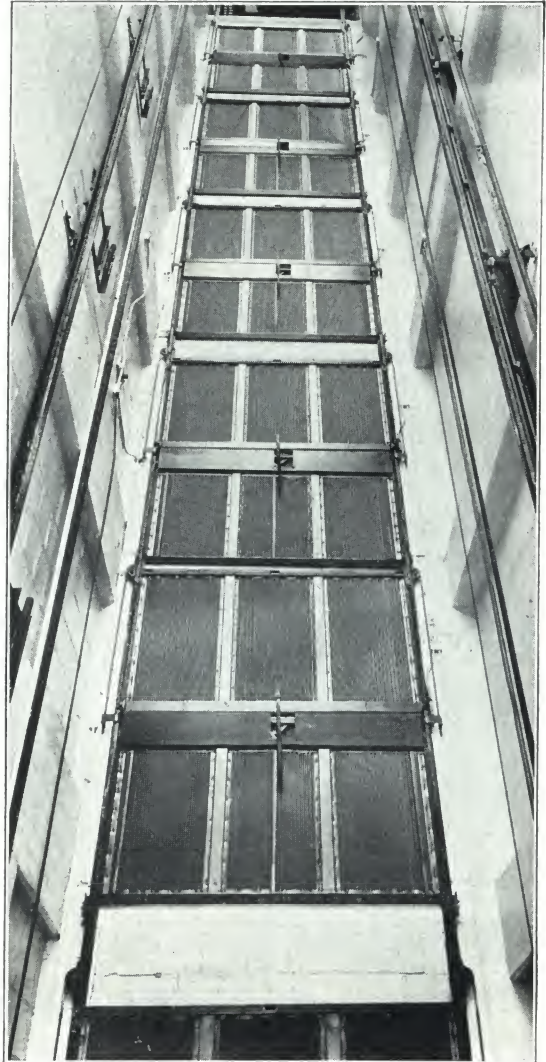
Both types require approximately 8 in. side room each side, but the telescoping door, being counterweighted, needs in addition space at both sides for 8x8-in. weight box.

Richmond counterbalanced doors are furnished with roller or ball bearing sheaves as may be desired, vision panels of labeled construction, if specified, and all modern improvements.

The upper rail of the lower section of the door is so reinforced and constructed that when the door is open a "bridge" is formed between the car and the building sill and, like a bridge, the span is supported at each end by substantial parts of the door assembly. This "bridge" provides a smooth trucking surface over the door.

Richmond counterbalanced dumbwaiter doors, kalamein, tin clad or steel plate, are similar in design and operation, but adapted to dumbwaiter shaft use. They require only 3 in. at each side.

Our catalogue gives all details of construction including shaft space requirements. Let us place a copy in your files.



Corrugated Iron Counterbalanced Doors in Shaft



Corrugated Iron Counterbalanced Door



Tin Clad Counterbalanced Doors

Kalamein Doors

Richmond kalamein doors are covered with No. 26 and No. 24 gauge galvanized patent leveled special door stock—the highest grade material in use in the trade. All work is die drawn in accordance with the usual architectural specifications. Grades heavier than No. 24 gauge are practically always brake formed.

All wood used is thoroughly dried in our own kilns.

We have dies for an unusually large variety of casings and mouldings. Kalamein frames and trim, or combination pressed steel bucks, can be provided with doors. Doors are available with a wide range of panel arrangement and may be labeled within limitations set by the Underwriters.

Our Catalogue contains illustrations of paneling types, moulding shapes, standard specifications, details of construction and other valuable information.

Richmond kalamein frames are formed upon cores rabbetted from one solid piece of wood, and casings, mouldings, etc., are of solid wood lengths up to standard sizes. No piecing or patching is permitted.

For elevator enclosures, our doors are specially reinforced at the head to receive hardware when appropriate.

Durable baked enamel, plain color or wood grained, is applied in our own ovens, when desired.

Particular attention is drawn to the Richmond special labeled kalamein door, which is manufactured with a steel edge underneath metal covering and a fireproof metal lock box. This door is furnished only when definitely specified.

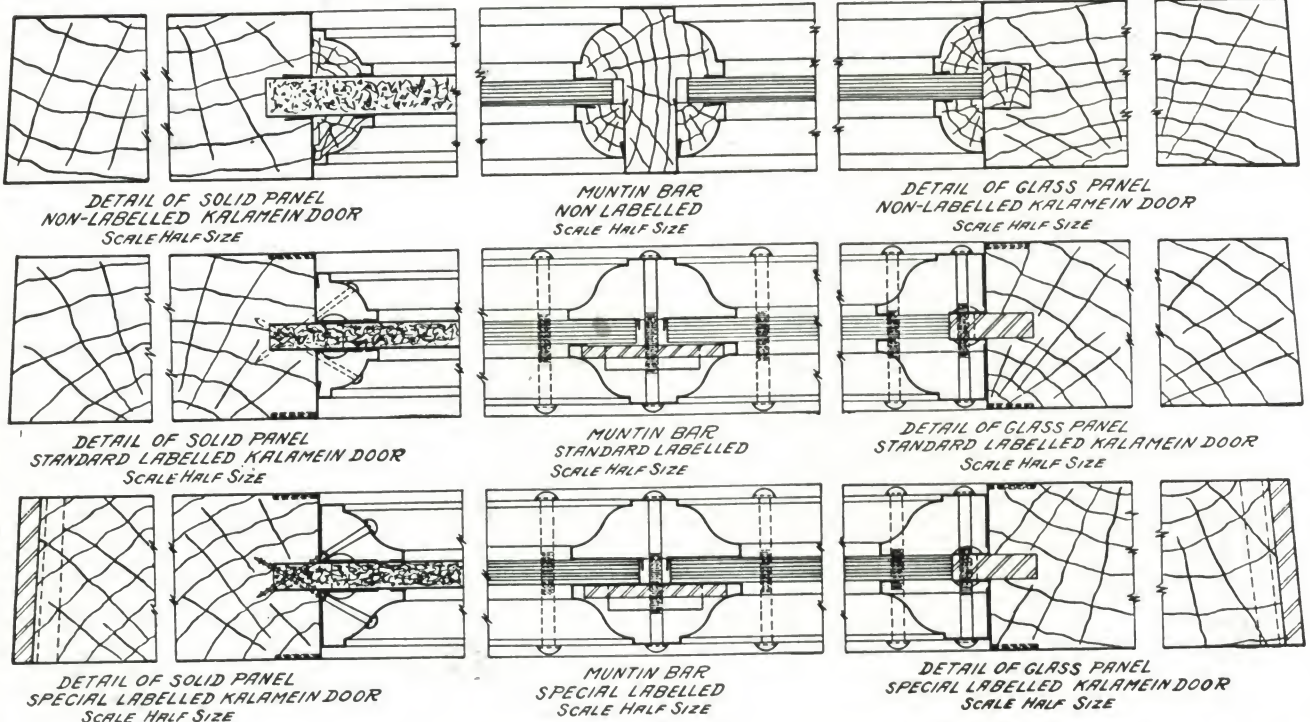
RICHMOND FIREPROOF DOOR CO. is prepared to furnish when desired, special Underwriters' labeled finished hardware completely installed in doors.



Kalamein Faced Counterbalanced Door



Kalamein Door and Partition



Industrial or Warehouse Doors

Richmond horizontal bi-folding doors are widely used for driveways and shipping platforms. Built in two sections, this door folds along horizontal meeting rails at the center, in jack-knife form, and rises upward, leaving a clear opening. The turnover door, made in one piece and adapted to the smaller size openings, operates in somewhat similar fashion, turning up inward overhead. For the two types, a space of 6 in. is required inside of one jamb and 16 in. inside the other jamb, with clear headroom varying according to weight and size of door. While the latter may be as little as 12 to 15 in., the efficient operating minimum is 24 in.

The telescoping or two-piece slide-up door, also in wide use for driveway and shipping platform openings, was described in connection with counterbalanced doors on the second preceding page.

All of the preceding types of doors may be had in wood, kalamein, tin clad, corrugated iron or steel plate, and all may be paneled for glass to permit the access of light, irrespective of material. In addition, we manufacture single and double swinging, sliding, side-folding and single-piece slide-up doors, for industrial purposes, of all the materials mentioned.

Hardware for all these doors, as well as that for fire doors and counterbalanced doors, is manufactured by us in our own factory, being of exceptionally sturdy and attractive design.

Industrial doors are described, together with suggestions as to the appropriate use of the different types, in a special pamphlet which we will be pleased to mail you.

The new Richmond patented *fire-panic* type handles for application to regular triple latches operate with direct, easy, horizontal push and pull, speeding up use of openings in congested factories. Sure locking and easy opening, they are a truly modern type of fire-door hardware operating handles. Specify them exclusively.



Wood Telescoping Doors



Wood Turnover Door



Kalamein Bi-folding Door (Outside Construction)

SECURITY FIRE DOOR CO.

Counterbalanced Truckable and Other Fireproof Freight Elevator Doors
3036-3048 Lambdin Avenue, ST. LOUIS, MO.

AGENCIES

AKRON, OHIO, 429 Ohio Building
ALBANY, N. Y., 71 State Street
ATLANTA, GA., 101 Marietta Street
BALTIMORE, MD., Maryland Avenue and 22nd Street
BIRMINGHAM, ALA., 1001 Martin Building
BOSTON, MASS., 333 Washington Street
BUFFALO, N. Y., 382 Michigan Avenue
CHICAGO, ILL., 38 So. Dearborn Street
CINCINNATI, OHIO, 534 Main Street
CLEVELAND, OHIO, 308 Euclid Avenue Building
COLUMBUS, OHIO, 975 West Goodale Street
DALLAS, TEX., 401 Construction Industries Building
DENVER, COLO., 1199 Stout Street
DES MOINES, IOWA, Hubbell Building

DETROIT, MICH., 1758 Penobscot Building
GRAND RAPIDS, MICH., 439 Houseman Building
HOUSTON, TEX., 1612 Miller Street
INDIANAPOLIS, IND., 631 So. Delaware Street
KANSAS CITY, MO., La Salle Building
KNOXVILLE, TENN., Holston Bank Building
LANSING, MICH., 410 West Saginaw Street
LOS ANGELES, CAL., 653 So. Clarence Street
LOUISVILLE, KY., 128 East Main Street
MEMPHIS, TENN., 229 Madison Avenue
MIAMI, FLA., 1229 Ingraham Building
MILWAUKEE, WIS., 1311 Majestic Building
MINNEAPOLIS, MINN., 700 Builders Exchange
NASHVILLE, TENN., 1033 Hamilton Avenue

NEW ORLEANS, LA., 1009 Maison Blanche Building
NEW YORK, N. Y., 404 East 34th Street
NORFOLK, VA., Citizens Bank Building
OKLAHOMA CITY, OKLA.
OMAHA, NEB., 1818 Harney Street
PHILADELPHIA, PA., 1215 Frankford Avenue
PITTSBURGH, PA., 303 Bowman Building
PORTLAND, ORE., 247 Fifth Street
RICHMOND, VA., 805 East Franklin Street
ROCHESTER, N. Y., 52 Brown's Race
ST. PAUL, MINN., 903 Builders Exchange
SAN ANTONIO, TEX., 304 Builders Exchange
SAN FRANCISCO, CAL., 534 Sixth Street
SEATTLE, WASH., 314 Seneca Street
TOLEDO, OHIO
WASHINGTON, D. C.

Products

"SEC-TEL" CORRUGATED, METAL CLAD and KALAMEIN TWO-SECTION SLIDE-UP FREIGHT ELEVATOR DOOR.

"SECO" CORRUGATED, METAL CLAD and KALAMEIN COUNTERBALANCED FREIGHT ELEVATOR DOOR.

"HORIFOLD" WAREHOUSE, FREIGHT HOUSE SHIPPING PLATFORM and GARAGE DOOR.

"VERTEL" CORRUGATED WAREHOUSE, FREIGHT HOUSE and SHIPPING PLATFORM TWO-SECTION SLIDE-UP DOOR.

"SECO" DOOR ELECTRIC INTERLOCKS.

Also Dumbwaiter Doors for department stores, hotels, hospitals, restaurants and factories.

Underwriters' Approval

All "Sec-Tel" and "Seco" freight elevator doors are inspected and labeled by the Underwriters' Laboratories, Inc., and the Factory Mutuals, when so desired, provided they are within the size limits that permit labeling.

The services of our Engineering Department, as well as those of our representatives in all the leading cities of the United States are at your disposal in solving door problems. Write for Catalogue "C" covering our "Horifold" and "Vertel" doors, or for Catalogue "D" giving complete information about our "Sec-Tel," "Seco" and dumbwaiter doors.



Corrugated "Sec-Tel" Door

"Sec-Tel" Door

The "Sec-Tel" door is a two-section slide-up or vertical telescoping elevator door.

"Sec-Tel" doors permit the use of the permanent building sill for trucking over on to the elevator car.

"Sec-Tel" doors can be furnished with corrugated steel, metal clad or kalamein panels.

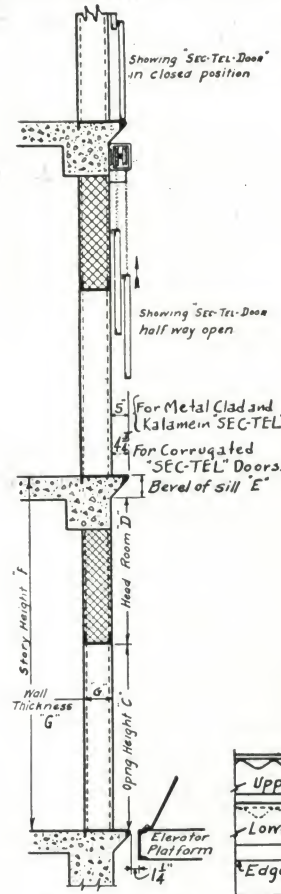
"Sec-Tel" doors operate in double guides, the lower half traveling twice as fast as the upper, so that as the lower section is raised, both sections are simultaneously set in motion and reach the lintel of the opening at the same time, giving a perfectly clear opening.

The use of double race ball bearing sheaves and antifriction door guides, assures ease of operation.

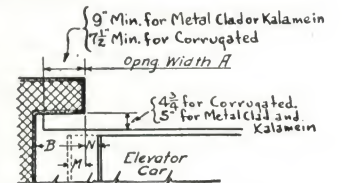
**SCHEDULE OF OPENING HEIGHTS
"SEC-TEL" DOORS**
For Various Floor Heights Allowing 4 in. for Bevel "E" of Sill

Opening height "C"		Minimum headroom "D"		Story height "F"	
ft.	in.	ft.	in.	ft.	in.
6	0	3	5	9	9
6	6	3	8	10	6
6	8	3	9	10	9
6	10	3	10	11	0
7	0	3	11	11	3
7	6	4	2	12	0
8	0	4	5	12	9
8	6	4	8	13	6
9	0	4	11	14	3
9	6	5	2	15	0
10	0	5	5	15	9

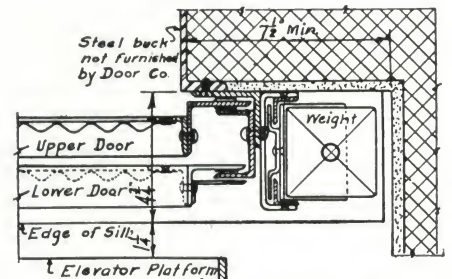
Note: Space "D" for metal clad or kalamein "Sec-Tel" doors should be increased 6 in. if possible.



Section Through Opening Showing "Sec-Tel" Door Space Requirements



Plan of Shaft at Jamb—"Sec-Tel" Door



Plan at Jamb—Corrugated "Sec-Tel" Door

Kalamein and metal clad doors require 9-in. space at sides and 5-in. projecting sills



Large Metal Clad "Seco" Door—Partly Open

"Seco" Counterbalanced Freight Elevator Doors

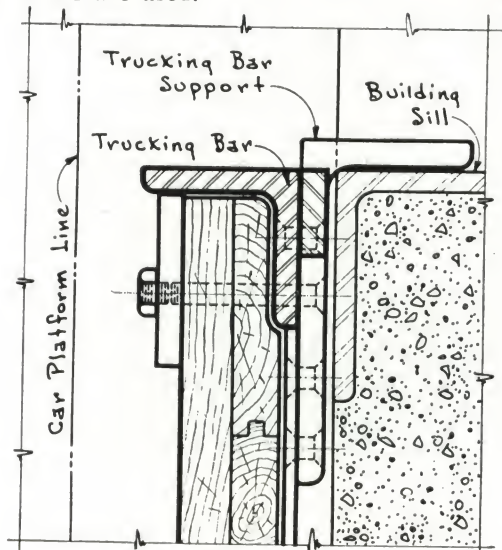
"Seco" doors are of the truckable counterbalanced type, being made in two sections, which slide in opposite directions on the shaft face of the wall. The sections are of equal weight, evenly counterbalancing each other, eliminating all counterweights.

"Seco" doors can be furnished with metal clad, kalamein or corrugated steel panels.

"Seco" doors are provided with heavy steel angle or tee trucking bars. The trucking bars form the top edge of the lower section and are supported in perfect alignment with the opening or floor sill when the door is in the open position by means of heavy angle trucking bar supports at each end of the trucking bar.

These sill or trucking bar supports rest on the solid opening sill, require no adjustment, and always remain in the same permanent position. The supports are designed to act as gusset plates in the upper corners of the lower section, reinforcing it and securely joining the section frame to the trucking bar.

"Seco" doors are hung with heavy adjustable chain rods and cable chain operating over large double race ball bearing sheaves. No safety gates required when "Seco" doors are used.



Regular Angle Trucking Bar Used with Metal Clad or Kalamein "Seco" Door



Kalamein "Seco" Door Installation

"Seco" Door Construction

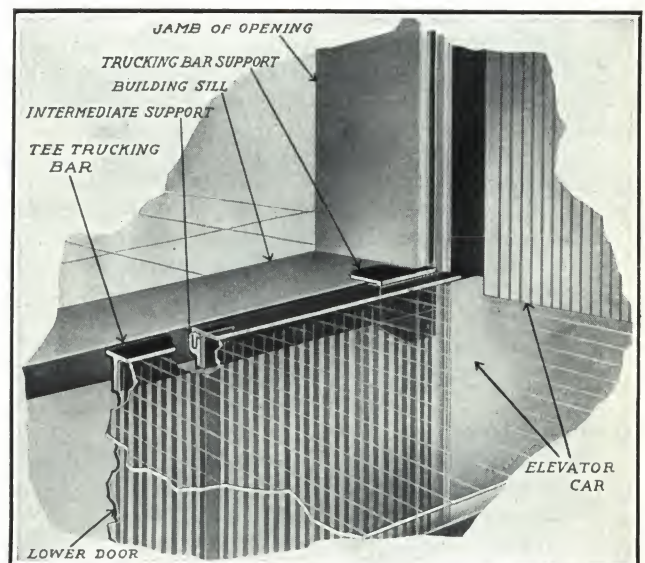
Metal Clad Panels—These doors are constructed of two thicknesses of white pine, clinch-nailed together and covered on both sides with fire door terne plate or flat galvanized sheets, and securely bolted into heavy angle frames.

Kalamein Panels—These doors are constructed of white pine cores, paneled on the room side, flush on the shaft side. Room side of panels is covered with smooth kalamein iron, glued to the core, and has drawn steel mouldings around panels fastened in place so that no nail or screw heads show.

The shaft side of doors is covered with flat galvanized steel sheets. All seams between stiles and rails are clipped, filled in with solder and ground smooth. Door panels are securely bolted into heavy angle frames.

Corrugated Steel Panels—These doors are made of corrugated steel sheets riveted into angle frames forming door sections, and are stiffened vertically with flat steel reinforcing bars.

See following page for space requirements and information on interlocks.

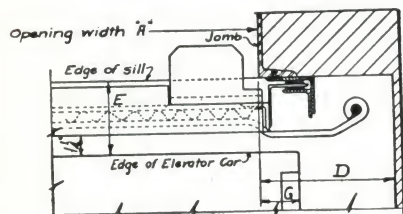


Corrugated "Seco" Door with Tee Trucking Bar
Open lower door providing trucking surface between building sill and elevator car

SCHEDULE OF MAXIMUM OPENING HEIGHTS "SECO" DOORS
For Various Floor Heights

Opening height "B" ft.	in.	Minimum "C" for regular type		Minimum "C" for pass type	
		ft.	in.	ft.	in.
6	0	9	9	7	6
6	6	10	6	8	0
6	8	10	9	8	2
6	10	11	0	8	4
7	0	11	3	8	6
7	6	12	0	9	0
8	0	12	9	9	6
8	6	13	6	10	0
9	0	14	3	10	6
9	6	15	0	11	0
10	0	15	9	11	6

Note: Minimum "C" for Regular Type doors can be slightly decreased in special cases. Consult factory.



Plan of Shaft at Jamb—Regular Type "Seco" Door

CLEARANCE REQUIRED FOR "SECO" DOOR

Corrugated "Seco" Door	D, in.	E, in.
Regular type.....	7½	4½
Pass type.....	7½	5½
Metal Clad "Seco" Door	D, in.	E, in.
Regular type.....	7½	4½
Pass type.....	8	6½

Space Requirements—Above schedule should be consulted in order to determine highest opening obtainable in certain story heights for Regular and Pass Type "Seco" doors.

Also note other space requirements to insure a perfect installation.

When story heights are such that Regular Type "Seco" doors can not be used for opening heights desired, Pass Type "Seco" doors should be used.

"Seco" Door Interlocks

Security Electric Interlocks are especially designed for vertically sliding doors and have been approved by the Underwriters and various State and municipal departments, assuring low casualty insurance rates.

Security Electric Interlocks are used with electric elevators, are attached to each door and are connected in series to the elevator control board, so that the elevator can not be operated until all doors in the shaft are closed and contact is made in the door interlocks.

Specify Type "C" or Type "D" Interlocks for car switch controlled elevators, Type "DL" Interlocks for "push button" or "double button" operated elevators.

Send for a copy of Catalogue "D."

"Horifold" Door

The "Horifold" door is a horizontal folding-up door, and can be made of wood, corrugated steel, tin clad or paneled wood metal covered sections.

"Horifold" doors are specially suited for shipping

platforms of warehouses, factory buildings, freight houses and garages.

"Horifold" doors are of rigid construction, operate with ease, and are unexcelled for withstanding severe weather conditions.



"Horifold" Doors to Shipping or Garage Space

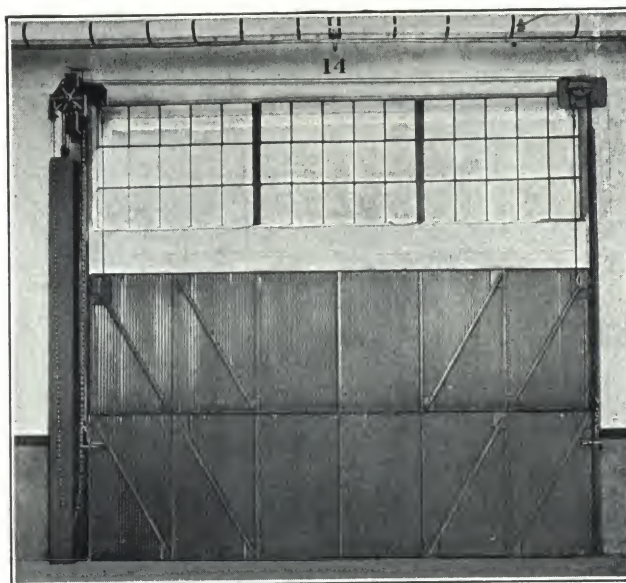
"Vertel" Door

"Vertel" doors are made of corrugated steel sheets, riveted into heavy angle frames, and are fireproof.

"Vertel" doors can be arranged for glass in upper half to admit light, and with a wicket door in lower section.

"Vertel" doors are made in two sections, both of which travel upwards; the lower section traveling twice as fast as the upper section, reaching the lintel of the opening at the same time.

"Vertel" doors are ideal for use in freight houses, and for openings where the space above the opening permits their use. "Vertel" doors permit the storage of material to within a few inches of the door without affecting its operation.



Security "Vertel" Door (Interior View)

Used for shipping platform and freight house openings. Above door is used on opening 16x9 ft. showing both door sections solid

QUINCY ELEVATOR GATE CO.

Manufacturers of Power Operators for Elevator Doors and Gates

QUINCY, ILL.

Products

FREIGHT ELEVATOR DOOR OPERATORS for opening and closing landing gates, counterbalanced doors, telescoping fire doors, steel rolling doors and riding car gates.

FREIGHT ELEVATOR GATES.

Also manufacturers of Operators for opening and closing garage doors and steel rolling entrance doors.

Quincy Electric Power Unit

The operating machine shown in Fig. 1 is made for either direct or alternating current. It occupies a floor space of about 4 ft. square and weighs 800 lb. The cable drum is driven by a reversible motor and a worm reducing mechanism and is stopped instantly by a magnet-controlled brake applied to a flanged coupling between the motor and the mechanism.

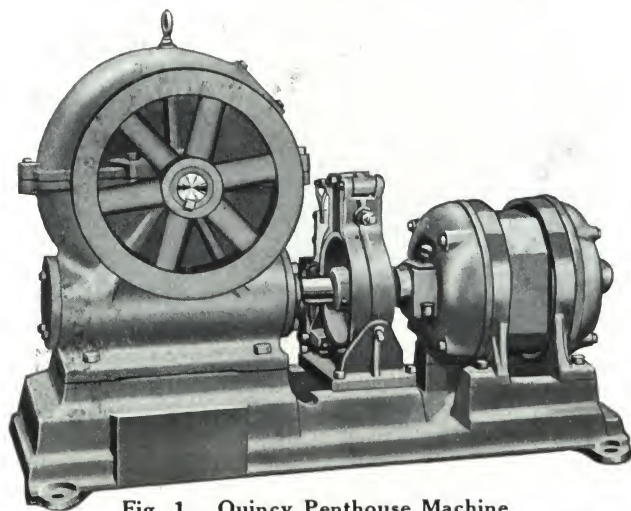


Fig. 1. Quincy Penthouse Machine

The annunciator informs the elevator operator of the stop to be made. When reaching that floor he releases his elevator control switch handle and the doors open automatically. The operator can at all times instantly stop the doors while opening or closing by pressing "Stop" button.

In addition to automatic opening device, there is a three-button station on the car marked "Open," "Close" and "Stop" and a duplicate station in a locked box at outside of hatch wall at any one designated floor.

Quincy Friction Grip System for Power Operation of Counterbalanced Elevator Doors

The Quincy Friction Grip System has two $\frac{5}{8}$ -in.



Fig. 2. Door Partially Opened (Riding Car Gate Is an Optional Feature)

round rods (one on each end of the door) connected to cables which pass over drums in the penthouse. Doors remain evenly balanced. Any one or more doors can be quickly changed to manual operation, remaining doors can continue to be operated by electric machine.

Door Device and Lock—To each side of the top door section a friction block is attached by means of a $\frac{3}{8} \times 3\frac{1}{2}$ -in. flat bracket.

A friction block can only engage with the vertical rod when the car is at its landing; thus the vertical rods slip through the open friction blocks on the other doors.

The combination lock and interlock is mechanical in operation and positively prevents operation of the elevator when any door is opened or unlocked.

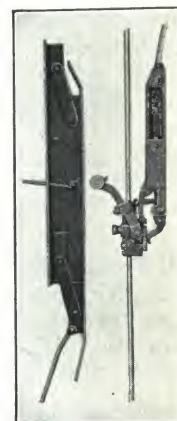


Fig. 4. Retiring Cam on Car; Friction Block on Door; Lock on Door Guide

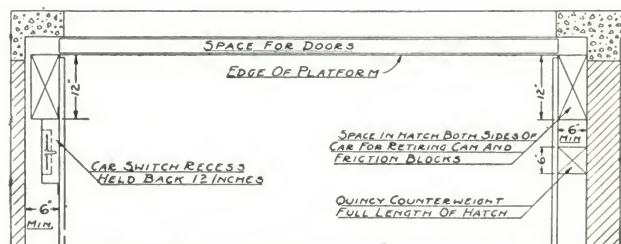


Fig. 3. Plan Showing Space Required in Shaftway for Quincy Operating Devices

J. EDWARD OGDEN COMPANY, INC.

Doors for Pier Sheds, Freight Warehouses, Industrial Buildings, Garages and
Airplane Hangars

TELEPHONE
RECTOR 4655

WORKS: BAYONNE, N. J.

147-149 Cedar Street, NEW YORK, N. Y.

AGENCIES

NEW ORLEANS, LA., OLE K. OLESON, 822 Perdido Street

SAN FRANCISCO, CAL., ROMAN & Co., 55 New Montgomery Street

MONTREAL, QUE., F. BACON & Co., LTD., 131 St. Paul Street W.

Products and Services

Mechanically operated OGDEN SINGLE SECTION TURNOVER DOORS.

Also Ogden Two-section Turnover Doors, Ogden Canopy Doors, Ogden Airplane Hangar Doors, and Ferry Bridge Operating Mechanism. This company is interested in the design, manufacture, and erection, of all the above named specialties.

Low Cost

You are interested in saving money and maintenance troubles, and at the same time always having doors in working condition, without paying an extra premium, in first cost, to accomplish this. The Ogden Company, therefore, asks you to see its engineers about the new single section turnover door which it has developed to give all of these results.

Use

This new door is for use in warehouses, industrial buildings, railroad freight sheds and public garages. It is comparable in price (and often lower in price) than a rolling steel door.

Advantages

This new door is forever free from rattles, rusting out between slats, trouble with hinges and deflection in high winds. It lends itself to the use of glass in the upper portion and a pass door in the lower portion—two things highly valuable in large warehouses.

This single section door is automatic in locking when closed, thus making it positive in closing, a thing that is seldom accomplished in the so-called jack-knife door. Unlocking is a manual operation.

A Prominent Installation

We have installed 136 of these doors in the large new warehouse of the Seaboard Terminal & Refrigeration Co., at Eleventh and Coles Streets, Jersey City, N. J. Cuts of these doors are shown on this page.

Only Data Necessary

You furnish us with the door opening dimensions. We design, manufacture, and install the doors, guides and mechanisms and erect them completely.

Specifications

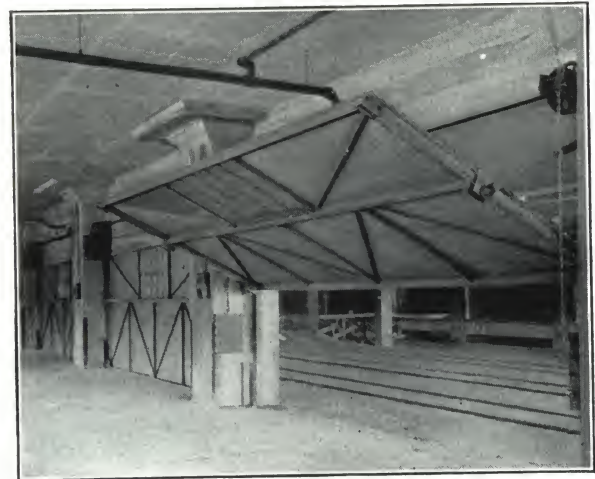
Door sections shall be of a skeleton steel construction, covered on outside with No. (black or galvanized, flat or crimped) steel. The door shall be of the slotted link bar type and be easily operated by one man.

Door sections shall be supported by links attached near the center of gravity so that a continuous pull on the chains attached to lower corner of door section will raise the bottom edge of door vertically and will swing the top of the door away from the door header, until, in its final open position, the door assumes a horizontal position extending into the building.

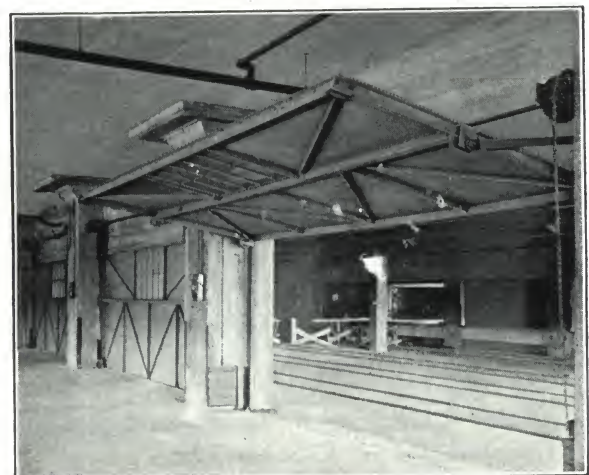
Each corner of the door section shall be securely locked when closed. These locks shall be automatic in closing. The top locks shall be manually operated in opening.



Doors Starting to Open, Half Open, and Fully Open



Door Half Open—Doors at Left Side of Illustration Fully Closed



Door Fully Open

MAJESTIC IRON WORKS, INC.

Standard and Underwriter's Labeled Steel Rolling Shutters and Doors

TELEPHONE
MAIN 0990

559-561 West Fulton Street
CHICAGO, ILL.

Product

MAJESTIC STEEL ROLLING SHUTTERS.

Important Features

The shutter revolves on hardened steel bearings which facilitates operation so that any one can raise or lower shutter with ease.

Spool-shaped flanged gears, each end of barrel, which eliminates friction and make curtain self-aligning when revolving.

One-piece sprocket and pinion gear enclosed in housing. Gear lubricated with cup grease.

Hood angular shaped; acts as water shed, protecting gears and mechanism against dirt and weather conditions. No gears exposed.

Bracket bearings on wall self-adjusting should building settle.

Curtain made of No. 16, 18, 20 or 22 gauge galvanized copper-bearing steel which prevents corrosion. Slats interlocking type, malleable iron ends, operating in heavy iron guides.

Each shutter has a counterbalancing helical oil tempered spring. Size and strength determined by size of

shutter; enclosed in steel tubing which protects it against atmospheric conditions.

Curtain fastened to barrel on adjustable rings with special attachments—no holes drilled in slats. Bottom of curtain strong and rigidly built.

Guides of extra heavy material able to withstand heavy bumps.

Types

Brackets either on face of wall, under lintel or hung on ceiling.

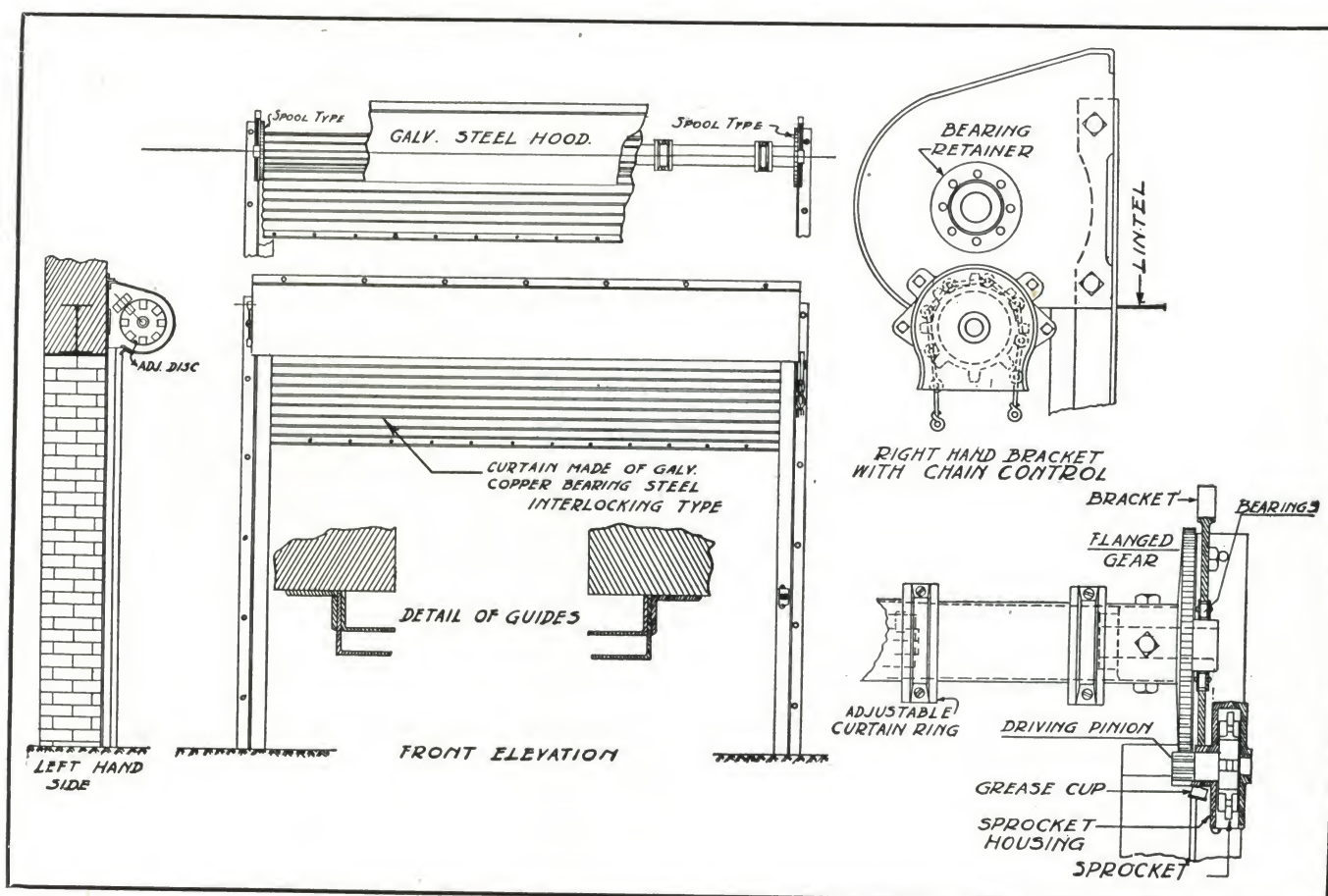
Installation

Simple to install; any mechanic with ordinary tools can set up. Instruction sheet furnished. Special locking attachment for each shutter.

Service

Consult with us regarding your rolling shutter problems.

Our engineers are competent to recommend the type best suited for the conditions existing.



Standard Detail Majestic Steel Rolling Shutter

CORNELL IRON WORKS, INC.

Steel Rolling Shutters and Doors; Underwriters' Labeled Fire Doors and Shutters

TELEPHONE

STILLWELL 3880, 3881
3882, 3883

36-20 13th Street (Marion Street)

LONG ISLAND CITY, N. Y.

BRANCH OFFICE, 26th Street and 11th Avenue, NEW YORK, N. Y.

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(Consult Telephone Book or write the Home Office)

ALABAMA Birmingham Mobile	GEORGIA Atlanta Savannah	MASSACHUSETTS Boston	NEW JERSEY Newark New Brunswick	OHIO (Cont.) Dayton Toledo	TEXAS Dallas Fort Worth Houston San Antonio
ARIZONA Phoenix	ILLINOIS Chicago Springfield	MARYLAND Baltimore	NEW YORK Albany Binghamton Buffalo Rochester Syracuse Utica	OKLAHOMA Oklahoma City	UTAH Salt Lake City
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CALIFORNIA Los Angeles San Francisco	IOWA Cedar Rapids Des Moines	MINNESOTA Duluth Minneapolis	OHIO Akron Canton Cincinnati Cleveland	PENNSYLVANIA Philadelphia Pittsburgh	WEST VIRGINIA Charleston Huntington
COLORADO Denver	KANSAS Salina	MISSISSIPPI Jackson	WASHINGTON, D. C.	SOUTH CAROLINA Greenville Spartanburg Rapid City	WASHINGTON Seattle
CONNECTICUT Hartford New Haven	KENTUCKY Louisville	MISSOURI Kansas City St. Louis		SOUTH DAKOTA Rapid City	WISCONSIN Milwaukee
FLORIDA Jacksonville Miami Tampa	LOUISIANA New Orleans Shreveport	MONTANA Helena		TENNESSEE Chattanooga Knoxville Nashville	

Products

CORNELL IMPROVED DEEP ARCH INTER-LOCKING SLAT STEEL ROLLING SHUTTERS and DOORS, handle, chain, crank, or motor operated, for residences, office buildings, garages, wharves and piers, warehouses, elevator shafts, store fronts, crane-way openings, etc.

UNDERWRITERS' LABELED FIRE DOORS and SHUTTERS.

Send for 32-page, 1927 Catalogue, with complete dimensions and specifications.

Location

Cornell doors are manufactured in Greater New York in a modern one-story factory.

Unexampled shipping facilities by all railroads, as well as water routes to all points on the east, south and west coasts, and the Great Lakes.



Experience

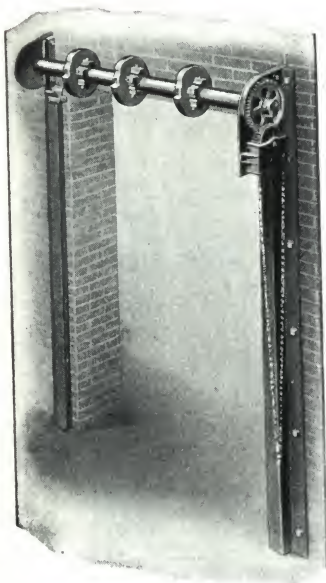
CORNELL IRON WORKS, INC., is the oldest rolling door manufacturer in the United States. Cornell doors have been in use for 50 years and more. Our latest types embody many modern improvements.

Description

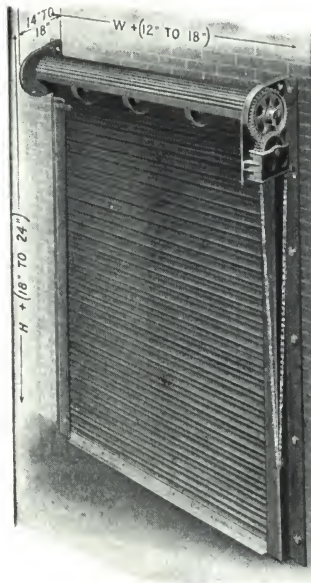
Cornell steel rolling doors are designed for the closure of all types of openings. They offer fire and burglar protection, combined with neat appearance and economy of space.

The curtains run in vertical side guides, and coil around a horizontal shaft above the opening.

The weight of the curtain is counterbalanced by springs in the shaft, which permit it to remain stationary in any position.



Steel Brackets Attached for Supporting the Shaft



Steel Curtain Installed



End View of Shaft and Curtain
Note malleable iron end locks and deep arch of slat



Widest Rolling Door Ever Made—45 ft., Motor Driven

Operation

There are four typical methods of operation:

Self-coiling Type—Standard for openings up to 8x10 ft. Push up and pull down by handles on the bottom bar. The quickest acting construction possible.

Hand Chain and Gearing Type—Standard for larger openings. Shaft revolved by endless hand chain, acting through single, or compound gearing, on an overhead gear bracket.

Motor Drive Type—Standard for the largest openings, up to 45 ft. in width.

Automatic Closing Type—Controlled by fusible links. Made to Underwriters' standards, labeled by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories. Thirty designs of labeled fire doors, including: Fire wall doors, Class "A"; vertical shaft doors, Class "B"; corridor and room partition doors, Class "C," and exterior doors and shutters, Class "D."

Special Cases—Worm and bevel gear drives, operating from either side of openings, with hand crank, or chain, are provided for special cases.

Cornell Improved Interlocking Steel Slat Curtains

Designed to give unusual rigidity against wind pressure, having a depth at the crown of $\frac{7}{8}$ in. The appearance is attractive from either side, as the curtain is made up of a series of cold rolled steel mouldings with deep relief.

The end locks are made of malleable iron, designed for maximum wear and strength.

Furnished in U. S. gauges from No. 16 to 22, cold rolled and galvanized.

Non-corroding Curtains

Of cold rolled, bronze, aluminum or zinc, interlocking slats.

An original Cornell product. Require no painting. Of great service in resisting coal gas, acid fumes, severe salt water exposure, etc.

Give a very handsome finish at comparatively small extra cost.

Cornell Non-corroding Curtain Bottoms

Experience proves that all exposed doors and shutters of steel corrode fastest at the bottom.

To neutralize this, CORNELL IRON WORKS, INC. has originated the feature of using 12 to 18 in. of bronze bottom slats for exposed doors.

The extra cost is small and the life of the installation may often be more than doubled by this method.

Motor Driven Units

Cornell motor drives are made in a self-contained unit, completely assembled in the shop. The gears can not get out of alignment.

The worm is placed under the worm wheel, is completely enclosed, and runs in an oil bath.

Automatic starters are furnished with all installations.

Electric brakes are furnished where required.

Equipment is G-E material.

Operation—On pushing the proper button, the solenoid acts to open the brake and the door moves up or down, as the case may be, at a rate of approximately 1 ft. per second.

On reaching the top or bottom of the door travel, the limit switch operates, automatically cuts off the current, stops the motor, cuts out the brake magnet and lets the brake go on with full power, locking the entire mechanism against further travel.

The action is foolproof.

Door may be stopped at any point in its travel, by simply throwing the switch. This operation automatically puts on the brake, and the door stops promptly.

Underwriters' Labeled Fire Doors

Cornell rolling doors have been thoroughly tested by Underwriters' Laboratories, Inc., Chicago, and carry their label for the following types of openings:

Fire Wall Doors—Made of No. 16 gauge and labeled up to 80 sq. ft. in size—Class A.

Vertical Shaft Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class B.

Corridor and Room Partition Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class C.

Exterior Doors and Shutters—Made of No. 22 or No. 20 gauge and labeled up to 100 sq. ft. in size—Class D.

Note: Doors larger than the above limits can be made to Underwriters' specification and a certificate of inspection furnished.



City of Cleveland Garage—10 Cornell Motor Driven Doors

GEO. W. JOHNSON MFG. CO.

INCORPORATED 1906

Standard Underwriters' Labeled Fire Doors and Utility Doors

ST. LOUIS, MO.

KANSAS CITY, MO.

Products

STEEL ROLLING FIRE DOORS and SHUTTERS.

STEEL COIL SERVICE DOORS for warehouses, piers and industrial buildings.

Also manufacturers of Counterbalanced Truckover Elevator Doors, Steel Air-space Fire Doors and Shutters, Tin Clad Fire Doors and Shutters, Metal Covered Doors, Vertical Sliding Counterbalanced Telescope Doors, Bakery Proof-rooms, Doors, Frames and Special Proof-room Door Latches, Dufold or Jack-knife Doors, Boiler Plate Doors, Steel Panel Doors, Pressed Metal Labeled Door Frames.

Service

Our engineering department will be pleased to co-operate in working out details and furnishing recommendations for the treatment of special conditions, and is ready at all times to render this assistance which the experience of over twenty years in the treatment of openings in buildings of all types has made possible.

Complete literature descriptive of any of the above types will gladly be furnished on request.

Types

Johnson Steel Rolling Doors and Shutters are made in two types:

(1) Underwriters labeled fire doors and shutters for protection of openings where insurance rates are a consideration. (2) Service doors and shutters for general use where labels are not required.

Labeled doors are classified according to their location in the building, are built in strict accordance to specifications of the Underwriters' Laboratories, Inc., and are inspected and labeled by their representative in our factory.

Design

Spindle or Shaft—Consists of a stationary pipe shaft of sufficient size to prevent deflection, and on which are mounted cast iron spring casing wheels, the number varying according to the size of the door. These wheels are trussed together by 4 flat mild steel bars which form a drum around which the curtain rolls. Highest quality counterbalancing springs of motor type, oil tempered



"Johnson" Roller Bearing Shaft

and of a number and size sufficient to properly counterbalance the curtain, with a factor of safety for reserve power, are attached at one end to the center shaft and at the other to the rim of the spring casing wheels. For mechanically operated doors, the spring wheel at operation end of spindle carries a gear which meshes with a pinion mounted in a bearing on the bracket.

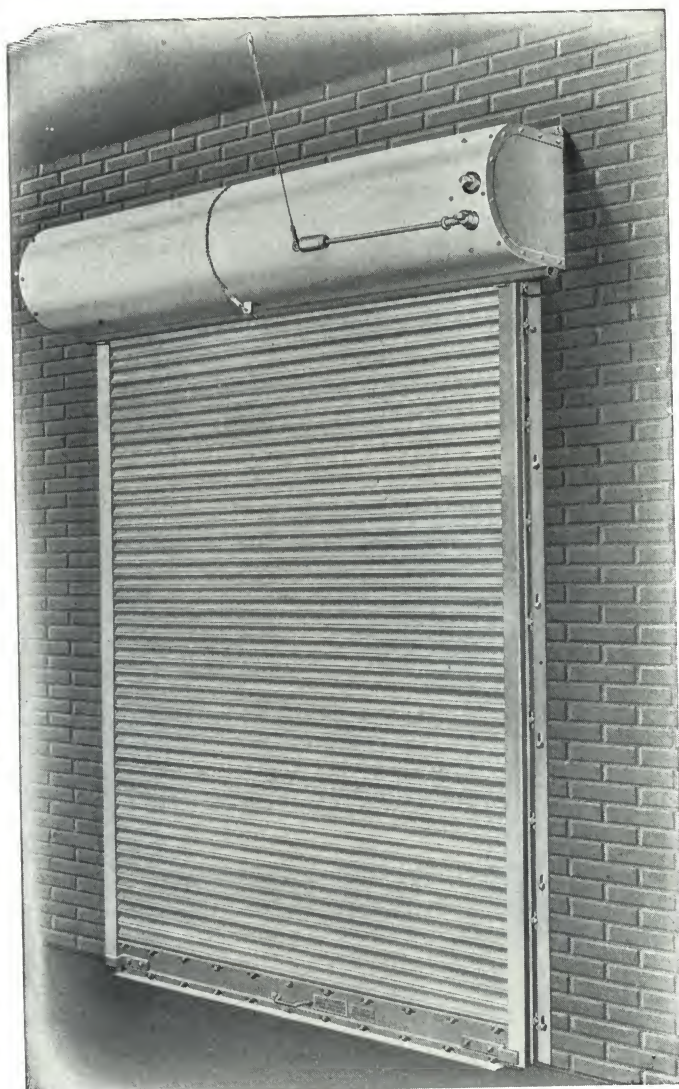
Brackets—D-shaped steel plates reinforced with angles and provided with heavy cast iron bearings to carry the spindle. Mechanical operation and automatic



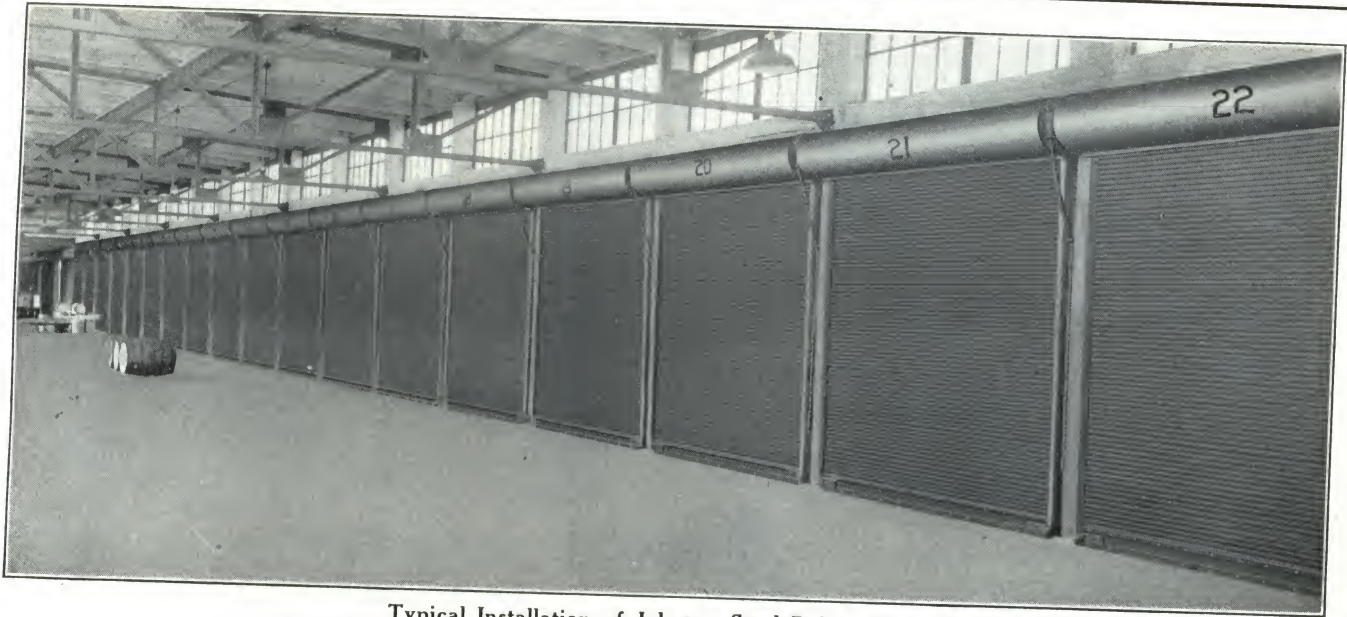
brackets are reinforced with properly designed castings, and easy and speedy operation insured by proper gear reduction. All gears are mounted on cold drawn steel shafting journaled in gray iron bearings (bronze bushed where necessary), and provided with means for lubrication.

Guides—Built up of steel angles of proper size and weight to meet conditions of openings for which they are intended. The several members are securely riveted together and the wall member provided with holes for bolting in place.

Curtains—Interlocking steel slats formed from rust resisting low carbon steel, furnished in gauges from Nos. 22 to 16 to meet size requirements of the openings for which the doors are intended, heavily galvanized to meet Underwriters' Laboratories', Inc., specifications, and provided at their ends with malleable cast iron edge guards or end locks which prevent lateral movement of the sections and provide a wearing surface in the guides.



Johnson Face of Wall Automatic Fire Door



Typical Installation of Johnson Steel Rolling Doors

Deeply corrugated steel curtain stock rolled from special analysis steel billets and heavily galvanized. Doors with Johnson corrugated curtains are in extensive use, are easily repaired, immediately responsive and speedy in operation, and more economical than the slat type.

The top section of both types of curtain is reinforced with 1-in. band iron with slotted holes (to allow for adjustment) for attachment of the curtain to the drum. The bottom of curtains are fitted with bottom rails 5 in. high reinforced at the bottom edge with two angles. The bottom section of curtain is flattened and bolted between the upper edge of the 5-in. rail and a 1-in. band.

Hoods—Sheet metal hoods with their edges beaded to reinforce and stiffen are provided to cover the coils. Exterior doors are furnished with flashings. Interior Underwriters' labeled doors are furnished with inner smoke dampers or flame baffles.

Locks—Manually operated doors are provided, where required, with push bolts on each end of the bottom-plate; chain operated doors are provided with clevis lock for locking the chain; and crank operated doors are furnished, in the design of the operating gear box, with means for locking with padlock. Special locks are furnished where called for.

Castings—Gray iron castings used in the manufacture of Johnson doors are moulded from metal patterns and machined where required. Malleable iron and steel castings are used where called for by strength and proper design.

Operation

Manually, by means of handles on the bottom plates of doors of nominal sizes.

By endless chain, sprocket and gears on the door side of the wall or on opposite side of the wall where required.

By crank shafting and gears from one or both sides of the wall.

By motor operators.

Note: Johnson doors can be operated at all times without interference with the automatic mechanism. Motor operated doors are provided with emergency hand chain operation.

Installation

Face of Wall—Brackets and drum mounted on face of wall above the lintel; guides on wall at jambs.

Between Jambs—Where required by structural conditions, either by placement within the existing opening, or by preparation of opening by provision of pockets to receive the brackets and rabbeted jambs to receive the guides.

TYPE SPECIFICATION NUMBERS OF JOHNSON DOORS

TYPE SPECIFICATION NUMBERS OF JOHNSON DOORS										
Class	Location	Face of wall			Between jambs (prepared opening)			Between jambs (plain opening)		
		Manual	Chain	Crank	Manual	Chain	Crank	Manual	Chain	Crank
Underwriters' Labeled—Automatic										
A	Fire wall.....	700	710	720	70R	71R	72R	70P	71P	72P
B C	Vertical shaft, corridor or room partition.....	600	610	620	60R	61R	62R	60P	61P	62P
D	Exterior door.....	500	510	520	50R	51R	52R	50P	51P	52P
	Exterior shutter.....	400	410	420	40R	41R	42R	40P	41P	42P
Underwriters' Labeled—Non-automatic										
D	Exterior door.....	300	310	320	30R	31R	32R	30P	31P	32P
Note: For Non-automatic Class "D," specify type of curtain; "S" for slat curtain; "C" for corrugated curtain.										
Service Types—Non-automatic										
		100	110	120	10R	11R	12R	10P	11P	12P
Note: For service types, specify type of curtain: "S" for slat curtain; "C" for corrugated curtain.										

THE KINNEAR MANUFACTURING CO.

Exclusively Door Manufacturers

820-870 Field Avenue
COLUMBUS, OHIO

BRANCH OFFICES

BOSTON, MASS., 294 Washington Street
NEW YORK, N. Y., 342 Madison Avenue
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PITTSBURGH, PA., 617 Oliver Building
NEW ORLEANS, LA., 730 Hibernia Bank Building

CLEVELAND, OHIO, 528 Union Building
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KANSAS CITY, MO., 503 Railway Exchange
SAN FRANCISCO, CAL., 444 Market Street

AGENTS IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.
FIRE DOORS and SHUTTERS.
WOOD ROLLING DOORS for Roundhouses.
WOOD ROLLING INTERIOR PARTITIONS.
WOOD BIFOLDING DOORS.
STEEL BIFOLDING DOORS.
VERTICAL SLIDING DOORS.
STEEL ROLLING DOORS and SHUTTERS for service purposes.

Types

Kinnear steel rolling doors and shutters are manufactured and sold under two distinct classifications, viz., Service and Labeled Types. Service doors are designed entirely for such openings as do not require underwriters' label and where insurance rates are not a consideration.

Construction of Steel Rolling Doors

Kinnear steel rolling doors are constructed of the highest class of materials by mechanics especially trained in the exclusive manufacture of doors.

Curtain proper on all Kinnear doors is made of open hearth interlocking steel slats galvanized and equipped with malleable iron endlocks. Curtain is coiled upon barrel journaled in heavy cast iron brackets and travels in steel guides mounted at sides of openings.



Curtain is counterbalanced by means of helical springs which are enclosed in barrel. Galvanized hood of steel of suitable design is supplied with each door.

Method of Installing Rolling Doors

Service doors in general are mounted on face of wall with brackets and coil entirely above the bottom of lintel and with inside face of guides flush with face of brick or concrete jamb.

Where headroom is limited and door can not be mounted on face of wall, it can be mounted in the opening, in which case the brackets and coil would be mounted directly under lintel and guides would be located on the jamb.

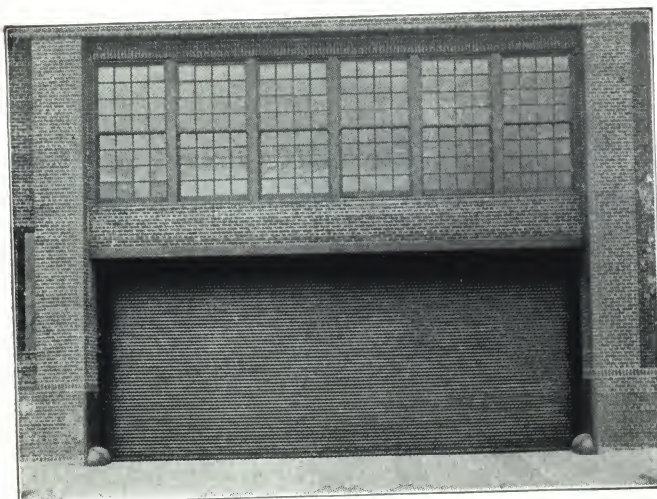
Operation of Rolling Doors

Doors may be operated as follows:

Push-up type of doors for openings not exceeding 100 sq. ft. can be operated in the same manner as window shade, being perfectly counterbalanced and same can be opened from either side.

Doors can be operated by means of reduction gearing and endless chain, or by means of crank, shafting and gear.

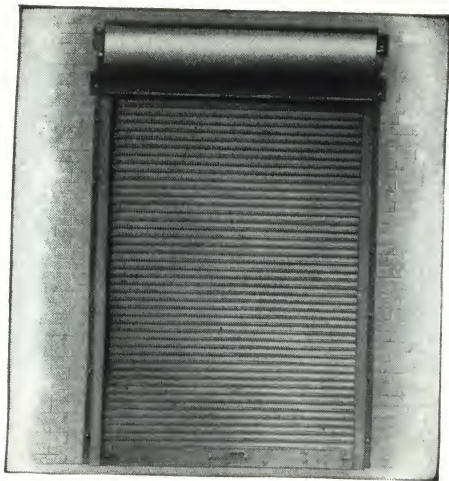
Where motor operation is desired, it is necessary to have complete description of current and drawing showing clearances and general conditions.



STEEL ROLLING DOOR IN DRIVEWAY OF THE COLOR PRESS BUILDING, CHICAGO TRIBUNE, CHICAGO, ILL.



BIFOLDING No. 3 DOORS CLOSING THE FIRST FLOOR OF THE BOSTON ARMY SUPPLY BASE—130 IN ALL



Elevation



Vertical Section



Cross Section



F.M. 10. CONSTRUCTION

Mounted on face of wall.
Push-up type, entirely counterbalanced.
Can be opened or closed from either side.
Provided with suitable lock.
Available for openings not in excess of 100 sq. ft.



Elevation



Vertical Section



Cross Section

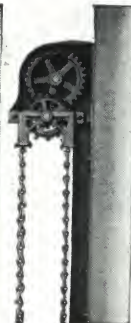


B.M. 10. CONSTRUCTION

Mounted in opening.
Can be opened or closed from either side.
Curtain entirely counterbalanced.
Paneled hoods can be provided



Elevation



End View

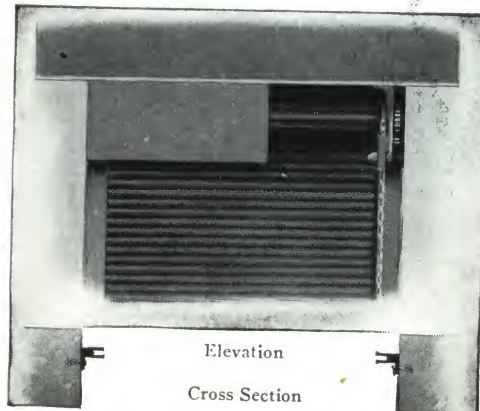


Cross Section

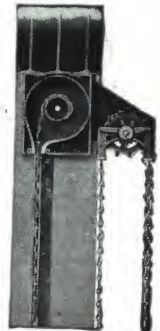


CONSTRUCTION No. F.H. 20

Mounted on face of wall; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear



Elevation

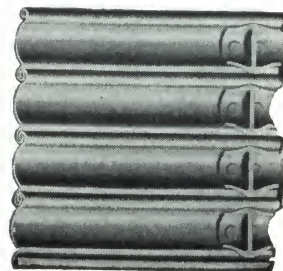
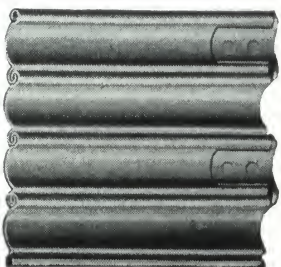


Vertical Section

Cross Section

CONSTRUCTION No. B.H. 20

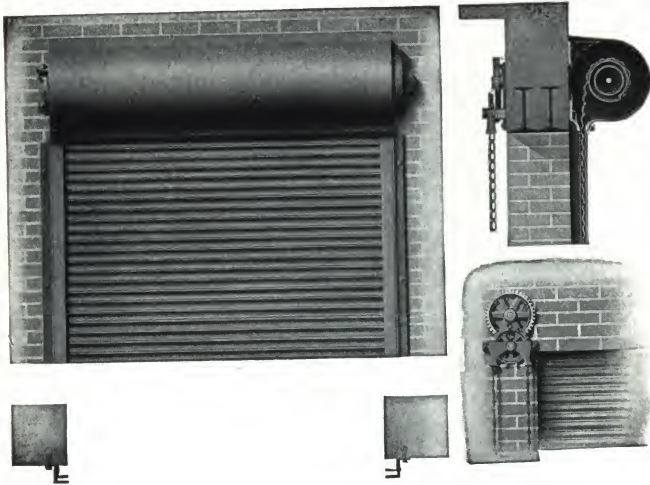
Mounted in opening; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear



CONCAVE AND CONVEX SIDES OF INTERLOCKING STEEL SLAT No. 2

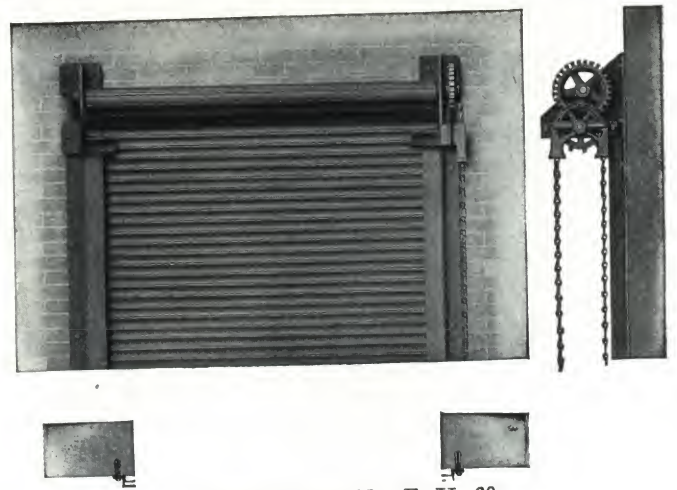
Illustrations to the left show slat No. 2 fitted with alternate endlocks; those to the right, fitted with continuous endlocks. Slat No. 2 is 1 7/8 in. wide on centers; depth of crown, 1/2 in. Made in gauges Nos. 24, 22, 20, 18 and 16. Especially adaptable to shutters equipped with mechanical operating device.

In cases of extremely wide openings, Kinnear No. 4 slat is used. This type of slat is larger than the No. 2 slat



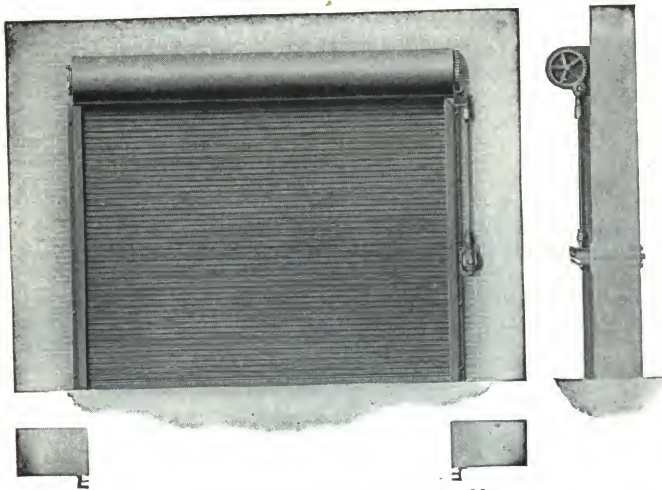
CONSTRUCTION No. F. H. 61

Door mounted on exterior face of wall. Operated from within building by means of endless chain, sprocket and gear, and by shaft extending through the wall. May be locked on inside by means of a chain lock



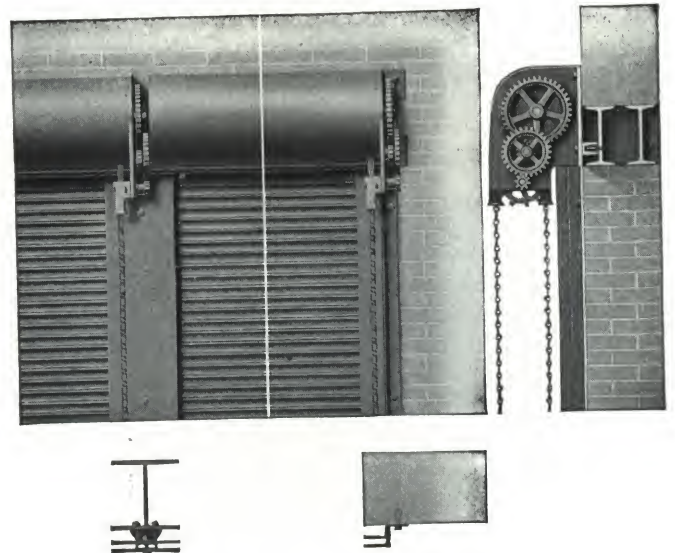
CONSTRUCTION No. F. H. 30

Mounted on interior face of wall; not furnished with hood. Open type of bracket facilitates erection. After brackets are in place, curtain barrel can be dropped into bearings. Closed brackets necessitate erection of both brackets and barrel together



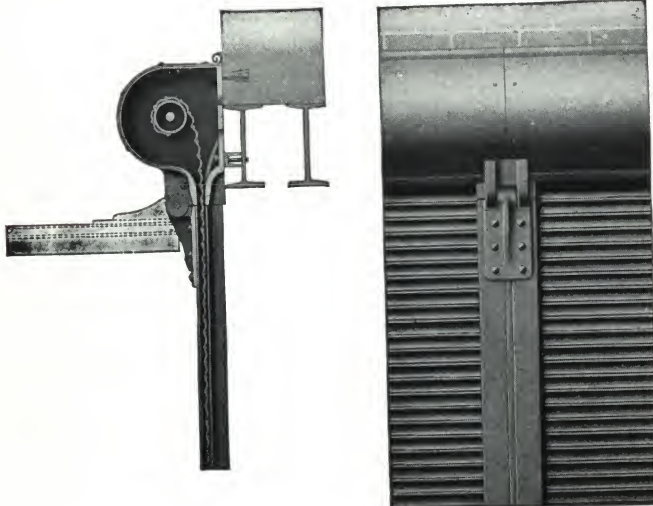
CONSTRUCTION No. F. C. 20

Mounted on face of wall. Operated by means of crank, imparting movement to the curtain barrel through shaft and suitable gear. Can be made to operate from either inside or outside of building, or both. Operation from one side only is standard arrangement



CONSTRUCTION No. F. H. 23

Modification of construction No. F. H. 20. A compact design well adapted to large openings, separated by narrow post



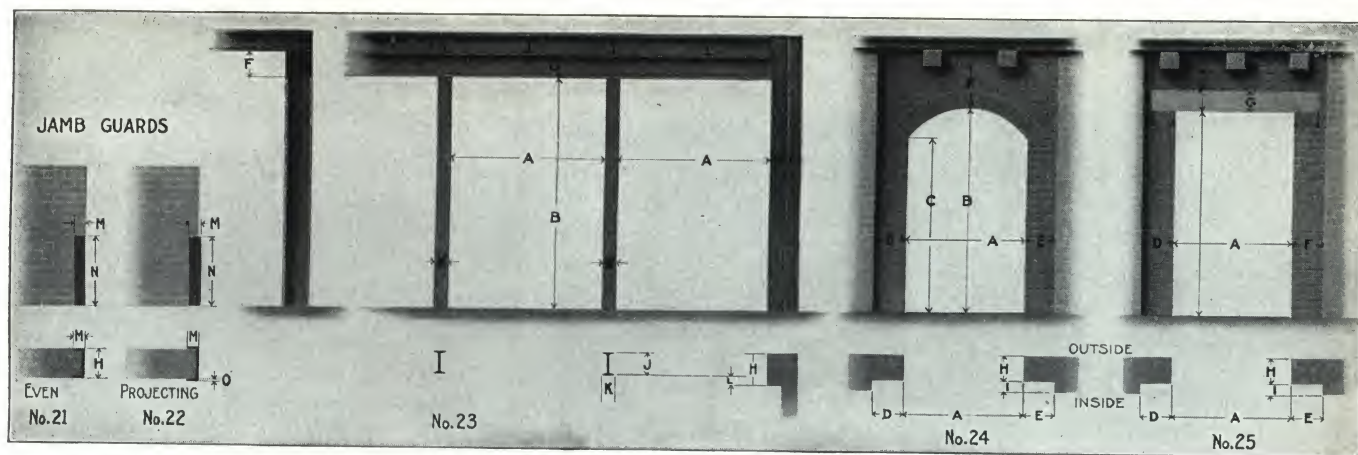
INTERMEDIATE MOVABLE POSTS

Wide openings can be frequently more economically closed by a number of small doors, than by a single large one, using, between doors, movable posts hinged to brackets. After doors are open, posts are swung up out of the way by ropes and pulleys

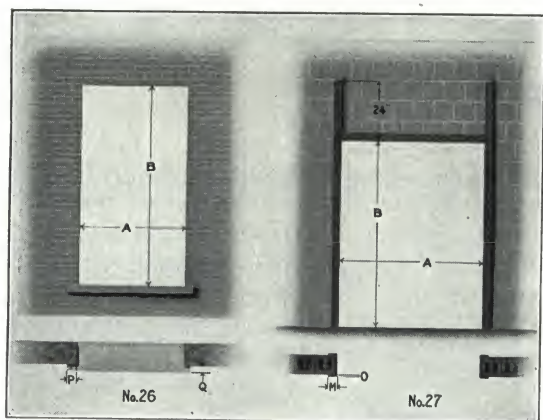


INTERIOR OF PIER 32, SAN FRANCISCO

Steel rolling doors arranged with movable intermediate posts shown above, making entire opening available



OPENINGS FOR KINNEAR ROLLING SHUTTERS



OPENINGS FOR KINNEAR ROLLING SHUTTERS

Information and Measurements Required

Illustrations show essential measurements. In giving information, describe lintel, shapes and sizes of parts composing it, accompanying same with sketch showing cross section. Essential measurements are as follows:

A—Width; if door is mounted in opening, give width at top and bottom.

B and C—Height of opening.

D and E—Projection in close proximity to opening.

F—Clearance between top of opening and floor beams, or ceiling.

G—Height of lintel.

H—Thickness of wall.

I—Projection of some part of wall near opening.

J—Depth of column; give shape and sizes of parts composing column.

K—Width of column.

L—Distance from column to inner face of wall.

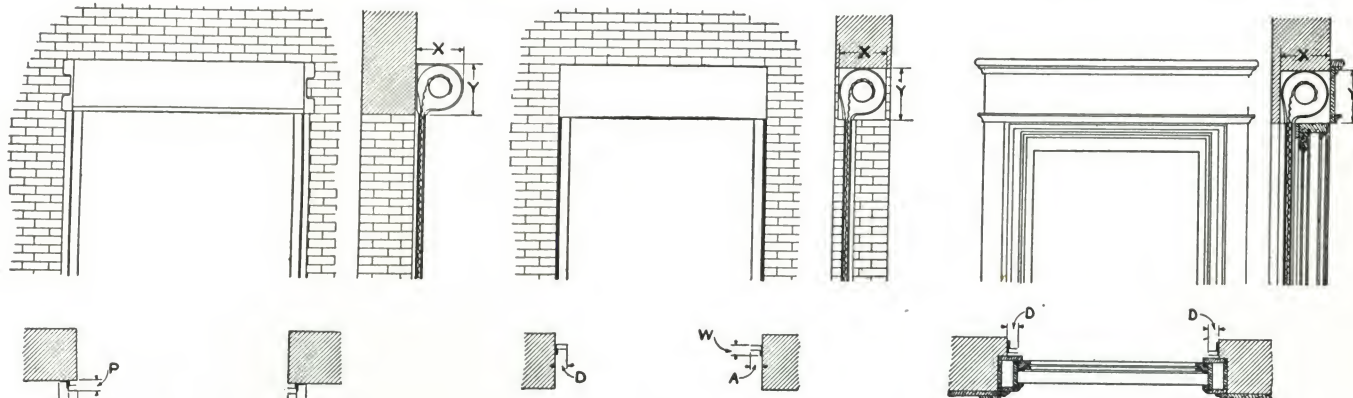
M—Lap of guard.

N—Height of guard.

O—Projection of guard.

P—Lap of guard.

Q—Projection of sill.

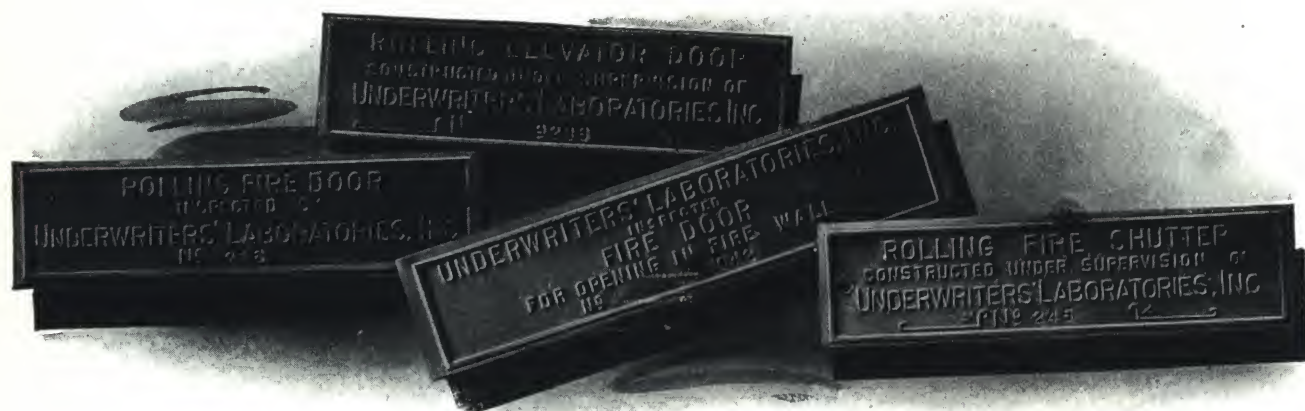


PROJECTIONS (Schedule Below)

Above are indicated the salient dimensions of usual sizes of standard service types of Kinnear steel rolling shutters. View to the left shows shutter placed on face of wall; central view shows shutter placed between jambs, and that to the right shows curtain with concealed coil. The following dimensions are for shutters of height and width indicated:

Height ft.	Width 3 to 7 ft. Groove depth "D", 2 in.					Width 7 to 11 ft. Groove depth "D", 2½ in.					Width 11 to 14 ft. Groove depth "D", 3 in.					Width 14 to 20 ft. Groove depth "D", 3½ in.				
	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.	X in.	Y in.	P in.	A in.	W in.
6	12¾	14	2¾	4	3	13½	15	2¾	4½	3½										
8	14¾	16	2¾	4	3	16½	18	2¾	4½	3½										
10	15¾	17	2¾	4	3	17½	19	2¾	4½	3½										
12	17½	19	2¾	4	3															
6	11	13	2½	4	3	11	13	2½	4½	3½	12¾	14	2½	5	4	15	17	3½	8	4½
8	11	13	2½	4	3	11¾	13	2½	4½	3½	12¾	14	3½	5	4	15	17	3½	8	4½
10	11¾	13½	3½	4	3	11¾	13½	3½	4½	3½	12¾	14	3½	5	4	15½	18	4	8	4½
12	13½	15	3½	4	3	13½	16	3½	4½	3½	13½	16	3½	7	4	17	19	4	8	4½
14	14¾	16	3½	4	3	14¾	16½	3½	4½	3½	15½	17	3½	7	4	17½	19	4	8	4½
16	15¾	17	3½	4	3	15¾	17	3½	7	3½	16½	18	4	7	4	20	22	4	8	4½
18	15¾	17	3½	4	3	15¾	18	3½	7	3½	17	19	4	7	4	22	24	4	8	4½

Sizes above division line apply to shutters operated by handle in bottom of curtain. Those below division line apply to shutters operated by endless chain or crank and bevel gear. Dimension "P" applies only to face of wall constructions. Dimension "W" only to "between jamb" construction. Dimension "D" in the between jamb section applies only to manually operated shutters. Use projection "A" for both sides where chain shutters 10 or 12 in. and more if possible. We do not recommend manually operated construction for curtains of larger area than approximately 100 sq. ft.; chain hoist should be used on larger sizes. Above does not apply to automatic construction; for clearance on automatic or any other special construction. Any unusual sizes, direct correspondence is advisable.



UNDERWRITERS' LABELS

Fire Doors and Shutters

Constructed under the supervision of the Underwriters' Laboratories, Inc., and labeled as above.

Important Features—Kinnear fire doors and shutters are specially designed for fire protection.

Details of construction have been carefully developed. The following are some of the important features:

(1) An auxiliary or inner hood is automatically dropped and closes the space between the barrel and outer hood, thereby preventing the passage of flame over the barrel.

(2) Special endlocks closing the concaved ends of slats and preventing the passage of flame around the edge of the curtain.

(3) Fusible washers employed in the construction of grooves which melt and allow the members composing the grooves to expand without buckling.

(4) Non-corrodible metal used for bearings and contact points of the automatic release.

(5) Single line contact bearings in releasing levers.

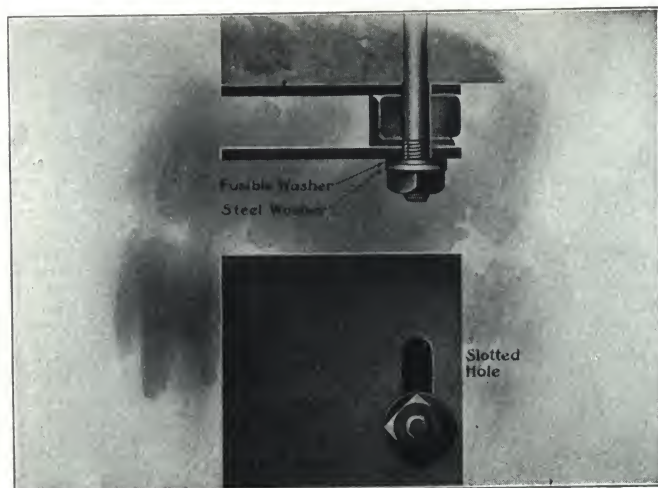
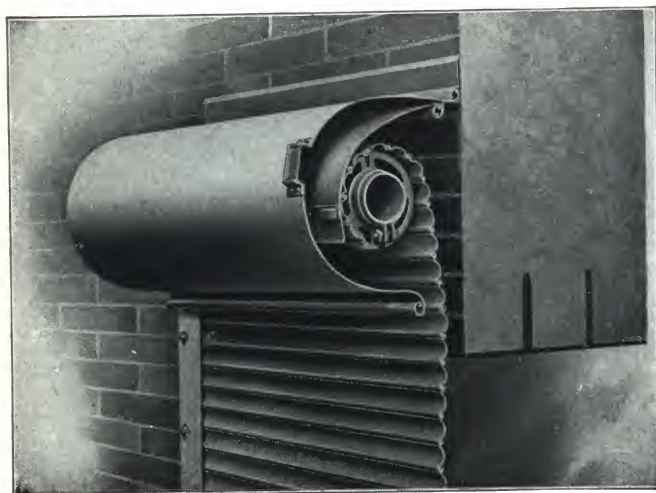
(6) Provision made for expansion of parts for all temperatures up to 2000° F.

(7) Disposition of fusible links, insuring prompt closing.

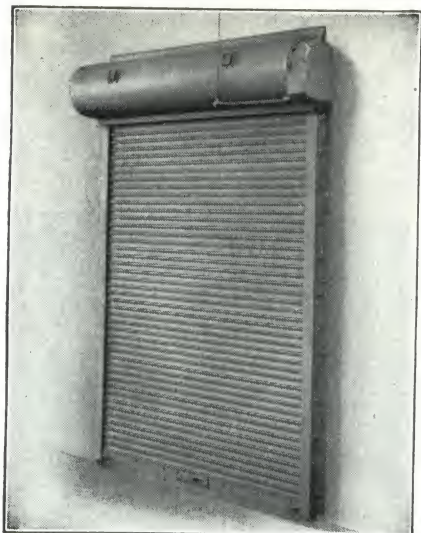
(8) The enclosure of automatic release, protecting it from the weather.

(9) Safety device controlling the speed of curtain in automatic closure.

Catalogues—General Catalogue No. 51 and the special Fire Door Catalogue No. 53 illustrate many additional types and their applications. These doors and shutters are designed to obtain easy operation in normal service, and are easily opened and reset by a single person after automatic closure.



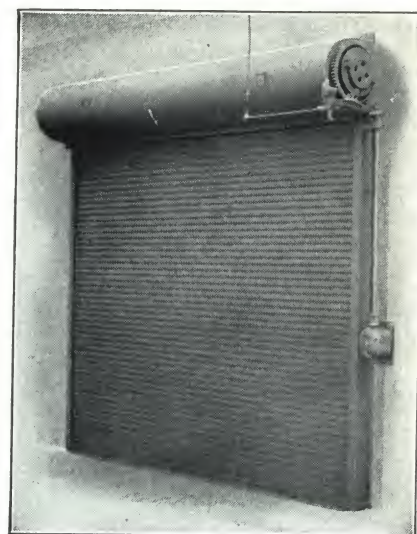
SALIENT FEATURES OF KINNEAR FIRE DOORS AND SHUTTERS



Manual Operation



Chain Operation



Crank and Shaft Operation

A FEW TYPES OF AKBAR CONSTRUCTION

Salient Features of Akbar Construction, a Distinctive Kinnear Product

(1) The automatic closing of this type of door is insured by a powerful starting force which diminishes as door is set in motion.

(2) A special safety device is provided on each door which controls drop of door in automatic closure and which eliminates every element of danger, as well as the violent impact common to other types.

(3) Can be opened and reset without difficulty after automatic closure.

(4) Are available for service purposes at all times and will close automatically from any open position.

Types—Akbar doors are made in the following types:

Akbar No. 1, manual operation

Akbar No. 2, chain operation.

Akbar No. 3, crank operation.

The above three types are labeled for openings in vertical shafts, partition walls, bridge and tunnel entrances where openings do not exceed 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 4, manual operation

Akbar No. 6, chain operation

Akbar No. 7, crank operation

Akbar No. 8, crank operation

The above four types are labeled for openings in fire walls not in excess of 80 sq. ft. and where width or height does not exceed 12 ft.

Akbar No. 9, chain operation

Akbar No. 10, crank operation

The above two types are labeled for openings in exterior walls for openings not in excess of 100 sq. ft., and where width or height is not in excess of 12 ft.

Other types similar to Akbar manual operation are available for exterior openings.

Salient Features of Superior No. 1 and No. 2 Constructions

Labeled for exterior window openings not in excess of 100 sq. ft., neither dimension exceeding 12 ft.

Normally remains in open position, closing automatically by means of fusible link.

Actuated by a powerful starting force which diminishes as shutters are set in motion.

Equipped with *safety device* which controls drop of door in automatic closure, eliminating all danger, as well as impact on sill.

Equipped with testing device by which periodical tests can be made as often as desired.

Can be raised after automatic closure with least possible difficulty.

After lever is reset, can be pushed and locked in any open position without adjustment.

Superior No. 1 to be mounted on face of wall.

Superior No. 2 to be mounted in opening.



SUPERIOR No. 1



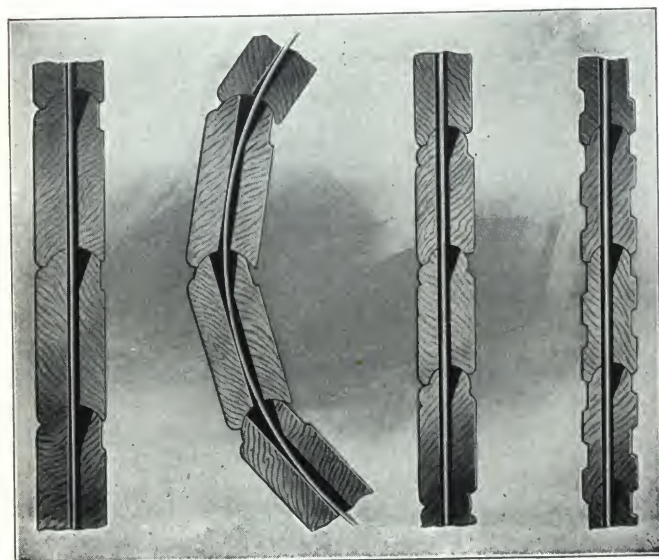
SUPERIOR No. 2

Wood Rolling Doors and Partitions

For Roundhouses—Wood rolling doors are particularly desirable in cases where chemical action is liable to deteriorate steel. This is particularly true in roundhouses and chemical plants.

These doors are constructed of wood slats assembled on phosphor bronze ribbons placed at proper intervals. Slats are made of cypress and treated with a coat of wood preservative.

Slat No. 27 is used on exterior doors.



No. 27

No. 27

No. 26

No. 24

SECTIONS OF WOOD SLATS

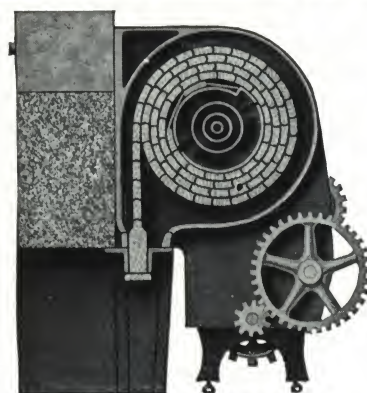
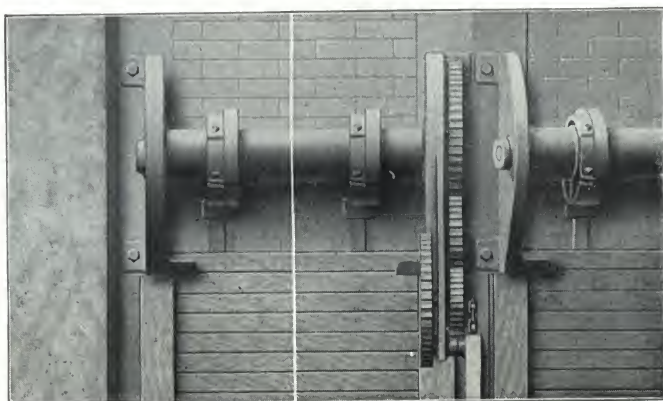
For Schools, Churches, etc.—Curtains are composed of slats assembled on phosphor bronze ribbons.

Made in long leaf yellow pine, cypress, quarter sawed oak and birch.

Slats Nos. 24 and 26 are for interior work; slat No. 27 for exterior work.

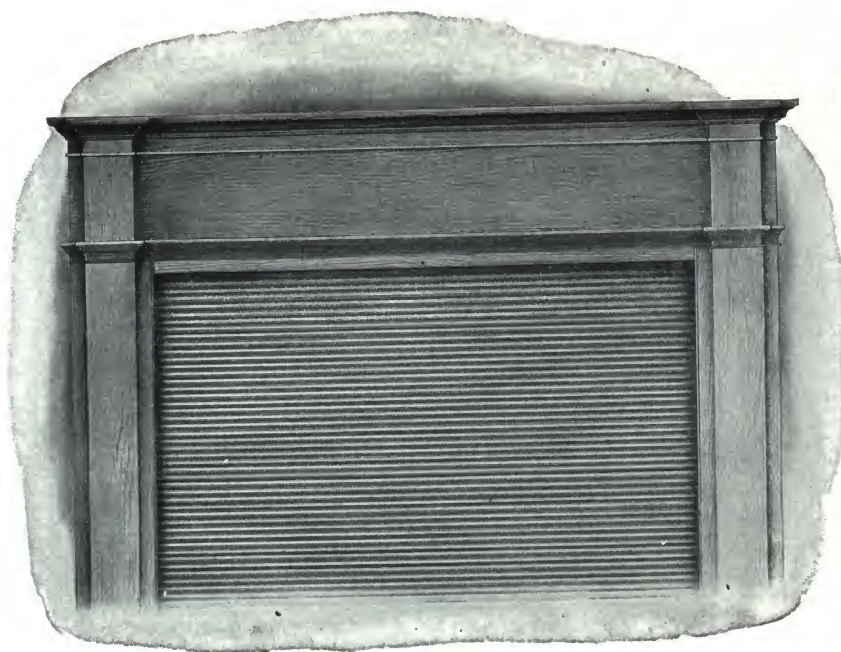
Illustration shows cross section through slats.

The opening through which the ribbon passes is so shaped that, during flexure of the curtain, there is no change in the relative length of the slats or curtain; nor is there any danger of pinching the ribbon.



CONSTRUCTION No. F. H. W. 22

Designed especially for roundhouses. Doors mounted on face of wall above opening; travel in grooves at sides. Counterbalanced by springs; operated by means of endless chain and reduction gear



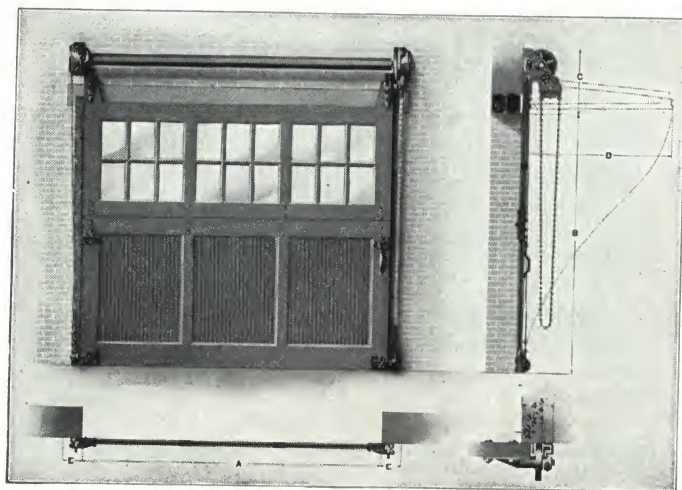
CONSTRUCTION No. W. B. M. 10

Application of wood rolling door for interior partition. Coil is concealed under lintel; operated by means of handle in bottom of rail. Mechanical operating devices are arranged for large doors. Can be concealed within the casing. Casing and grooves are not supplied, but should be included in general carpenter work

Bifolding Doors, Wood or Steel

In cases where light is desired through doors, the bifolding type lends itself readily to such condition. These doors may be constructed either of wood or steel, and are of two sections hinged at the center and pivoted at top of opening. The upper panel may be fitted with sash, giving a glass area of about two-thirds the total area of the panel.

Bifold No. 5—This is without doubt the most practical bifolding door now on the market, requiring less clearance at both head and sides of opening than do most other types.



BIFOLD No. 5

CLEARANCES REQUIRED FOR BIFOLD NO. 5

Height	6' 0"	7' 0"	8' 0"	9' 0"	10' 0"	11' 0"	12' 0"	13' 0"	14' 0"	15' 0"
B	26 1/2"	26 1/2"	26 1/2"	26 1/2"	28 1/2"	31"	33"	35"	35"	37"
C	3' 10"	4' 4"	4' 10"	5' 4"	5' 11"	6' 6"	7' 1"	7' 8"	8' 2"	8' 9"
E	8"	8"	8"	8"	8"	10"	10"	10"	10"	10"

Dimension A should not exceed 18 ft; dimension B should not exceed 15 ft.

Kinnear Bifold No. 5 is designed with a spring counterbalance, eliminating the heavy counterweights usually used on this type of door. Steel cables connect the door to the counterbalancing device at the top of the opening. Bottom panel is fitted with rollers which travel in guides attached to wall and transmit the thrust.

The simplicity and sturdiness of the mechanism reduces maintenance to a negligible factor and renders quick and easy operation. Less side clearance is required as there are no counterweights. Send us a sketch showing conditions as they actually exist and we will show how this flexible construction adapts itself to other than standard conditions.

Kinnear panels are fabricated in our own factory from extra heavy materials and are built on a purely quality basis. Write for prices and catalogue.

Bifold No. 3—Designed for large openings. Panels are built in two sections. Upper section may carry glass if desired.

In operating, the lower section rises to half the height of opening. The door then breaks, and both sections move simultaneously, the lower edge vertically, the upper edge horizontally, on suspended tracks to a position above the opening.

Panels are entirely counterweighted and operated by means of reduction gearing and endless chain.

This type of door was used in the Boston, Brooklyn, and Charleston army bases by the United States government.

Panels can be constructed either of wood or steel.



BIFOLD No. 3 IN OPEN POSITION

Vertical Sliding Doors

This type of door is particularly suitable for freight houses, piers and warehouses where light is essential through doors.

The door comprises two or more sections consisting of trussed frame covered with corrugated iron, hung independently with chains connected with counterbalance weights. Operated by means of endless chain and suitable reduction gearing.

Where doors are mounted on steel columns, guides and weight boxes should be incorporated as a part of the column, and should be supplied by the steel contractor, according to details supplied by our Engineering Department.

This type can also be supplied to be mounted on the face of the wall, in which case we furnish weight box and guides as part of the equipment.

It is advisable to procure definite information from the factory in connection with the above type of door.



VERTICAL SLIDING DOORS
Installed in Santa Fe freight shed

Kinnear Power Units

THE KINNEAR MANUFACTURING Co., to meet a constantly growing demand for power operation in connection with Kinnear steel rolling doors when applied to openings of extreme sizes, and where frequent operation is required, have developed three distinct types of power units.

While fundamentally the same in operation, the three types afford the opportunity of selecting a type most suitable for the condition in hand.

Kinnear power units are available for small openings on garages or mercantile establishments where frequent operation is desired, and on large railroad openings or crane openings where manual operation would be very difficult or entirely impossible.

Motor operation necessitates a door properly designed and carefully built. Kinnear doors, because of their sturdy character, lend themselves especially to motor operation.

We supply our doors and power units as a complete unit, assuming full responsibility not only for the quality of the material employed, but also for the workmanship, and for the erection and proper working of same where Kinnear erectors put up the work in the field.

Construction of Kinnear Power Units

Each power unit comprises motor, limit switches, reduction gear, manual (or emergency) operating mechanism, automatic starter, reversing and service switches; also a magnetic brake which is an integral part of the unit.

Limit Switches—Of our own design and manufacture and susceptible of precise adjustment.

Control the travel of the curtain, stopping it at the proper time; also actuate the magnetic brake and the automatic starter which breaks the circuit, stopping the motor.

Reduction Gear—Suitable reduction gearing enclosed in heavy cast iron housing. Cast iron and steel cut teeth, running in oil bath, the spray lubricating all bearings.

Bearings—All heavy bearings are bushed with bronze. Light bearings are babitted.

Service Switches—Enclosed type of knife switches externally operated, safety type, are supplied as our standard equipment.

Kinnear Power Unit No. 1

This unit is designed for excessive loads and is so constructed that either power or manual operation is secured through the same gear. Either method may be employed without the shifting of clutches. The emergency chain is always in position to be used in absence of power.

Designed for extremely large openings.

Kinnear Power Unit No. 2

This type is designed for average sized openings and is essentially a power drive; manual operation is intended for emergency only. The emergency chain can

be placed on sprocket in case of emergency, but when motor is employed, the chain should be removed.

Kinnear Power Unit No. 3

This unit is small and very compact and can be supplied in two designs, one mounted on bracket and the other to be mounted on wall or steel members.

It is designed for small openings in garages and buildings of a similar character.

Accessories

Wire, wiring, fuses or conduit are never included in our equipment and must be supplied and installed by others.

Necessary Information

In order to quote intelligently on motor operated doors, we must have the number and sizes of doors. Also a complete description of the current and the number of times the doors will be opened and closed each day.

Kinnear Motor Operated Doors—Practical and Efficient

Motor operation in connection with Kinnear steel rolling doors has grown in popularity for the very good reason that our power units are so designed that they are practically foolproof. They represent the finished product after years of experimental work by capable engineers and are sold with an absolute guarantee that if correctly installed and properly maintained they will render a service 100% efficient.

One power unit will operate one door or a group of doors as a unit. Where hinged posts are used in dividing large openings, power units can also be employed in operating them. Through interlocking switch and automatic locking devices, the entire side of a building may be opened up from any point desired by means of switches.

Push button control is available for individual doors, or for a group of doors operated as a unit. However, where doors and posts are both to be electrically operated we recommend the enclosed type of knife switches externally operated. Push button control is particularly suitable for garages where doors are operated frequently as the stations can be placed in office, or at any other suitable point, and can be operated by any class of help, being as nearly foolproof as it is possible to make it. There is no chance of making a mistake; each operation follows in its logical sequence.

The doors under ordinary conditions will operate at the rate of 1 ft. per second.

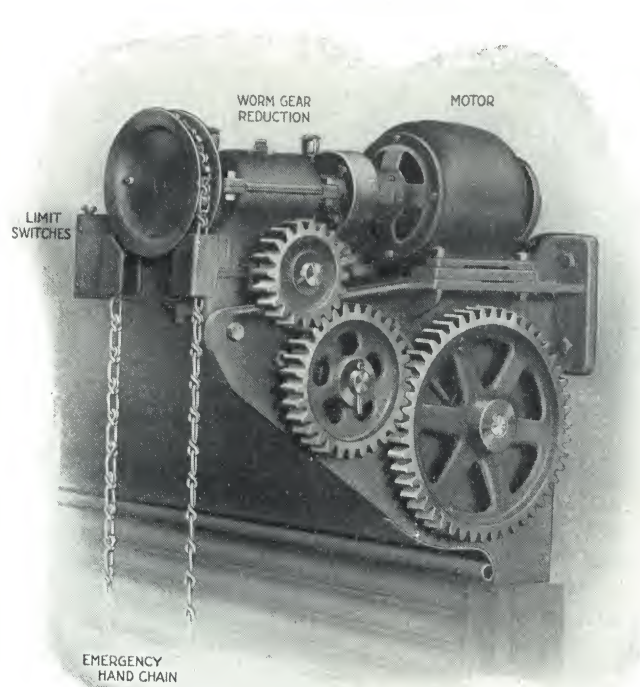
In General

Kinnear power units are the result of years of painstaking effort, are compact, sturdy, and are long past the experimental stage.

Kinnear motor operated doors are in general use everywhere and are great time savers on large openings.

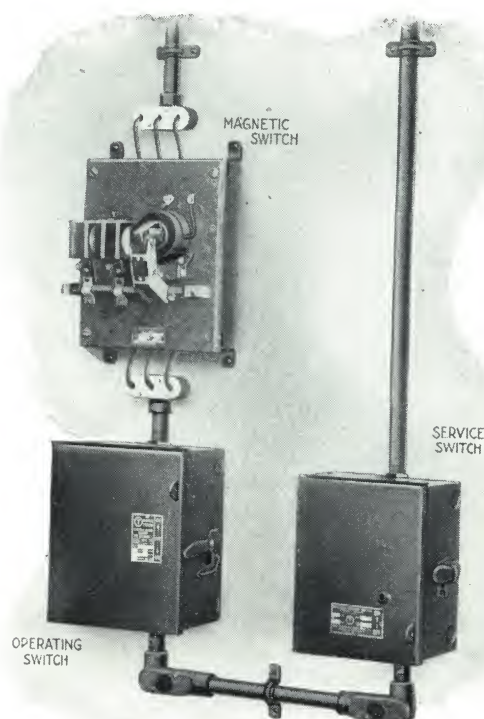
If you have door problems it will give us pleasure to help develop them.

Write for detailed information.

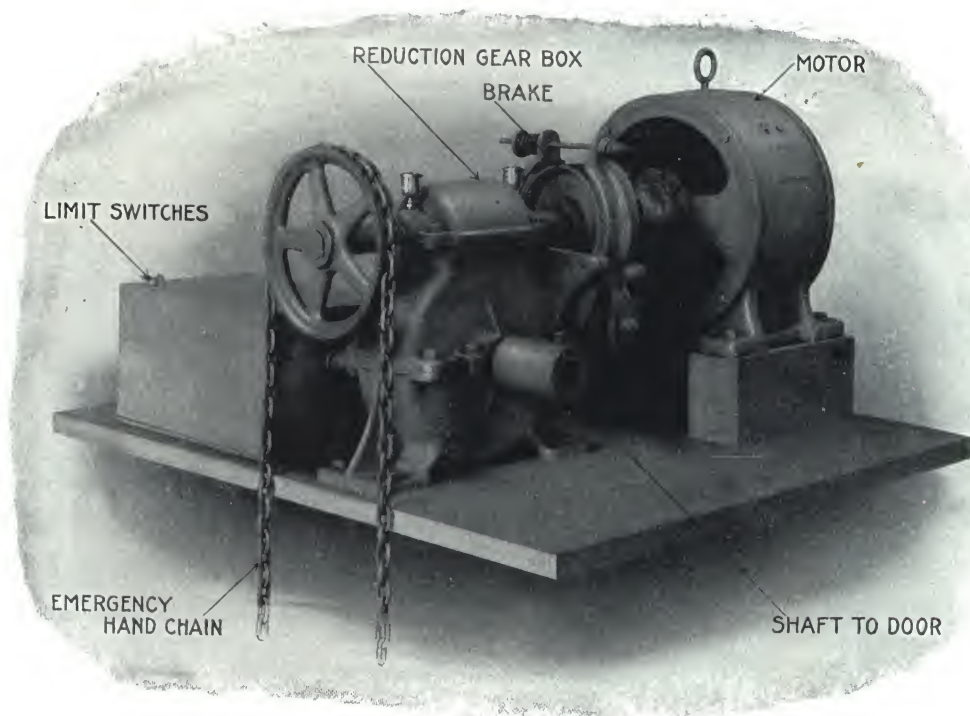


KINNEAR POWER UNIT No. 3

Can be supplied as shown or mounted on wall, being flexible enough and compact enough to be used almost anywhere



ENCLOSED TYPE OF SWITCHES
Supplied as part of Kinnear equipment



KINNEAR POWER UNIT No. 2

For large openings. Rugged, compact and complete; out of sight and out of the way. A silent servant ever ready to respond to the touch

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Steel Rolling Doors

CINCINNATI, OHIO

Products

- "MECCO" STEEL ROLLING DOORS.
- "MECCO" FIREPROOF KALAMEIN DOORS.
- "MECCO" FIREPROOF HOLLOW METAL

WINDOWS.

Also manufacturers of Tin Clad Doors; Kalamein Smoke Screens; "Mecco" Spanish Metal Tile; Garages; Marquise; Shingles (tin, galvanized or copper), Painted and Galvanized Roofing, Siding and Corrugated Sheets.



"Mecco" Steel Rolling Doors

Advantages—All-steel rolling doors have certain recognized general advantages over doors of other types. "Mecco" doors have other points of superiority that have won general recognition and are of special interest to architects, engineers, owners and contractors, viz.:

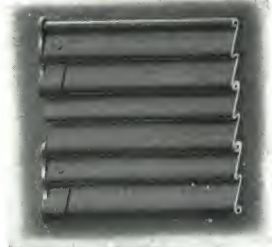
- (1) Ease of erecting "Mecco" doors.
- (2) Ease of operating "Mecco" doors.
- (3) Extremely low maintenance cost.

Slat Construction—

"Mecco" slats are rolled from galvanized copper bearing open hearth steel of best grade, with easy curves to prevent crystallization.

The modified Z-form makes this slat unusually strong and able to resist great pressure.

"Mecco" slats are extra wide, thus reducing the joints by 50%—a real advantage

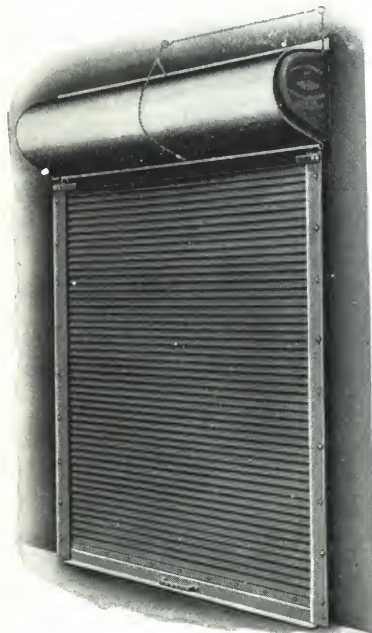


Slats with Malleable End Locks Attached

needing no explanation.

Underwriters' Approved Type No. 100—

Labeled for interior opening not exceeding 80 sq. ft. in area or 12 ft. in width or height. This type for erection on face of wall. Operated by handle on bottom bar, also automatic closing under control of fusible link melting at 150°. Curtains for class "A" openings No. 16 gage galvanized steel; for class "B" No. 20 gage. Two doors required for class "A" openings, one door on class "B" openings to secure full insurance credit.



Type No. 100

Types of Installation—The type of installation most frequently used has the coil mounted on the face of the wall above the opening. Where headroom is limited, the coil and the brackets are mounted under the lintel

and guides placed on the jambs. A large opening may be filled with several doors using removable posts.

Methods of Operation—(1) Handle on bottom bar. This is the push-up type, operated like a window shade. May be operated from either side of the opening. The area for the push-up type should not exceed 100 sq. ft.

(2) Operation by reduction gears and an endless chain.

(3) Operation by gears, shafting and crank.

(4) We also build electric motor operated doors. We must have a complete description of the current to quote on or build motor equipment.

Installations—The following are a few of the users of "Mecco" doors:

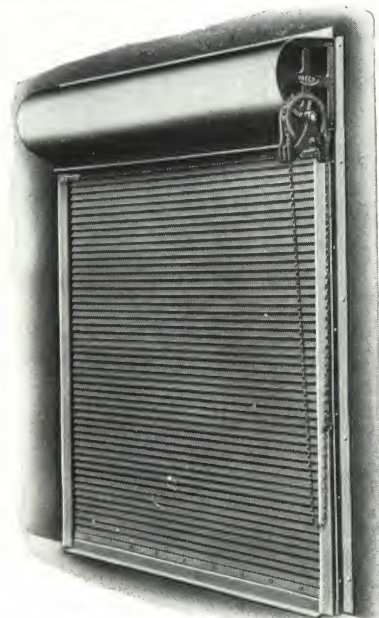
- Cleveland Fruit Auction House, Big Four R. R., Cleveland, Ohio
- U. S. Parcel Post Terminal Building, Cincinnati, Ohio
- National Biscuit Co., Cincinnati, Ohio
- Atlantic Coast Line R. R. Co., machine and erection shops, Montgomery, Ala.
- Louisville & Nashville R. R. Co., freight house, Covington, Ky.
- Donaldson Lithographing Co., Newport, Ky.
- B. F. Goodrich Co., Akron, Ohio
- Northern Ohio Traction & Light Co., Akron, Ohio
- Penn Public Service Corporation, Johnstown, Pa.
- Allis-Chalmers Co., Cincinnati, Ohio
- Wm. Powell Co., Cincinnati, Ohio
- Henke Building, Houston, Tex.
- Geo. L. Williams Building, Cleveland, Ohio
- U. S. Industrial Alcohol Co., Peoria, Ill.
- F. W. Albrecht Grocery Co. Warehouse, Akron, Ohio

Services

Our engineers are at your service at all times to give any data you may require.

Quotations will be furnished on any quantity or type.

Get "Mecco" service and quality.



Type No. 6

Erected on face of wall, operation by chain and gear

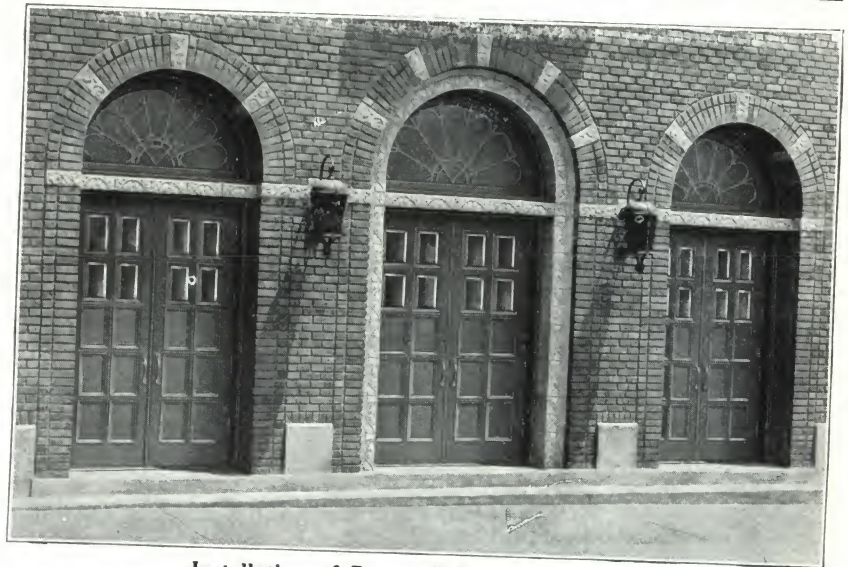
"Mecco" Kalamein Doors

We manufacture a complete line of kalamein doors, covered with stretcher leveled kalamein iron, copper or bronze. Frames may be wood core, metal covered, or of steel, either hollow or solid.

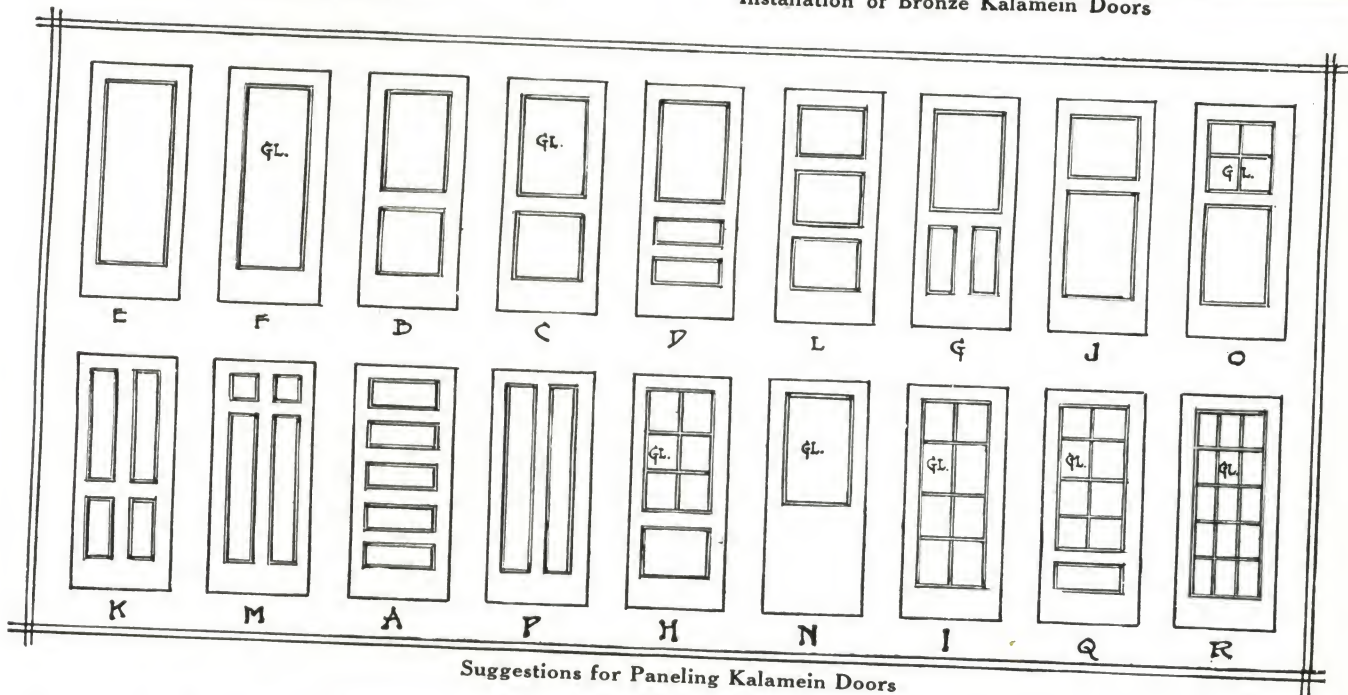
Doors covered with kalamein iron are ordinarily supplied with a prime coat of paint. We, however, can supply any desired enamel finish, or doors grained in imitation of any kind of wood. Cut shown to right is of doors covered with No. 20 gauge bronze.

Labeled Kalamein Doors

We can supply labeled kalamein doors or frames. Doors with metal panels may be labeled for "Vertical Shaft," "Corridor" openings or "Fire Escape" openings. Doors with glass can not be labeled for vertical shaft.



Installation of Bronze Kalamein Doors



Suggestions for Paneling Kalamein Doors



Ball Gymnasium, Indiana State Normal School, Muncie, Ind.

"Mecco" Hollow Metal Windows

We manufacture a complete line of hollow metal windows of every type, labeled by the National Board of Fire Underwriters.

Double Hung Type—The cut to the left shows an installation of "Mecco" double hung windows.

We have hundreds of such installations in high class office buildings, terminal buildings, stores and other semipublic and private structures.

The sash of windows are made to slide perfectly and yet the design and workmanship are such as to exclude the elements. "Mecco" windows are labeled.

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

Manufacturers of Rolling Steel and Wood Doors and Shutters

TELEPHONE

CALEDONIA 8970, 8971, 8972

CABLE

"WILCORP, NEW YORK"

GENERAL OFFICES

11 East 38th Street
NEW YORK, N. Y.FACTORY
NORFOLK, VA.

BRANCH OFFICES

ATLANTA, J. M. VAN HARLINGEN
BOSTON, THE J. G. WILSON CORPORATION
BUFFALO, THE J. G. WILSON CORPORATION
CHICAGO, H. B. DODGE & CO.HOUSTON, THE J. G. WILSON CORPORATION
LOS ANGELES, THE J. G. WILSON CORPORATION
PHILADELPHIA, THE J. G. WILSON CORPORATION
PITTSBURGH, H. H. CHARLES

SAN FRANCISCO, THE J. G. WILSON CORPORATION

AGENTS IN PRINCIPAL CITIES

ProductsROLLING STEEL DOORS and SHUTTERS,
Wilson Standard and Underwriter Labeled.

ROLLING WOOD DOORS and SHUTTERS.

For Partitions and Wardrobes, see pages
B2163-2165; for Blinds and Awnings, see page
B2291.

TRADE-MARK

overcome the resistance of Wilson safety knobs
is as follows:18-ft. span 1000 lb. 24-ft. span 500 lb.
30-ft. span 300 lb.

A wind velocity of 120 miles exerts a pressure of 43 lb. per sq. ft.

Curtain has same appearance on either side, thus preserving symmetry when it becomes necessary to hang some doors on inside and others on outside of same elevation.

Made in Nos. 22, 20, 18 and 16 gauge—depending wholly on size on opening.

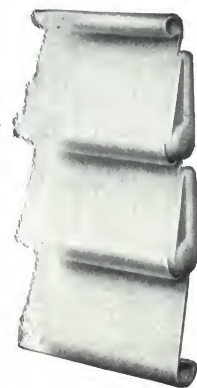
"Little 4" Interlocking Slat—Similar to "Big 4" slat in appearance and design; the depth of corrugation being slightly less, but possessing the same advantages as the "Big 4." Used in small doors for openings where coil must be made as small as possible and for underwriter labeled exterior wall doors. Fitted with fire stops when necessary.

Made in Nos. 22 and 20 U. S. standard gauges.

No. 2 Interlocking Slat—Especially designed for use on underwriter labeled fire doors and other doors installed on interior of buildings when not subjected to wind pressure or unusual hard service.

Made in Nos. 20, 18 and 16 U. S. standard gauges.

The curtains of the underwriter type are equipped with fire stops on the ends of slats, baffle plates in the hood, and (where permitted) automatic devices which cause them to close in case of fire.

**No. 2 Interlocking Slat with Fire Stops****Where Wilson Rolling Steel Doors Are Used**

Wilson rolling steel doors and shutters are designed to meet all classes of service; first, effective closure of openings against weather and intrusion, second, closure of openings where fire doors are required.

Wilson Interlocking Slat Curtain

The Wilson curtain, that part of the door closing the opening, is formed of a series of interlocking slats of Wilson special Keystone copper-bearing galvanized steel, conceded by all metallurgical authorities to be more effective in retarding corrosion than any other similar product. By actual experience and practical test Wilson doors will greatly outlast all others.

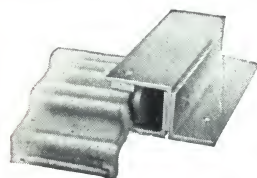
Wilson interlocking slats are made in the three following types:

"Big 4" Interlocking Slat—This slat has distinct advantages possessed by no other slat. Being of corrugated form it has far greater rigidity than the ordinary channel form slat. Its design permits of end-shields which actually do take all wear from that part of the curtain sliding in the grooves. Every part of the Wilson end-shields functions in a definite way, adding considerably to the life of the door.

Deep corrugations also protect the interlocks from damage when hit by moving vehicles. Kinks and dented interlocks will materially affect the operation of other doors.

**"Big 4" Interlocking Slat**

An exclusive Wilson feature is the patented safety grooves and wind locks which are standard equipment on doors over 14 ft. in width. Doors so equipped cannot possibly be blown from grooves and will withstand any conceivable wind pressure without excessive deflection of the curtain, at the same time minimizing possible damage to curtain from whatever cause.

**Safety Groove and Wind Lock**

The wind pressure necessary per square foot of shutter to

Operation of Wilson Rolling Steel Doors

Wilson rolling steel doors may be operated from either one or both sides of opening. Small doors are usually raised and lowered by handles on bottom bar, and large doors are usually operated by chain gear, crank gear, or electrically.

Self-coiling Operation—Wilson types S. C. 11 and 22 are operated by hand by means of handles on bottom bar of door. This type is not recommended on openings over 10 ft. wide or more than 8 ft. in height, or exceeding 80 sq. ft.**Chain or Crank Operation**—Should be used for doors larger than the limitations of self-coiling operation. Wilson types C. G. 11 and 22 are operated by means of chain and gear. Wilson type K. G. 11 is operated by crank gear. The chain operated door has been universally adopted as the standard service door.**Motor Operation**—Coming into general use since the perfection of Wilson super-equipment, constructed entirely of General Electric products, is being used on doors of most any size and type depending largely on the use of the door.

In view of details involved, we solicit the opportunity of working on any such installations to insure provisions being made for the proper equipment at a minimum cost.

Hinged Wicket Doors

Standard size, 2x6 ft., may be placed in any door. Designed so that wicket door with its frame can be swung back out of way with a minimum effort. Substantially built and very practical—used for passage when opening is a means of exit to part of building in which located.

Wilson Rolling Steel Fire Doors (Underwriter Labeled)

Exceptionally durable and equipped with special fire protective devices. Close automatically in case of fire and are approved and labeled by the Underwriters' Laboratories, Inc. for the following services:

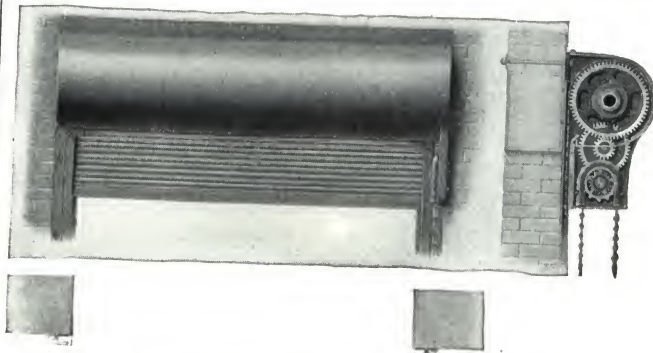
Vertical Shafts, Corridors and Room Partitions

—Area of opening not to exceed 80 sq. ft.; neither width

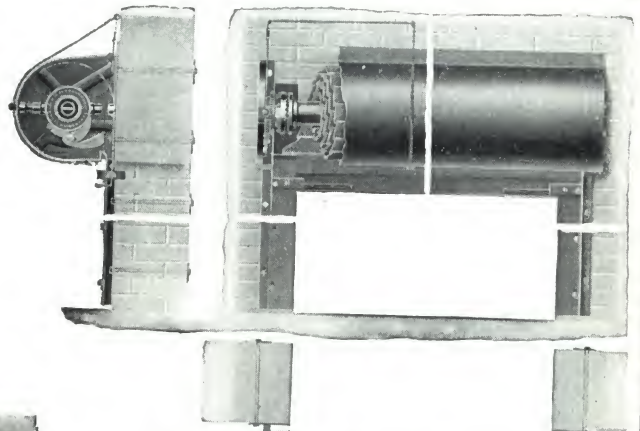
nor height of opening to exceed 12 ft. Curtains may be hung on face of wall or between jambs, self-coiling or crank operation, and where required are automatic closing in case of fire. Specify Wilson type Nos. 21 to 26, inclusive, interlocking slat No. 2, No. 20 gauge.

Fire Walls—Area of wall opening not to exceed 80 sq. ft.; neither width nor height to exceed 12 ft. Two doors are required and may be hung on face of wall or between jambs, self-coiling or crank operation, and close automatically in case of fire. Specify Wilson type Nos. 31 to 35, inclusive, interlocking slat No. 2, No. 16 gauge.

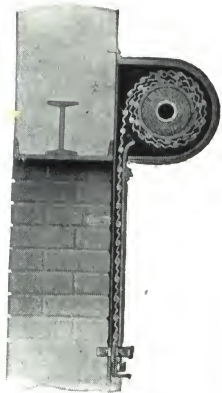
Exterior Walls—Area of wall opening not to exceed 100 sq. ft.; neither width nor height to exceed 12 ft. Curtain may be hung on face of wall or between jambs,



CHAIN GEAR OPERATION, TYPE C. G. 11



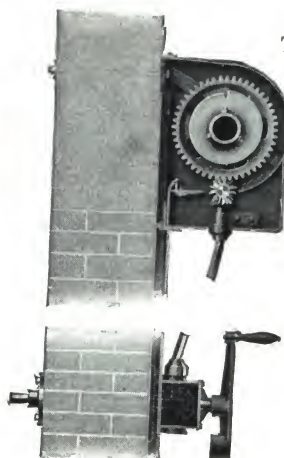
TYPICAL APPLICATION OF WILSON UNDERWRITER LABELED DOOR



SELF-COILING OPERATION, TYPE S. C. 11



CHAIN OPERATION THROUGH WALL, TYPE C. G. O. 11



CRANK OPERATION, TYPE K. G. 11



TYPE C. G. 11 EQUIPPED WITH WICKET DOOR

Coils and grooves are shown on face of wall but can be located between jambs if desired

SCHEDULE OF COIL AND GROOVE CLEARANCES

Underwriter Labeled Doors				Self-coiling Operation Wilson Standard Doors				Chain or Crank Operation Wilson Standard Doors			
Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.	Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.	Height opening, ft.	Diameter coil, in.	Width opening, ft.	Depth groove, in.
6	15½	3 to 6 7 to 12	6 6½	6	14½	3 to 6 7 to 10	6 6	10	16½	6 to 12 13 to 15 16 to 20	6½ 7½ 7½
8	16½			8	15½			12	18½		
10	18½			10	15½			14	19½		
12	19½			12	18½			16	21½		
								18	22½		
								20	23½		
								22	24½		
								24	25½		
								26	26½		

Dimensions shown are recommended standard sizes, subject to modification.
Advise us your requirements. We will send representative or details to assist you.

Details of Wilson Rolling Steel Doors

self-coiling, chain or crank operation, and, where permitted, may be automatic closing in case of fire. Specify Wilson type Nos. 41 to 51, inclusive, interlocking slat "Little 4," No. 22 gauge.

Automatic Closing Device—Where required, doors close automatically by the fusing of one of two links located at the head or side of opening, and near the ceiling.

Doors close easily on the sill and can be raised immediately after without difficulty. Automatic device can be reset and new link inserted without removing the hood or dismantling the door.

Grooves and bottom bar of door are provided with

Wilson Rolling Wood Doors and Shutters

Especially made to withstand the corrosive fumes so destructive to iron and steel. Recommended for roundhouses, powerhouses, chemical plants, refrigerating plants, etc.

Heavy Slat Doors—Made of wood slats 2 in. wide and about $1\frac{1}{8}$ in. thick, threaded on bronze bands running from top to bottom about 18 in. apart. Each band is riveted to top slat and attached at bottom to a strong spiral spring anchor of phosphor bronze. This

slotted holes to allow for expansion. Fusible washers are used with bolts securing grooves to wall, allowing freedom of movement during expansion. Bolts for brackets and grooves are bolted through wall or attached to iron inserts furnished and installed by others.

Consultation—Inasmuch as fire doors usually present problems and difficulties, it is suggested that we be consulted for definite details and requirements. A door may be labeled, but will not pass inspection because installation does not meet requirements of the local board, due to construction of opening or conditions surrounding opening.

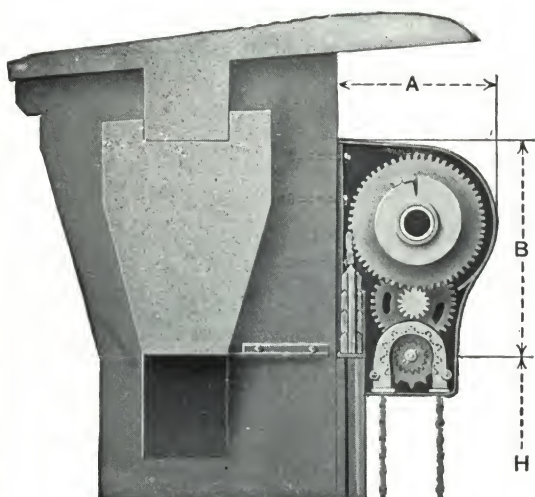
construction allows for shrinking and swelling of door due to atmospheric changes. It requires less than one minute to raise or lower the door.

The doors are treated with carbolineum, reducing to a minimum any expansion or contraction, and acting as a preservative.

Light Slat Doors—Similar to heavy slat type except slats are $\frac{1}{8}$ in. thick. Used on smaller openings or where not subjected to as heavy wear as the heavy slat door.

SCHEDULE OF COIL SIZES

Height of opening, ft.	Heavy slat, in.		Light slat, in.	
	A	B	A	B
8	18	26 $\frac{1}{2}$	14	20 $\frac{1}{2}$
10	18	26 $\frac{1}{2}$	15	21 $\frac{1}{2}$
12	21	29 $\frac{1}{2}$	16	22 $\frac{1}{2}$
14	22	30 $\frac{1}{2}$	16	22 $\frac{1}{2}$
16	23	31 $\frac{1}{2}$	18	24 $\frac{1}{2}$
18	23	31 $\frac{1}{2}$	19	25 $\frac{1}{2}$



SECTION THROUGH HEAD OF OPENING

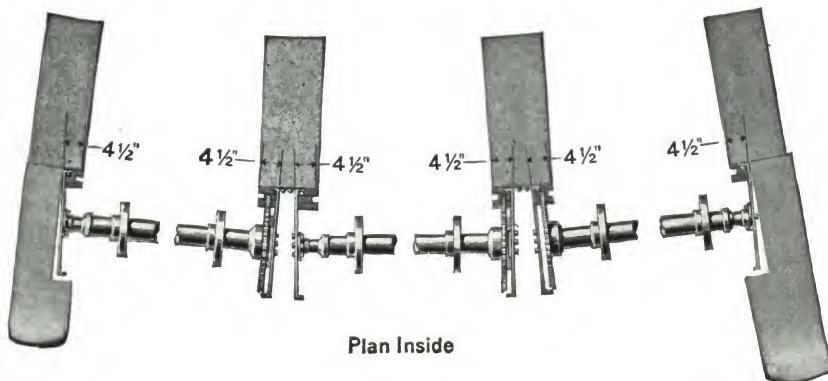


SECTION OF BOTTOM BAR
SHOWING BRONZE ANCHOR
SPRING AND BAND

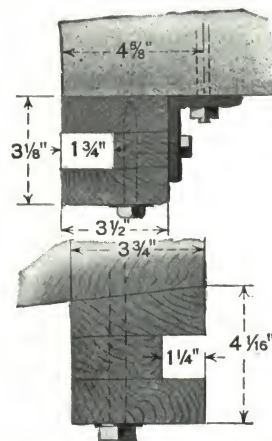


HEAVY SLAT

LIGHT SLAT



Plan Inside



SECTION THROUGH LIGHT AND HEAVY
SLAT DOOR GROOVES

Details of Wilson Rolling Wood Doors

ALLEN & DREW, INC.

Manufacturers of Electrically Operated Doors, Gates and Partitions

43-45 Brookford Street
CAMBRIDGE, MASS.

NEW YORK OFFICE, 50 Church Street

Products

ELECTRICALLY OPERATED DOORS and GATES of the following types:

Horizontal Sliding, One-piece.
Horizontal Sliding, Two-piece, Two-speed.
Horizontal Sliding, Two-piece, Part-

ing.
Swinging, singles or pairs.
Swinging, Two-section,
Folding.

Vertical sliding, One-piece.
Vertical Sliding, Two-piece,
Two-speed.

Slide-up Turnover, in One
or Two Sections.

Bi-folding or Canopy.

Craneway.

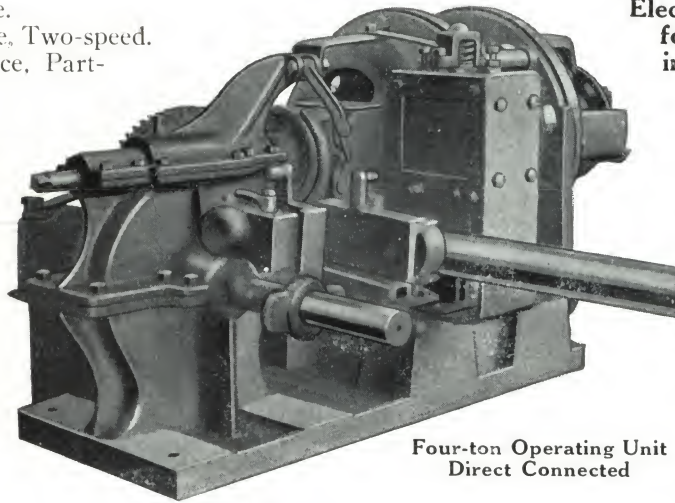
Doors for Hangars.

VERTICAL SLIDING PARTI-
TIONS and CURTAINS.

Service

Wherever the use of electrically operated mediums for closing difficult openings are desirable we will be pleased to place our experience at the disposal of architects and engineers.

We have made installations covering exceptionally large openings, also those requiring speedy operation.



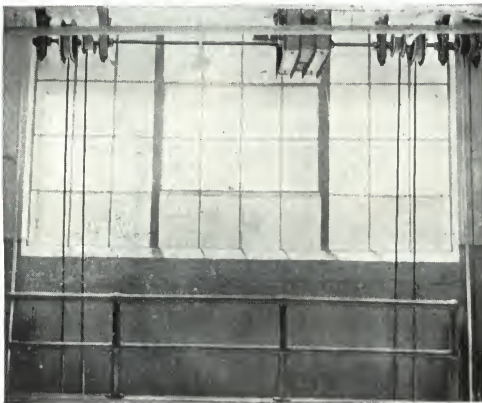
Four-ton Operating Unit
Direct Connected

Electric Operating Units for Heavy Sliding, Folding and Swinging Doors

We make complete equipment for operating any type of door, except rolling steel, and for all widths of openings.

All units are remotely controlled from one or more push button stations. Units include motor of proper size to operate without overload; directly connected limit switch; solenoid or disc brakes. Remote control master

switches include overload and undervoltage protection to the equipment. Mechanical power transmission includes hardened steel worm, phosphor bronze worm gears. High grade of material is used throughout.



Operating Mechanism for Door Illustrated
Below



Swing Door



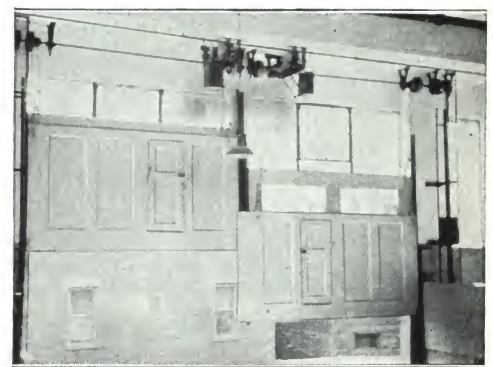
Fold-up Doors



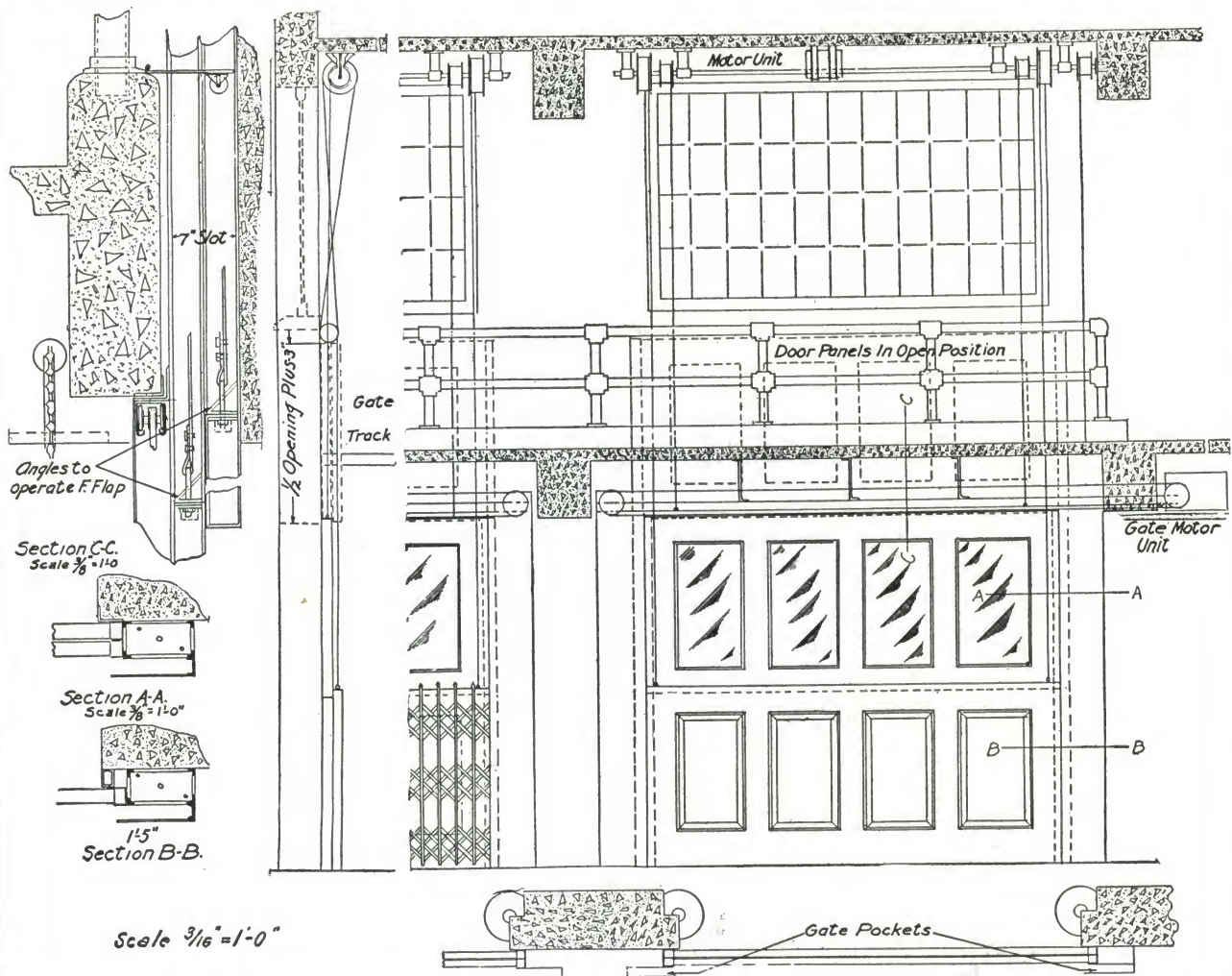
Two-piece, Two-speed Vertical Sliding Doors



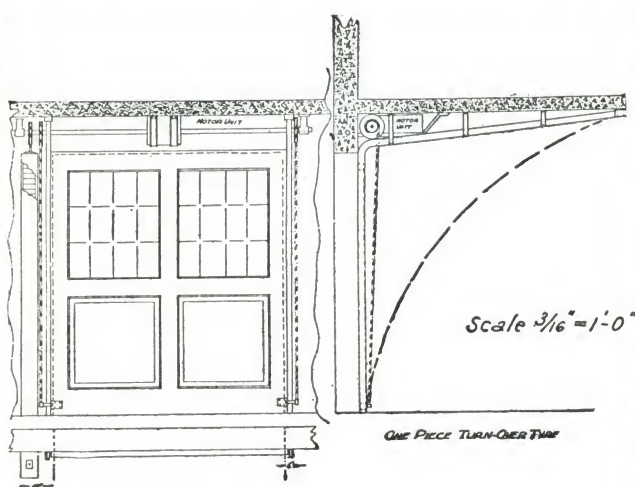
Vertical Sliding Door



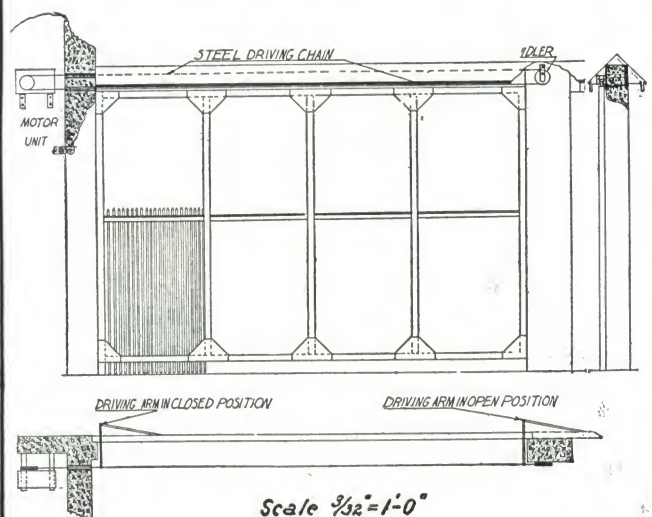
Two-piece, Two-speed Vertical Sliding Doors



TWO PIECE-TWO SPEED-SLIDE UP DOOR WITH COLLAPSIBLE GATES



ONE PIECE TURN-OVER TYPE



ONE WAY SLIDE TYPE

DETAILS OF MOTOR OPERATED DOORS & GATES

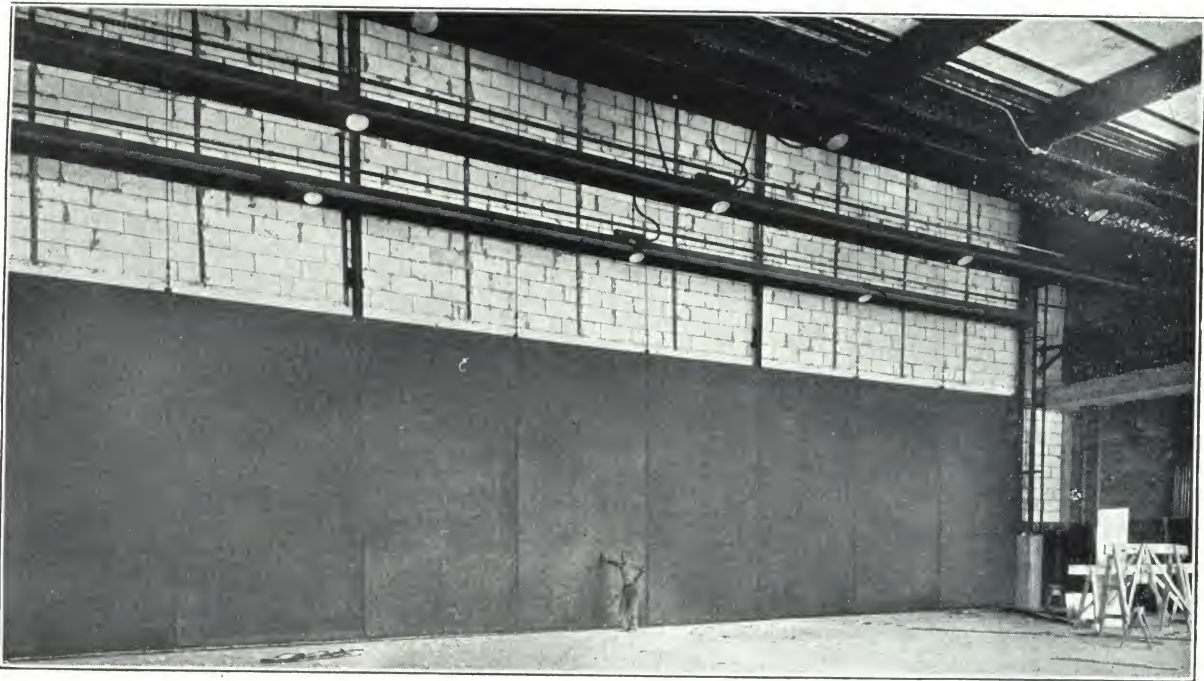
Electrically Operated Vertical Sliding Partitions or Curtains for Schools, Auditoriums, Churches, etc.

The Allen & Drew Vertical Sliding Partition is built of a properly constructed channel frame covered on both sides with sheet metal, the hollow space being filled with fireproof sound retarding material. The size of the channel framing and gauge of sheet metal varies according to the use to which the "partition or curtain" will be put.

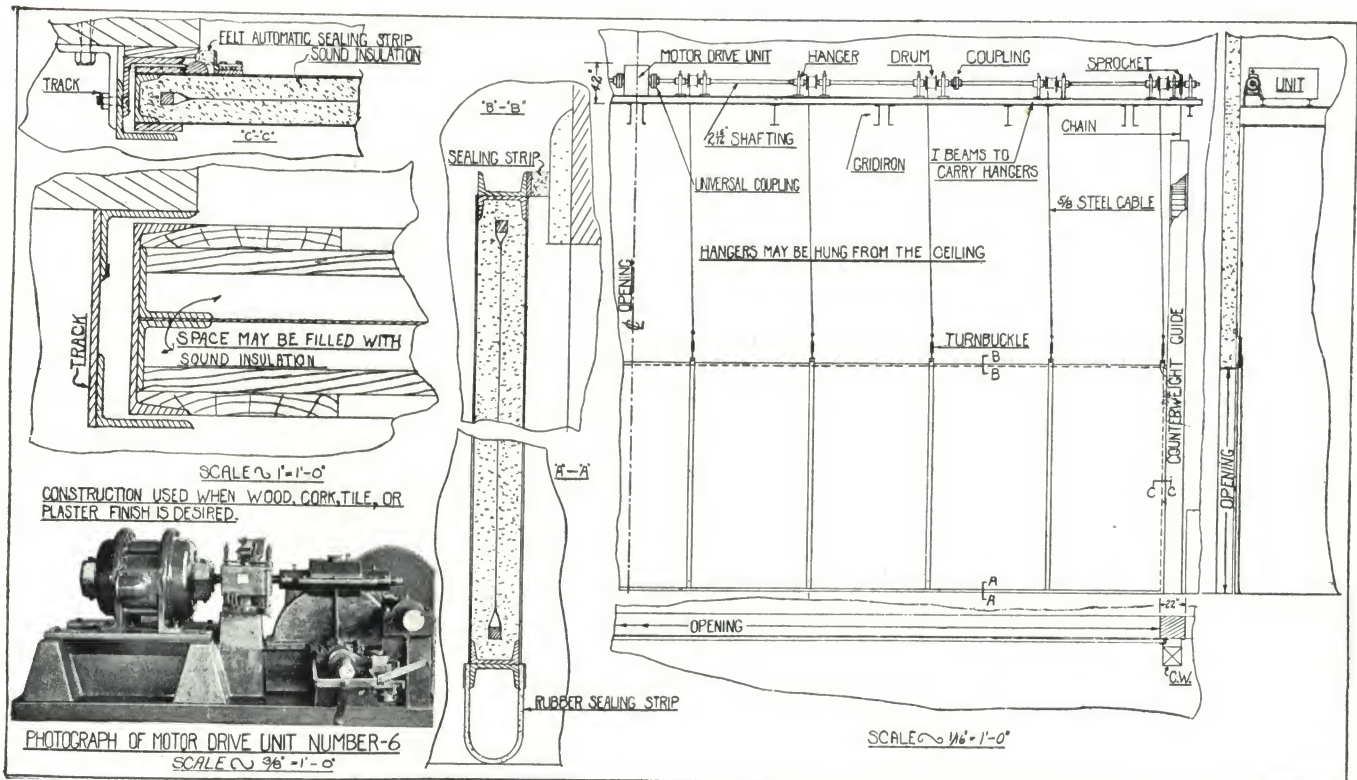
The Allen & Drew partition has fixed guides at each end and several telescoping guides at intermediate points. The bottom of the partition is equipped with dowel pins to lock it to the floor.

The partition is lifted by cables or chains attached to the top. It is raised by means of an overhead equalizing shaft extending the entire width of the opening. A motor drive unit is directly connected to this shaft, making it impossible for the partition to move without releasing the electric brake and rotating the worm.

Estimates and Service—All installations of this nature present problems requiring individual attention. We shall be pleased to receive sketches for any proposed use of curtains or partitions of this type and will gladly furnish detailed drawings, specifications and formal quotations for the complete installation of this equipment in any part of the United States.



Partition Installation on Opening 90 ft. wide by 19 ft. high



THE ATCHISON REVOLVING DOOR CO.

MAIN OFFICE AND FACTORY
INDEPENDENCE, KAN.

AGENCIES IN 60 OF THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA
Consult City or Telephone Directory for Name of Nearest Representative or Write the Main Office

Products

REVOLVING DOORS and ENCLOSURES: wood, metal covered and hollow metal; Wings—"Curved" (exclusive patent) and "Straight"; Types—Safety Exit or Panic-proof (NLD and NLE), Full-folding (PB), Semifolding (C), Contiguous Trim, Doors and Accessories in wood and bronze.

Revolving Door Benefits

Conserve Health—Prevent drafts, control ventilation, eliminate dust.

Convenience—Save floor space, reduce entrance effort by elimination of wind pressure, prevent confusion by automatic traffic division.

Increased Capacity—2000 to 3000 persons per hour each way (greater than is usual with swing doors).

Economy—20% annual return on investment due to fuel saving. A door pays for itself in about 5 years.

Always Open—To traffic.

Always Closed—To outside winds and cold.

General Data—Manufacturer's Recommendations

Adaptability—For office buildings, hotels, banks, department stores and all public and semipublic buildings where periodic or continuous traffic congestion exists.

Capacity Provision—The ideal entrance is one provided with revolving doors of sufficient capacity for normal traffic, flanked by single or pairs of swing doors. (See suggested arrangements or send plan of present entrance for individual recommendations.)

Where not originally included, provision should be made for future installations with the least structural change. Preliminary suggestions will be gladly submitted by our service department.

Sizes—For dimensions see cuts No. 164 and No. 166 (second page following). 4-wing doors *should not be less* than 6 ft. inside diameter. The standard is 6 ft. 6 in. except in hotels where 7 ft., 7 ft. 6 in. or even 8 ft. is needed for the convenient handling of luggage.

3-wing doors may be 4 ft. 6 in. to 5 ft. 6 in. in diameter. They are adapted for use where space is too small for 4-wing door or where less capacity is required.

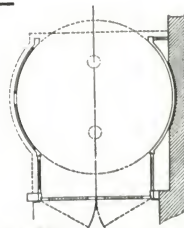
Inside height should be 7 ft. to 8 ft., standard being 7 ft.

Access to Bearing—Space over door *should* (not *must*) be accessible for oiling and adjusting main bearing.

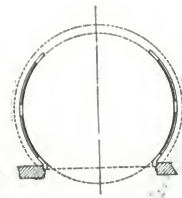
Glass—That the braces may be set sufficiently high to reduce racking strains, 24 in. is recommended as the minimum height from floor to bottom of wing glass.

Avoid other than rectangular glass, to avoid breakage. Beveling is undesirable because of refraction.

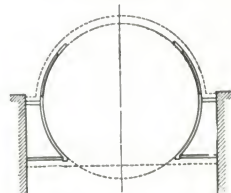
Marble Enclosures—Atchison wings are ideal for use with marble enclosures, as no ceiling slot is needed, and slabs can be supported from bearing channel which lies directly over it. Only a 1¾-in. center hole is needed—no other provision prior to placing of wings, except access to space overhead. Always provide anti-flop bevel or relief at ends of walls.



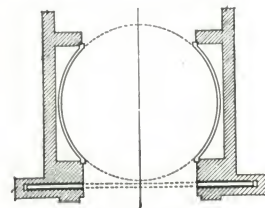
A—One Wall against blank Building Wall—Screen Doors at Outside



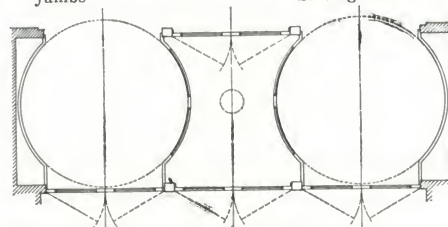
B—Common Layout Taking Place of Pair of Swinging Doors



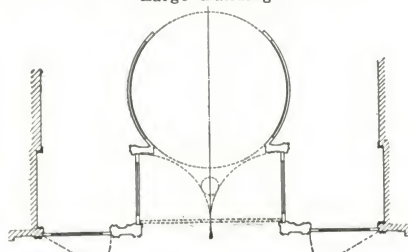
C—To Set Between Thick Masonry Jamb



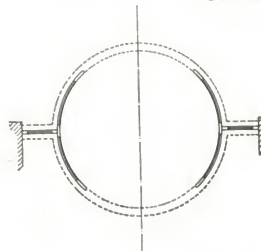
D—Placed in Existing Vestibule, Sliding Doors at Outside



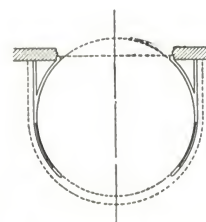
E—Combining Revolving and Swinging Doors for Large Buildings



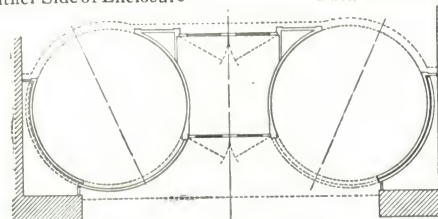
F—Another Combination with One Pair Outer Swing Doors Used as Connecting Jamb



G—Having Swing Doors or Side Lights at Either Side of Enclosure



H—With Enclosure Walls Straight Back to Building Wall



I—Special Layout to Get Two Revolving Doors and Small Swing Doors Into Narrow Opening—Note Curved Sliding Doors at Exterior

Suggested Layouts

Types

Safety Exit or Panicproof, Types NLD or NLE
—For doors that are the *sole* exits for massed crowds (not offices, banks or hotels). Their added expense is not warranted for exits where side swinging doors are present or for average exit conditions. Wings assume full line collapsed position and allow passage at either side without revolving. They *also fold aside* like Type PB. See cut No. 165 (following page).

Type NLD is equipped with push-bar-release, Monel cable brace and toggle tightener which will open under panic conditions without knowledge of the mechanism, but which *will not* release under jars, ordinary traffic, or wind pressure.

Type NLE is equipped with simple automatic releasing cast bar braces.

Full-folding, Type PB—Standard wings fold aside in pairs, on pivots, and lie entirely back of the chord line. They lock or unlock from either inside or outside at both top and bottom in diagonal position. They may be fastened (to ceiling only) in crosswise, quartering or lengthwise position.

Semi-folding, Type C—Wings fold into one plane not detached from central pivot and in lengthwise position only (to allow unrestricted passage and passing objects through).

Note: When revolving, they have the same value as other types, and are adapted to use where traffic does not justify investment in the more expensive types.

Special Features

"Curved Wings"—An exclusive basic improvement in design of outstanding importance surpassing all secondary improvements affecting manner of folding, collapsing and locking. The "curved wings" increase the usable space 6 in. in front of the body, permitting a more natural, upright position and easy stride in the line of traffic than is possible with the straight wing.

The "curved wing" is quoted at actual extra cost, under a policy of many years standing.

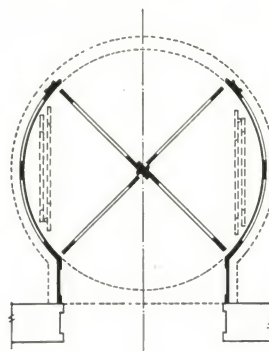
Experience *shows* that breakage of "curved wing" glass is extremely rare. A replacement plate may be carried or can be obtained promptly from stock at cost.

Folding of Wings—When desired, the wings (with exception of Type C) fold aside in pairs and *lie entirely back* of the enclosure wall opening or chord line *leaving full unrestricted passage space*. Note the particular advantages in this respect of the "curved wing" design. The main wings (to which the secondary wings are hinged) have top and bottom pivots operated by a powerful lever mechanism in the outer stile. By setting these pivots and releasing the wings from each other and from the center pivot and hanger stem, the wings swing smoothly back against the enclosure walls. The whole folding operation may be accomplished with ease in 30 seconds.

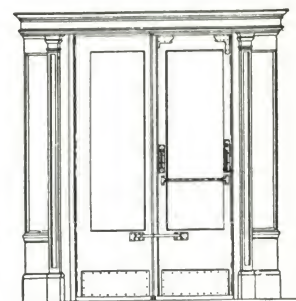
No Ceiling Slot—Due to the Atchison method of folding, the conspicuous and unsightly ceiling slot with traveling suspension carriage is eliminated.

Screen Doors—Light double acting screen or flap doors may be hung with removable hanging strips to enclosure wall ends without interference with wings (an exclusive Atchison feature).

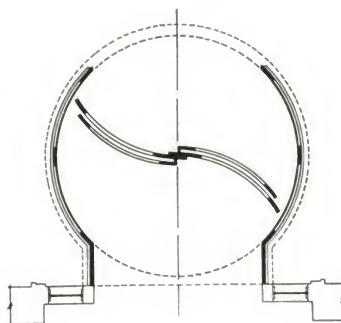
Air Lock Strips—Especially designed and selected to maintain the air lock with just the proper amount of friction. Easily adjusted. Consist of wide flexible rubber strips at bottom; heavy felt strips at top; tapered moulded rubber side strips with piano felt edges.



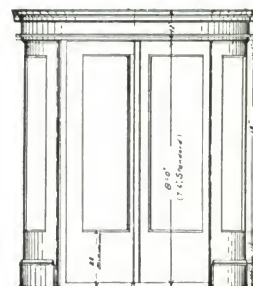
Plan No. 6



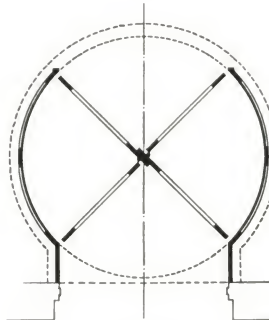
Elevation No. 7



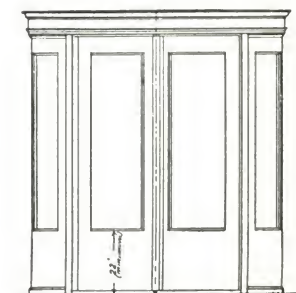
Plan No. 92



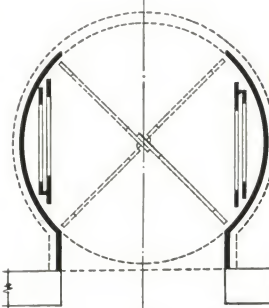
Elevation No. 91



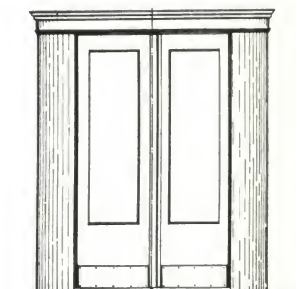
Plan No. 80



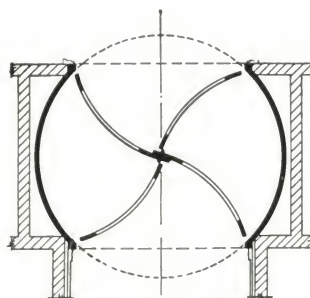
Elevation No. 95



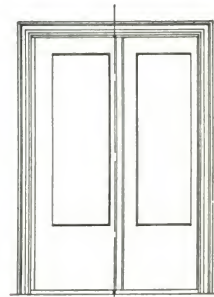
Plan No. 8



Elevation No. 9



Plan No. 16



Elevation No. 18

Standard Design Layouts

Materials, Construction and Finish

Wood—Wings and enclosures of all cabinet woods veneered over an improved type of laminated core construction. Material, construction and workmanship commensurate with the highest quality of cabinet work.

The highest class of painters finish applied by skilled workmen in any standard or special finish. (Samples of standard finishes furnished on request.)

Metal Covered—Bronze plate overlay construction in No. 16 gauge (recommended) or No. 20 gauge, applied with special metal holding adhesive, under heavy pressure, to faced, hardwood, laminated cores, with hair-line reinforced joints.

Note: This construction is recommended over hollow metal construction because of (1) greater stiffness to meet twisting strains (usually absent in swing doors), (2) less weight for the required stiffness (essential to avoid undesirable momentum and inertia effects), (3) lower cost, (4) greater fire resistance.

Connected work in ornamental cast iron and bronze. Finishes to match adjacent work. Bronze recommended in fine-line medium oxidized or statuary, not lacquered. (Samples of standard finishes furnished on request.)

Hollow Metal—Enclosures furnished in No. 10 and No. 12 gauge, with drawn and extruded moulds. Wings in No. 14 gauge, specially constructed for stiffness.

Hardware—Heavy, plain design, cast bronze in either polished or brushed natural finish.

Cylinder locks (master-keyed if desired), are standard equipment.

Stock Doors and Enclosures

To be had in one design only, as shown, size 6 ft. 6 in. diameter by 7 ft. high. In oak, gum or birch. All types, with or without glass in enclosure walls. Finished to suit. At considerable saving over cost of door especially designed.

Facilities

Experience—Atchison Revolving Doors have been made continuously since 1906. An outgrowth of 50 years' millwork experience.

Plant—A modern efficiently planned and lighted one-story plant of 75,000 sq. ft. area, equipped throughout with the most modern motor driven machinery. A woodworking factory accustomed to executing and finishing the highest grade cabinet millwork. A complete metal covered and hollow metal door shop. A complete foundry. Every part (except lock cylinders) from the simplest wood to the most elaborate metal doorway executed under our own roof and under closest supervision.

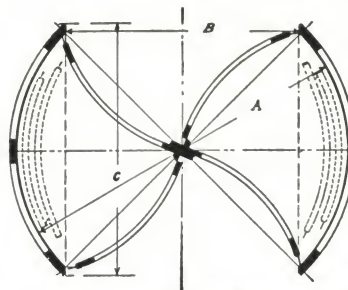
Location—Favorable manufacturing conditions; uninterrupted, prompt, economical execution and advantageous shipping facilities to any part of the United States.

Patents—The "Curved Wing" and other Atchison exclusive features are protected by patent. This company will guarantee against loss or damage from any and all infringement suits.

Service—Adequate and capable Engineering and Service Department maintained at plant and Atchison agents accessible in all principal cities of the United States and Canada.

Specifications

Furnish and install, where shown on plans and details,

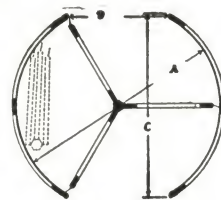


No. 164. "Curved Wing" Door Floor Plan

Note folded position of wings

DIMENSION TABLE

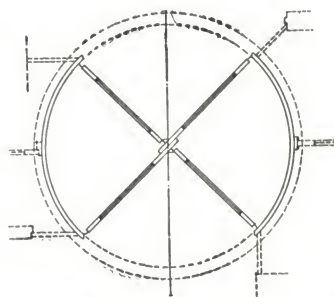
A	B	C
6'0"	4' 2 1/4"	4' 7 1/2"
6'6"	4' 6 3/4"	4' 11 3/4"
7'0"	4' 11"	5' 4"
7'6"	5' 3 1/4"	5' 8 1/4"
8'0"	5' 7 1/2"	6' 0 1/2"



No. 166. 3-Wing Door Floor Plan

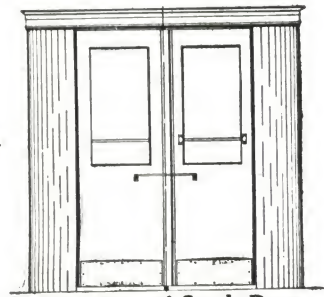
DIMENSION TABLE

A	B	C
4'6"	2'2 1/2"	4'2"
5'0"	2'5 1/2"	4'7"
5'6"	2'8 1/2"	4'2"

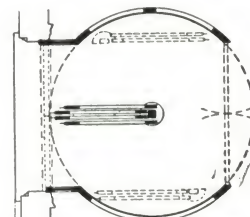


Plan of Stock Door

Dot lines representing various connections which can be applied at job

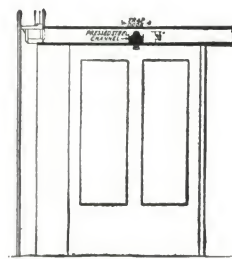


Elevation of Stock Door



No. 165. Floor Plan Type NLD Safety-Exit Door

Showing screen doors



No. 169. Section Through Typical Ceiling

Showing connection at transom bar

revolving doors as made by THE ATCHISON REVOLVING DOOR Co., Independence, Kan.

(Here specify optional requirements.)

(A) Design: Special or stock. (B) Type: PB; C; NLD or NLE. (C) Wings: "Curved" or "Straight" (D) Material and finish (E) Connections (F) Special equipment, ceiling lights. Master-keyed cylinders, etc.

Quotations and Ordering

Agents can generally quote direct on stock designs. Due to numerous variations in material, design, finish and equipment, special design doors must be quoted upon by the factory. Approximate or comparative estimates from sketch plans and designs promptly furnished.

We urge the placing of orders in the spring and summer to avoid seasonal congestion of fall and winter.

References

A list of notable installations and references furnished on application.

REVOLVING DOORS, INC.

TELEPHONE
CHICKERING 10300

556 West 27th Street
NEW YORK, N. Y.

OFFICERS

A. H. BURGESS, PRESIDENT

J. F. SCHWAB, VICE-PRESIDENT AND SECRETARY

J. H. VALENTINE, TREASURER

DIRECTORS

A. H. BURGESS and W. D. MITCHELL (Directors of Jno. Williams, Inc.), and JOHN E. CARLSON (Manhattan Wood Working Co.)

Products and Services

REVOLVING DOORS of every description and of any desired material.

Specialists in all Mechanical Devices as applied to Revolving Doors. Complete installations contracted for anywhere in the United States and Canada.

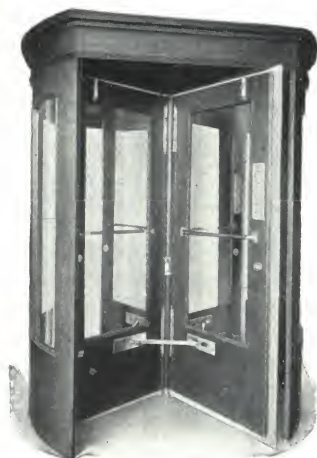
This company supplies Fixtures for Revolving Doors to manufacturers of cabinet work, kalamein work, hollow steel and architectural bronze work, together with construction details and, if desired, assembling and erecting labor.

Automatic Panicproof Revolving Door

Wings are suspended from a universal ball bearing located in a dustproof oil chamber mounted on a carriage running on tracks. The wings can be folded centrally and moved to one side in the usual manner.

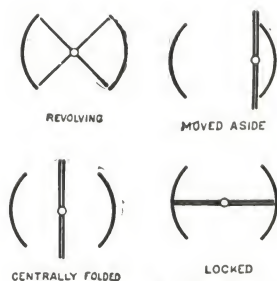
Each wing is hung to the center post with spring hinges, which hold it under spring control when the braces are detached, preventing slamming of the wings against each other and breaking the glass, which happens in other panicproof revolving doors.

The Slip-bar—The braces which hold the wings in rotating position are the vital feature of a panicproof door. This company uses neither cables nor chains, but manufactures the only slip-bar brace that pushes or pulls out under undue pressure. Brace is positive in action, durable, and conforms to building and fire department regulations.



**Standard Design No. 106,
Panicproof Slip-bar
Construction**

Adaptable to slight architectural changes. Any material; any wood or hardware finish; kick plates and key locking bolts when desired



**Diagram of Different
Positions of Wings**

Some Recent Installations

The following is a list of some recent installations with the names of the architects and contractors who were connected with the work:

New York, N. Y.

Graybar Building (6 doors), 420 Lexington Avenue, Sloan & Robertson, Architects; Todd, Robertson & Todd Engineering Corp., Contractors
Chelsea Exchange Bank, 36th Street and Eighth Avenue, Eugene Schoen, Architect; Charles H. Tyler Co., Contractors
Manufacturers Trust Company, 407 Broadway, A. F. Gilbert, Architect; installed for Norman-Seton Co.
Ritz Tower Apartment Hotel, 57th Street and Park Avenue, Emery Roth, Architect; Thomas Hastings, Associated Architect; Todd, Robertson & Todd Engineering Corp., Contractors
Apartment Hotel, 95th Street and West End Avenue, Emery Roth, Architect; Bing & Bing, Inc., Contractors
Franklin Society for Home Building & Savings, Broadway and Vesey Street, John J. Sheridan, Architect; Wm. L. Crow Construction Co., Contractors
Hearst Publications, Inc., South Street & Catherine Slip, Charles E. Birge, Architect; Turner Construction Co., Contractors
Union Dime Savings Bank Addition, 40th Street and Sixth Avenue, A. H. Taylor, Architect
New Fifth Avenue Hotel, Fifth Avenue and 9th Street, Emery Roth, Architect; Bing & Bing, Inc., Contractors
Silver's Cafeterias, Astor Building, Fifth Avenue and 33rd Street and Astor Theatre Building, 45th Street and Broadway, B. H. Whinston, Architect
Toddle Inn Restaurant, 2549 Broadway, B. H. Whinston, Architect
East River Power Station (3 doors), 14th Street and East River; installed by Dahlstrom Metallic Door Co.
Office Building, 20-22 East 57th Street, Emery Roth, Architect; installed by Norman-Seton Co.
Apartment Hotel, 115 West 46th Street, George Fred Pelham, Architect; Samuel Roseff & Sons, Owners
Standard Oil Building (7 doors), 26 Broadway, Carrere & Hastings, Shreve, Lamb & Blake, Architects; Charles T. Wills, Inc., Contractors
New York County Courthouse (5 doors), Center, Worth, Baxter and Pearl Streets; Guy Lowell, Architect; installed for John Polacheck Bronze & Iron Co.

Brooklyn, N. Y.

Copley Plaza Apartments, Eastern Parkway and Underhill Avenue, Shampian & Shampian, Architects
Manufacturers Trust Co., Broadway & Sumner Avenue, E. A. Klein, Architect; installed by Norman-Seton Co.

Other Localities

Denver, Colo.—Bosworth Chanute Building, Fisher & Fisher, Architects; Alexander Simpson Jr. Co., Contractors; installed by Colorado Builders Supply Co.
Columbus, Ohio—American Education Press Building, Richards, McCarthy & Bulford, Architects; E. Elford, Contractor
Williamsport, Pa.—Williamsport Sun Building, Jacob Gehron Company, Contractors
Norfolk, Va.—Parkes Restaurant; installed by Hall-Hodges Co.
Wilkes-Barre, Pa.—Liberty State Bank, Ralph M. Herr, Architect
Salisbury, Md.—Wicomico Hotel, Wm. E. Booth & Son, Contractors
Lincoln, Neb.—Lincoln State Capitol; installed by Art Metal Construction Co.
Newark, N. J.—Kresge Department Store, second section (5 doors), Starrett & Van Vleck, Architects; Starrett Bros., Contractors
Harrisburg, Pa.—Dauphin Deposit Trust Co., Halsey, McCormack & Helmer, Inc., Architects; Joseph W. Pomraning, Contractor

VAN KANNEL REVOLVING DOOR CO.

TELEPHONES

DAYTON 5620, 5621, 5622

716 Whitlock Avenue
NEW YORK, N. Y.

REPRESENTATIVES

ALBANY, N. Y., 119 State St.
ATLANTA, GA., 675 Greenwood Ave., N. E.
BALTIMORE, MD., Maryland Ave. and 22nd St.
BILLINGS, MONT., Fratt Bldg.
BIRMINGHAM, ALA., 513 No. 21st St.
BOSTON, MASS., 1042 Little Bldg.
BUFFALO, N. Y., 519 Jackson Bldg.
CANTON, OHIO, P. O. Box 314
CHARLESTON, W. VA., 209 Hale St.
CHATTANOOGA, TENN., 103 E. Sixth St.
CHICAGO, ILL., Tribune Tower
CINCINNATI, OHIO, 534 Main St.
CLEVELAND, OHIO, Keith Bldg.
COLUMBIA, S. C., 17 Carolina Bank Bldg.
COLUMBUS, OHIO, 145 No. Front St.
DALLAS, TEX., 616 Slaughter Bldg.
DAYTON, OHIO, 494 Ludlow Arcade
DENVER, COLO., W. 3rd Ave. and Tejon St.
DES MOINES, IOWA, 621 Hubbell Bldg.
DETROIT, MICH., 420 U. S. Mortgage Bldg.
EL PASO, TEX., NEFF-STILES CO.
ERIE, PA., 405 Scott Bldg.

EVANSVILLE, IND., INTERNATIONAL STEEL & IRON CO.
FARGO, N. D., 217 Broadway
FORT WAYNE, IND., 1751 Lindley Ave.
GREENSBORO, N. C., 113 E. Gaston St.
HARRISBURG, PA., 18th and Mulberry Sts.
INDIANAPOLIS, IND., 725 Continental Bank Bldg.
JACKSONVILLE, FLA., Florida National Bank Bldg.
KANSAS CITY, MO., 507 Railway Exchange
KNOXVILLE, TENN., 712 So. Gay St.
LIMA, OHIO, 417 Opera House Block
LOS ANGELES, CAL., 800 Hibernian Bldg.
LOUISVILLE, KY., 1446-48 Levering St.
MEMPHIS, TENN., 216 Madison Ave.
NASHVILLE, TENN., 57 Arcade Bldg.
NEW ORLEANS, LA., 319 Dryades St.
NORFOLK, VA., 235-37 Monticello Arcade Bldg.
OKLAHOMA CITY, OKLA., 200 1/4 W. Reno Ave.
OMAHA, NEB., 707 South 27th St.
PHILADELPHIA, PA., 1600 Walnut St.
PHOENIX, ARIZ., P. O. Box 145

PITTSBURGH, PA., 507 Century Bldg.
PORTLAND, ME., 31 1/2 Exchange St.
PORTLAND, ORE., 61-7 Albina Ave.
RALEIGH, N. C., 313 So. Wilmington St.
RICHMOND, VA., 202 Davis Bldg.
ROANOKE, VA., 507 Commerce St.
ROCHESTER, N. Y., Builders Exchange
ST. LOUIS, MO., Century Bldg.
ST. PAUL, MINN., 2694 University Ave.
SALT LAKE CITY, UTAH, 204 Dooley Bldg.
SAN FRANCISCO, CAL., C. J. WATERHOUSE & Sons Co., 55 New Montgomery St.—Telephone, Garfield 6480
SEATTLE, WASH., 216-17 Walker Bldg.
SHREVEPORT, LA., 310 Ricou-Brewster Bldg.
SIOUX FALLS, S. D., 213 Paulton Bldg.
STROUDSBURG, PA., Stroudsburg National Bank Bldg.
SYRACUSE, N. Y., 423 1/2 So. Salina St.
TERRE HAUTE, IND., 125 So. 7th St.
TULSA, OKLA., 402 Kennedy Bldg.
WASHINGTON, D. C., 1756 M St., N. W.
WILKES-BARRE, PA., Miners Bank Bldg.
WINNIPEG, CAN., 120 Lombard St.

UCHIDA TRADING CO., LTD., 291 Broadway, N. Y. (Agents for Japan and Korea)

Products

Three distinct types of REVOLVING DOORS, known under the following terms: AUTOMATIC COLLAPSIBLE, PANICPROOF TYPE; STANDARD "C" RIGID BRACE ARM TYPE; STANDARD "N" RIGID BRACE ARM TYPE.

VAN KANNEL REVOLVING DOORS are manufactured in various styles, using the above types. The styles of doors are as follows: 3-Wing Revolving Door and 4-Wing Revolving Door.

Also manufacturers of Van Kannel Revolving Pantry Windows (Patented).

Original Patentee

This company is the pioneer manufacturer and original patentee of revolving doors; its patents cover every practical improvement and substantial feature.

Architects may spare their clients expense and embarrassment from patent litigation by specifying Van Kannel doors.

Van Kannel Revolving Doors

Automatic Collapsible, Panicproof Type—This type of door has 3 or 4 wings hung independently of each other on a central shaft of metal and wings are held together by flexible cables. This type of door gives a feature of absolute safety at all times and under all conditions. The safety feature lies in the fact that the revolving wings are so arranged that by application of pressure to any part of the revolving door, slightly more than necessary to revolve door, the revolving wings will instantly and automatically collapse and fold outwardly in line of egress, leaving a free, unobstructed passageway.

Rigid Brace Arm Type, Styles "C" and "N"—These two types consist of either 3 or 4 wings, held together in their radial position by rigid braces; wings are collapsed only by means of pressing a spring when it is desired to have doors open in the middle, or pushed to one side for a wide open passageway. These types, although collapsible as to folding of wings, are not automatically so, as in case of automatic collapsible, panicproof type of door previously described.

3-Wing Revolving Door—The 3-wing revolving door is especially adapted for entrances that are too small to accommodate a 4-wing door at least 6 ft. in diameter. It is being used to a great extent in entrances to toilet rooms in schools, institutions and public buildings and the company has installed 34 of these doors for the Prudential building, Newark, N. J. Approximately, 5 ft. diameter.



3-Wing Revolving Door

TABLE OF DIMENSIONS—FT.-IN.

A	B	C	D	E	F	G	H
5-10	2-11	3-11 1/2	6-1	1-0 3/4	1-7 1/4	7 3/8	2-3 3/8
6-0	3-0	4-1	6-3	1-1	4-8 1/2	7 3/4	2-4 1/4
6-2	3-1	4-2 1/2	6-5	1-1 1/4	4-10	8	2-5
6-6	3-3	4-5 1/4	6-9	1-1 1/2	5-0 3/4	8 3/8	2-6 3/8
6-10	3-5	4-8	7-1	1-2 1/2	5-3 1/2	9 1/4	2-7 3/4
7-0	3-6	4-9 1/2	7-3	1-2 3/4	5-5	9 1/2	2-8 1/2
7-2	3-7	4-10 3/4	7-5	1-3 1/8	5-6 1/2	9 3/4	2-9 1/4
7-6	3-9	5-1 1/4	7-9	1-3 3/4	5-9 1/4	10 3/8	2-10 3/8
7-10	3-11	5-4 1/4	8-1	1-4 3/8	6-0	11	3-0
8-0	4-0	5-5 3/4	8-3	1-4 3/4	6-1 1/2	11 1/4	3-0 3/4

DESCRIPTIVE DATA

Standard Type Wings — Thickness, 1 1/4 to 1 1/2 in., wood; 1 to 1 1/2 in., metal.

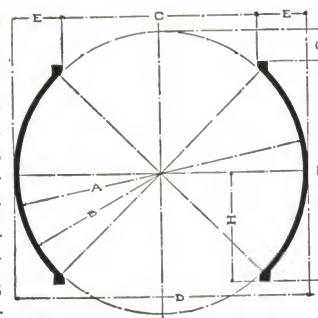
Panicproof Type Wings — Thickness, 1 1/4 in., wood; 1 to 1 1/2 in., metal.

Door Vestibules—4 ft. 8 in. to 6 ft. diam., 3 wings; 6 ft. to 8 ft. diam., 4 wings; 7 ft. diam., normal.

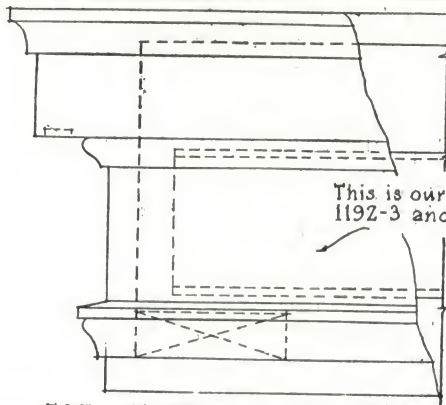
Standard Size—7 ft. to 7 ft. 6 in. vestibules. Large enough for maximum capacity.

Materials—Materials used for entire construction are any kind of hardwood, bronze or steel on a metal frame or wood core covered with various gages of metals in either copper, steel or bronze, using the following gages—Nos. 24, 20, 16. Revolving door vestibules may be made of other materials such as marble, tile or cement, as may be needed in order to carry out architectural treatments.

Stock Designs—Several stock designs are carried on hand in plain oak and birch, on which practically immediate delivery can be quoted. See stock series and stock special doors as illustrated.



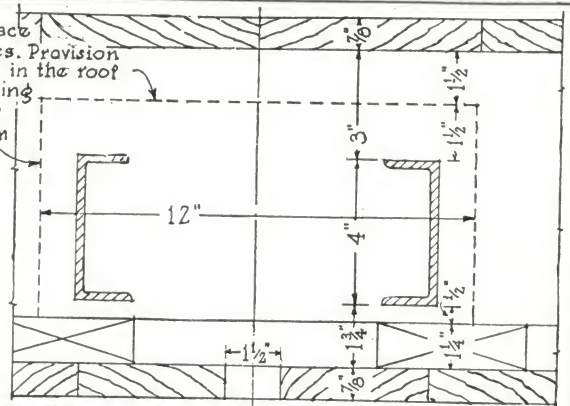
Dimension Diagram



ELEVATION OF CORNICE

Dotted line shows space required for all types. Provision can be made, either in the roof or a trap in the ceiling to take care of our overhead mechanism.

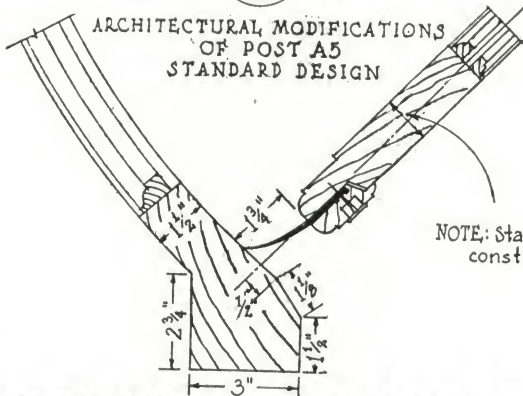
This is our high stock cornice, 1192-3 and 1192-4 designs. Our 1192-1 and 1192-2 designs have low cornice, 2 1/4" to 3" high, necessitating a channel box covering to protect overhead trolley mechanism.



CHANNEL CONSTRUCTION AND LOCATION

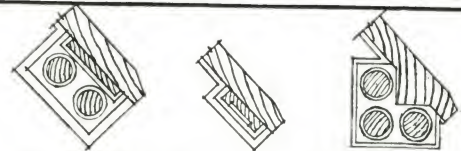


ARCHITECTURAL MODIFICATIONS OF POST A5 STANDARD DESIGN

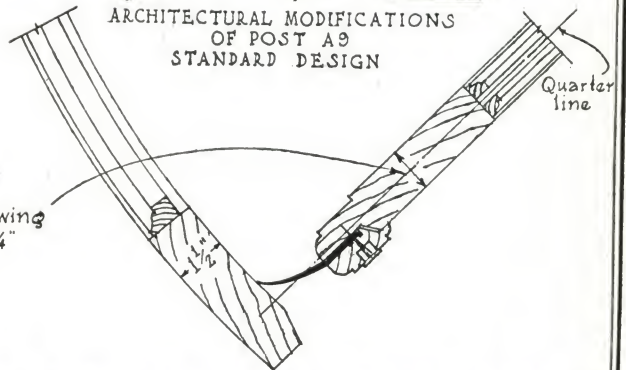


DETAIL OF POST A5 STANDARD DESIGN

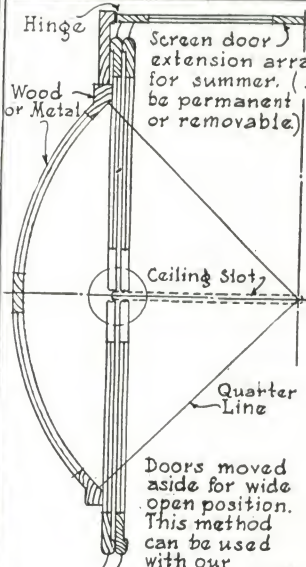
SCALE 3/8"=1"



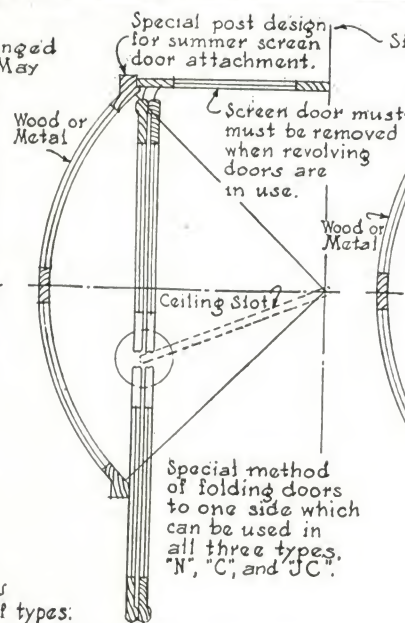
ARCHITECTURAL MODIFICATIONS OF POST A9 STANDARD DESIGN



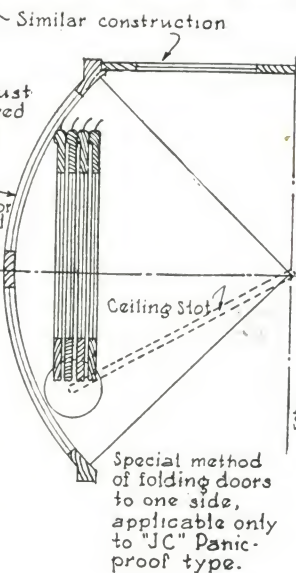
DETAIL OF POST A9 STANDARD DESIGN



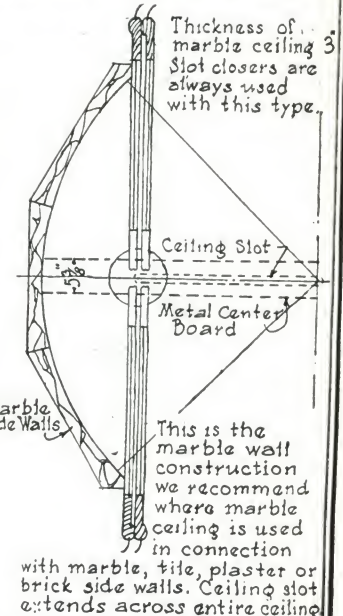
Doors moved aside for wide open position. This method can be used with our Standard "N," Standard "C," & "JC" Panic-proof types.



Special method of folding doors to one side which can be used in all three types, "N," "C," and "JC."



Special method of folding doors to one side, applicable only to "JC" Panic-proof type.



This is the marble wall construction we recommend where marble ceiling is used in connection with marble, tile, plaster or brick side walls. Ceiling slot extends across entire ceiling.

NOTE: Standard size vestibule giving maximum capacity is 7'-0" diameter, 7'-0" high. Revolving doors are made in 3-wing and 4-wing types. The 3-wing type vestibule ranges from 4'-8" to 6'-0" diameter, and the 4-wing type ranges from 6'-0" to 8'-0" diameter. Normal diameter 7'-0". We also make 6-wing type doors, but do not advocate their use.

VARIOUS TYPES OF VESTIBULE CONSTRUCTION TO PERMIT CONVENIENT FOLDING OF WINGS

CONSTRUCTION DETAILS OF THE VAN KANNEL REVOLVING DOOR



Illustration No. 1

Type JC Automatic Collapsible
Standard Design 1192-1

Material: bronze

Design 1192-1-U: vestibule finished inside only



Illustration No. 3

Type C Rigid Brace Arm (Collapsible)
Standard Design 1192-3

Material: oak



Illustration No. 5

Type Stock JC Automatic Collapsible
Hardware

Standard Design 8

Material: birch

Specifications for Standard Equipment

The revolving door contract to include the revolving wings, circular walls, ceiling and cornice, together with all necessary mechanism, hardware, push bars, push plates, key locks and kick plates. All glass, either bent or flat, to be best selected American polished plate.

Type JC, Illustrations No. 1 and 2—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Automatic Collapsible. Material: (if wood) the kind selected to match surrounding trim; (if metal) either kalamein plate on wood core construction or hollow metal.

Type C, Illustration No. 3—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Collapsible. Material: (if wood) the kind selected to match surrounding trim; (if metal) either kalamein plate on wood core construction or hollow metal.

Stock "Special" Illustration No. 4—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design Stock "Special" Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock Standard Design 8, Illustration No. 5—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Standard Design 8, Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock "Series" Illustration No. 6—Furnish and install where shown on plans, revolving doors of the VAN KANNEL DOOR Co. make, Design Stock "Series" [No. 1S] [No. 2S] Collapsible. Woodwork to be white pine. Finish to match surrounding trim.

Type "N" Fixtures

This type of fixture may be applied to any 4-wing design of Van Kannel Revolving Door, made of any material. The four wings are held in their revolving position by means of metal brace arms in the form of hooks. When it is desired to fold the wings for any reason it is only necessary to unhook the brace arms and hook them back against the fixed wings, since all the four brace arms are attached to these wings by means of sockets. After the brace hooks are caught back, as above mentioned, the two hinged wings can be folded and the revolving door may assume positions illustrated on following page.

Literature

Send for our 24-page "Manual of Revolving Door Construction and Architectural Design."

Positions Assumed by Wings

Note on following page position assumed by wings of various types here shown.



Illustration No. 2

Type JC Automatic Collapsible
Standard Design 1192-2

Material: bronze



Illustration No. 4

Type Stock JC Automatic Collapsible
Hardware

Standard Design 7

Material: birch



Illustration No. 6

Type Stock "Series" (Collapsible)
Design 2-S

Design 1S: wood panels in sidewalls instead of glass
Material: white pine

Positions Assumed by Wings

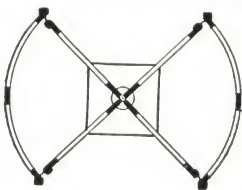
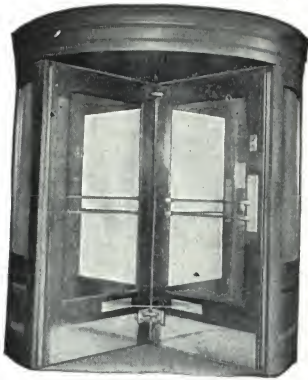


Fig. 1

REVOLVING POSITION

Four wings extended, permitting persons to pass in and out, at the same time excluding noise, rain and snow, heat and cold, wind and dust

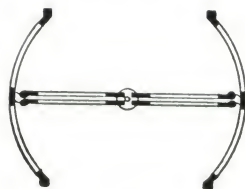


Fig. 2

LOCKED POSITION

Four wings folded in pairs and placed across vestibule, securely locked or bolted. Lock operates from both sides



Fig. 3

CENTRAL OPEN POSITION

Wings folded flat in pairs and held in position by folding bars, making two passages separating traffic



Fig. 4

FULL OPEN POSITION

Wings folded and moved aside, making available full width of entrance



Fig. 5

PANIC COLLAPSED POSITION

Wings folded on each other in outward position, dividing traffic into two streams

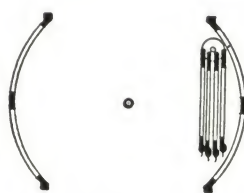


Fig. 6

FULL OPEN POSITION WITH WINGS COLLAPSED

Wings folded on each other and moved to one side making available full width of entrance

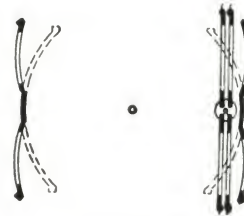


Fig. 7

FULL OPEN POSITION WITH FLEXED WALLS

Wings folded and moved aside with hinged walls flexed for added space

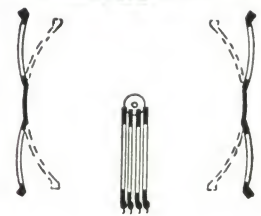


Fig. 8

PANIC COLLAPSED POSITION WITH FLEXED WALLS

Wings folded on each other in outward position with walls flexed for added space

Positions Assumed by Wings—All Types of Doors

Note: One wing may also be folded at a time if desired.

TYPE STOCK "SERIES"—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE STOCK "VK"—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE STOCK "SPECIAL"—Positions Nos. 1, 2, 3, 4 and 5 assumed by wings.

TYPE C COLLAPSIBLE—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE N COLLAPSIBLE—Positions Nos. 1, 2, 3 and 4 assumed by wings.

TYPE JC AUTOMATIC COLLAPSIBLE—Positions Nos. 1, 2, 3, 4 and 5 assumed by wings.

Note A—Special trolley construction can be furnished which will permit wings to assume position shown in Fig. 6.

Flexed Walls—In order to provide added entrance space where desired, flexed wall construction can be furnished which will permit wings to assume positions shown in Figs. 7 and 8.

THE LEONARD SHEET METAL WORKS, INC.

Manufacturers of Fireproof Windows and Doors

800 Ferry Street
HOBOKEN, N. J.

NEW YORK OFFICE: 1270 Broadway

Products

STEEL BUCKS.
FURNITURE STEEL COVERED DOORS.
HOLLOW STEEL DOORS.
ROLLED STEEL WINDOWS.
BRONZE COVERED DOORS.
BRONZE STORE FRONTS.
"BILTRITE" HOLLOW STEEL UNDERWRITERS' DOORS.
Also Copper Covered Doors and Windows.

Facilities and Service

Our plant is one of the largest in this line and our output runs from 1500 to 2000 steel bucks per week. Output of steel covered doors from 500 to 1000 per week. Everything turned out is a quality job and delivered on date specified.

Steel Bucks

The details shown on the following page are the latest type. The 16 gage rolled steel combination bucks illustrated in Fig. 1 are made for 6, 4 and 3-in. partition walls, to receive 1 $\frac{3}{4}$ -in. thick doors. The buck for a 3-in. wall can be made for 1 $\frac{3}{8}$ -in. doors.

The bucks numbered A, A3, C, and C1 are 16 gage rolled steel type.

Steel Bucks Type B—Pressed steel bucks illustrated are made in 16, 14, 12 and 8 gage to fit any width partition or wall and to any thickness rabbet or width of flange. These bucks can be arranged with applied, clipped or spot-welded trim.

Sanitary Design Buck Type D—Pressed steel buck shown is made in 14, 12 and 10 gage. This type of buck is used in Bell Telephone Co. buildings and various hospitals because of the sanitary design.

Furniture Steel Covered Doors

Leonard Furniture Steel Covered Doors are made of 22 gage furniture steel with various types of paneling and glazing and with 20 gage hollow steel moulding. The moulding is welded into the frames and housed in stiles and rails when doors are put together. The stiles and rails are mortised, tenoned and doweled.

Underwriters' labeled doors can be had in furniture steel at very little extra cost.

Hollow Steel Doors

Made of 18 gage rolled steel. The principal feature of these doors is the rolled edge strip which takes all of the cut-out and reinforcement for hardware. This means that as long as we have the size of the door and type of paneling we can proceed with the manufacturing of the door without waiting for the hardware.

Hollow steel doors come only in a prime finish.

Can also get Underwriters' label service on these doors at small extra cost.

Rolled Steel Windows

Our standard on these windows is 22 gage galvanized steel for frames, 14 gage galvanized steel for sash, 16 gage galvanized steel for sills and 14 gage furniture steel for stools. Frames, sills and stools can be heavier if desired. Windows are labeled by the National Board of Fire Underwriters.

Bronze Covered Doors

Our standard doors can be covered with 20, 18 or 16 gage bronze for rails, stiles and panels. Extruded bronze shapes are used for mouldings and edge pieces. Cast bronze ornaments can be applied to rails, stiles, and panels.

Bronze Store Fronts

Made over white pine cores, in either 20 or 16 gage bronze, to architects' designs.

Reference list of installations furnished upon request.

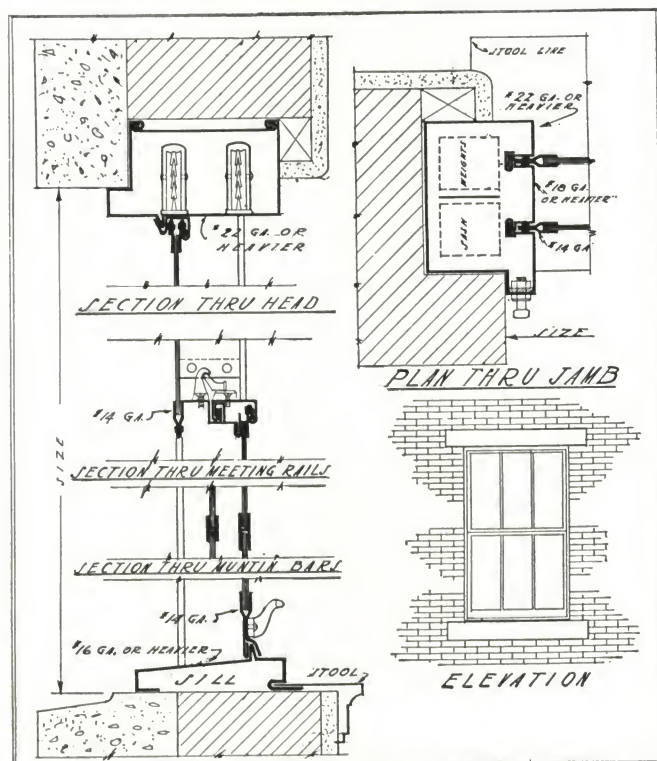


Leonard Bronze Store Front Work

"Biltrite" Hollow Steel Underwriters' Doors

This is a 20 gage steel built-up door which is manufactured under supervision of the National Board of Fire Underwriters. Can be either slide or swing. Used for vertical shafts, party walls, boiler and transformer rooms. Made in two thicknesses, equivalent to 2 and 3-ply tin covered doors.

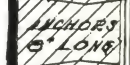
They pass any classification of the Underwriters.



Detail of Leonard Double Hung Window

Remington Building, 113 W. 42nd St., New York, N. Y.
119 West 57th St., New York, N. Y.
1385 Broadway, New York, N. Y.
84th St. and Central Park West, New York, N. Y.
1081 Park Ave., New York, N. Y.
810 Fifth Ave., New York, N. Y.
660 Park Ave., New York, N. Y.
37th St. and Eighth Ave., New York, N. Y.
Meyer Bros. Department Store, Paterson, N. J.
Military Park Bldg., Newark, N. J.
Globe Indemnity Bldg., Newark, N. J.
Medical Tower, Newark, N. J.

Gothic Towers, Jersey City, N. J.
26 Court St., Brooklyn, N. Y.
Oppenheim Collins Store, Buffalo, N. Y.
Oppenheim Collins Store, Pittsburgh, Pa.
Federal Reserve Bank, Houston, Tex.
Woodside Security Bldg., Greenville, S. C.
Newburgh Free Academy, Newburgh, N. Y.
St. Mary's Academy, Newburgh, N. Y.
Childs Building, Atlantic City, N. J.
Ellerie Tower, 57 Sip Avenue, Jersey City, N. J.
Kitay Building, Paterson, N. J.
Royal Bank of Canada, Lima, Peru



SCALE
3" = 1'-0"

METAL DOOR & TRIM CO.

SUCCESSORS TO J. C. McFARLAND COMPANY

LA PORTE, IND.

BRANCH OFFICES

NEW YORK, N. Y., 10 W. 46th Street

CHICAGO, ILL., 1458 Builders Bldg.

KANSAS CITY, MO., 1722 Tracy Street

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

ROLLED STEEL FRAMES for Doors and Sidelights.

Also Hollow Metal Doors, Frames and Trim; Elevator Enclosures; Dumbwaiter Enclosures; Steel Mouldings.

Rolled Steel Frames

Frames illustrated on following page may be used in connection with either wood, kalamein or hollow metal doors or sash 1 3/8 or 1 3/4 in. in thickness.

Frames are manufactured by a *rolled process* (not formed), insuring clean cut profiles true to detail.

These units are made to jamb opening sizes in accordance with architects' plans and in any combination suitable for 2-in. plaster, 3, 4 or 6-in. tile partitions, brick walls, wood stud or Simplex partitions.

Frames are mortised, reinforced, drilled and tapped for hardware at the factory and are delivered to the building completely assembled ready to install.

The side jambs are coped to the heads with mortise and tenon attachments, insuring proper alignment and accurate dimensions. The casing sections are accurately mitred and welded on the reverse side, insuring neat and permanent joints.

Time, the essential factor in the completion of a building, is materially reduced by the use of steel frames, the enforced waiting period necessary between the erection of wood bucks, thorough drying out of plaster and application of jambs and casings being entirely eliminated.

Steel frames, owing to their initial low cost, durability and economical installation on any sizable operation, such as office, apartment or hotel buildings, are a desirable factor in present day building.

Catalogue

For Specifications and Details of Hollow Metal Doors, Frames and Trim, Elevator and Dumbwaiter Enclosures, Steel Mouldings, also for further details on Rolled Steel Frames for doors and sidelights see our Metal Door and Trim Catalogue. Sent on request.

Specifications for Rolled Steel Frames

Frames to be manufactured of No. 16 gauge cold rolled steel by a *rolled process* (not formed), to insure moulded members being clean cut, straight and true, equal in quality to that manufactured by METAL DOOR & TRIM Co., La Porte, Ind.

Jamb portion of frame to be coped at intersections to insure proper alignment and accurate jamb dimensions with tenons in side members entering up through slots in head member and bent over, while casing portion of frame is to be mitred and oxy-acetylene welded from the inside and then cleaned off to make a neat, permanent joint.

Frames shall be mortised, reinforced, drilled and tapped for lock strikes and butts in an approved manner at the factory. (Drilling and tapping for any other hardware, as well as the application of hardware shall be done at the building by the contractor erecting the doors.)

Frames to have No. 14 gauge clip angles spot-welded to bottom of each side member for fastening to floor.

Wire anchors to be provided for securing frames to masonry partitions.

Where transom bars or mullions are required, they are to be rolled of not less than No. 18 gauge cold rolled steel and fastened in frames in an approved manner.

Removable cold drawn mouldings of standard design, made up into frames, neatly mitred and welded at the corners, and fastened to frames with oval head machine screws to be furnished for retaining sash or glass panels.

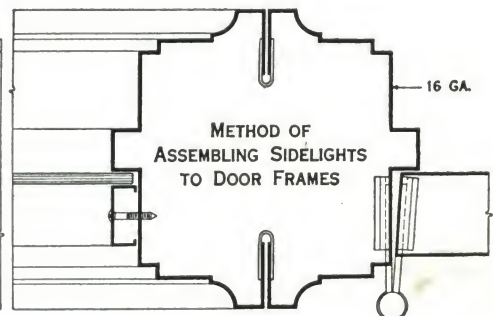
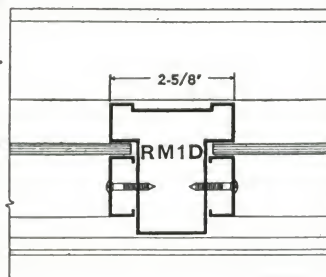
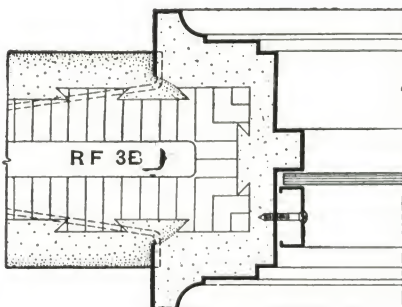
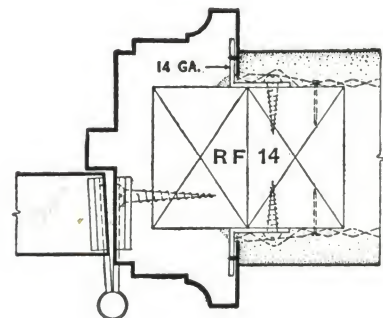
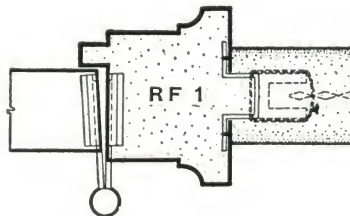
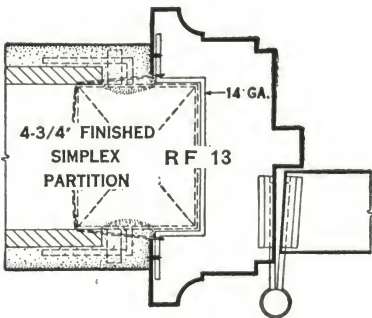
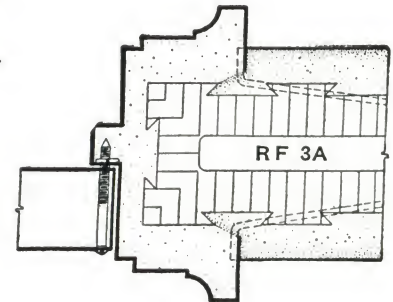
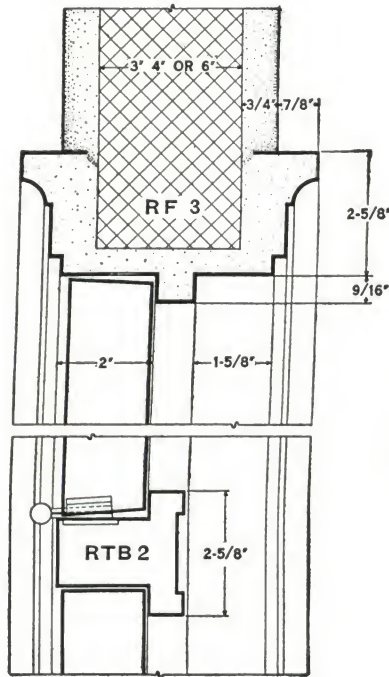
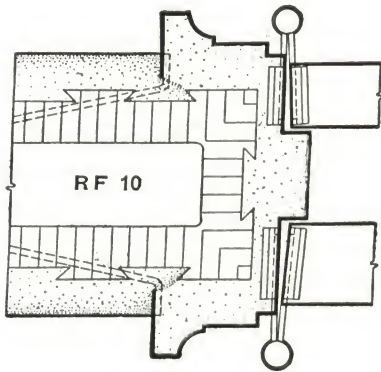
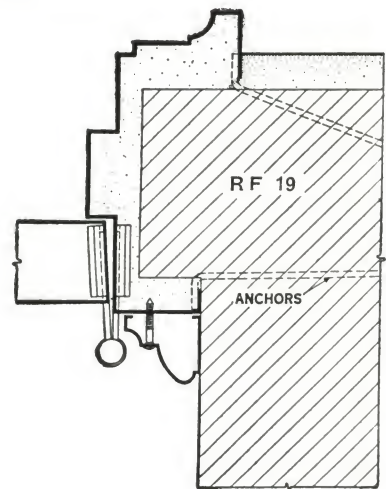
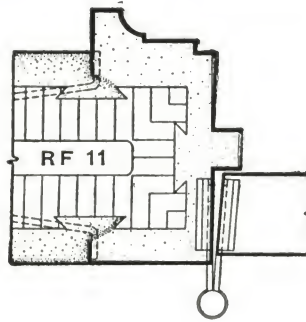
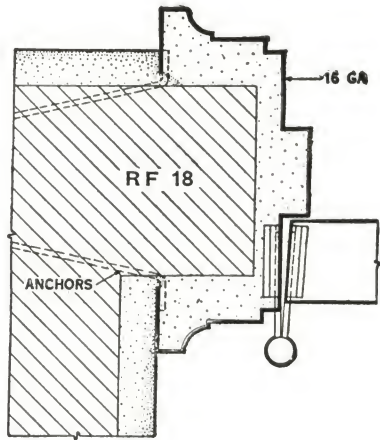
After removing all oil, dirt, rust or impurities frames are to receive one dip coat of red oxide primer. Final finish to be applied at building by painter contractor.

Frames shall be set accurately and braced in position until partitions are set up. After partitions have been built and before the mortar has set, this contractor shall check up each frame to see that it is in proper location, plumb and true.

Note: On these pages we present specifications and detail drawings of rolled steel frames only. See "Catalogue" paragraph for other products.

A Partial List of Buildings Equipped with Rolled Steel Frames

- | | |
|---|--|
| ANDERSON, IND.—Anderson Bank & Trust Bldg., Vonnegut, Bohn & Mueller, Architects | NEW YORK, N. Y.—No. 274 Madison Ave. Office Bldg., Sloane & Robertson, Architects |
| ASHEVILLE, N. C.—City Hall Bldg., Douglas D. Ellington, Architect | Netherlands Hotel, Schultze & Weaver, Architects |
| BILOXI, MISS.—Edgewater Gulf Hotel, Benjamin H. Marshall, Architect | Savoy-Plaza Hotel, McKim, Mead & White, Architects |
| BIRMINGHAM, ALA.—Jefferson Hotel, D. O. Whilldin, Architect | Drake Apartment Hotel, Emery Roth, Architect |
| CHATTANOOGA, TENN.—New Read House, Holabird & Roche, Architects | Manger Hotel, H. Craig Severance, Architect |
| CHICAGO, ILL.—Pure Oil Bldg., F. P. Dinkelberg, Architect | No. 1 Park Ave. Bldg., York & Sawyer, Architects |
| Austin Hospital, J. E. O. Pridmore, Architect | James McCutcheon Store, Starrett & Van Vleck, Architects |
| Palmer House, Holabird & Roche, Architects | PEORIA, ILL.—Pere Marquette Hotel, Horace Trumbauer, Hewitt & Emerson, Associate Architects |
| Edgewater Beach Hotel, Marshall & Fox, Architects | PHILADELPHIA, PA.—Girard Trust Co. Bldg., McKim, Mead & White, Architects |
| CINCINNATI, OHIO—Belvedere Apartment Bldg., C. H. Ferber, Architect | Mutual Trust Bank Bldg., Heacock & Hokanson, Ballinger Co., Associate Architects |
| DANVILLE, VA.—New Danville Hotel and Theatre Bldg., H. A. Underwood Co., Architects | PITTSBURGH, PA.—Webster Hall, H. Hornbostel, Eric Fisher Wood & Co., Associate Architects |
| DETROIT, MICH.—Detroit Hotel, C. W. & Geo. L. Rapp, Architects | ROANOKE, VA.—Colonial National Bank, Frye & Stone, Architects |
| Book-Cadillac Hotel, Louis Kamper, Architect | ST. LOUIS, MO.—Nurses' Training School, Wilbur T. Trueblood and Hugo K. Graf, Associate Architects |
| DURHAM, N. C.—Duke University, Horace Trumbauer, Architect | Shell Bldg., James P. Jamieson and George W. Spearl, Associate Architects |
| KANSAS CITY, MO.—Office and Medical Arts Bldg., Geo. B. Post & Sons, Architects | SCHENECTADY, N. Y.—Y. M. C. A., Helmle & Corbett, Architects |
| LINCOLN, NEB.—Cornhusker Hotel, Alonzo H. Gentry, Architect | TAMPA, FLA.—Floridan Hotel, Francis J. Kennard & Son, Architects |
| MEMPHIS, TENN.—Baptist Memorial Hospital, Pfeil & Awsumb, Architects | TOPEKA, KAN.—Jay Hawk Hotel, Thomas W. Williamson & Co., Geo. B. Post & Sons, Associate Architects |
| B. P. O. Elks Bldg., George Mahan, Jr., J. J. Broadwell, Associate Architects | |
| MILWAUKEE, WIS.—Schroeder Hotel, Holabird & Roche, Architects | |
| NEWARK, N. J.—B. P. O. Elks Bldg., Warren & Wetmore, Architects | |
| NEW ORLEANS, LA.—Masonic Temple, Sam Stone, Jr., Architect | |



METAL DOOR
& TRIM CO.
LAPORTE, IND.

ROLLED STEEL FRAMES FOR DOORS AND SIDELIGHTS

DRAWING NO. 1
JUNE 23, 1927
SCALE 3 IN.=1 FT.

PETERSON AND NEVILLE, INC.

Manufacturers of Pressed Steel Products: "Steelweld" Steel Door Frames, Medicine Cabinets and "Kleen Kitchen" Metal Furniture
365 Dorchester Avenue, BOSTON, MASS.

Product

"STEELWELD" DOOR FRAMES.

Also Radiator Furniture, Economy Lockers, Steel Tanks, Conveyor Buckets, Steel Platform Skids, Circuit Breaker Tanks, Steel Tote Boxes and Steel Concrete Forms.

For "Kleen Kitchen" Metal Furniture, see pages B2216-2217; for Medicine Cabinets, see page C2581.

Steel Combination Door Frames

Five types of our steel combination door frames are shown in cuts A, B, C, D and E. These frames are suitable for all interior openings and are complete frames in every detail, embodying the buck, jamb and trim, with provisions made to receive all hardware, such as hinges, striking plates, locks and pads for door checks or any other special hardware.

"Steelweld" door frames are made of steel, are fireproof and free from defects. They will not sag, warp or open up at the joints as do wood frames. All joints are gas welded and ground to a smooth finish.

The economy of "Steelweld" frames becomes apparent when you consider that the erection of a "Steelweld" frame comprises the total cost of erecting a finished door opening. The buck, jamb and trim are all in one piece so there is no further cost of erecting the finished jamb and trim. Our frames can be made to accommodate walls of varying thicknesses, from a 2-inch wall up.

There are several designs of steel anchors that are used with these frames as shown in Types A, B, C, D and

E. The selection of the type of anchor is left to the architect, who can select a fixed or a loose anchor as he chooses.

Type A Frame—Made of No. 14 gauge cold rolled steel of simple design and few mouldings, and is very suitable for school work.

Type B Frame—Made of No. 18 gauge auto body steel and is one that we have used extensively for apartment hotels. In lots of 1000 frames or over we can modify these mouldings somewhat to meet the architect's designs.

Type C Frame—Made of No. 16 gauge cold rolled steel with $\frac{3}{8}$ -in. plaster lock holes placed 2 in. on center as shown in sketch. We have used this type extensively in hotel work. This is a very rugged frame and one that will stand considerable abuse.

Type D Frame—Made of No. 12 gauge cold rolled steel with very simple mouldings suitable for hospital work.

Type E Frame—Made of No. 12 gauge blue annealed steel and shows another treatment to prevent the plaster from cracking where it joins the metal buck. This method is somewhat more expensive than the other types.

Other Uses

These same sections can be used in making up the steel door frames for elevator enclosures, also for cased openings, and all interior sash, either fixed or movable.

Service and Samples

We will be pleased to study your specific problem in detail if you will send us a set of floor plans and a copy of the specifications.

These frames can be shipped economically to any part of the country, especially if there are 400 frames or over. 400 frames fill an average car and can be loaded without the extra expense of individual crating for each frame.

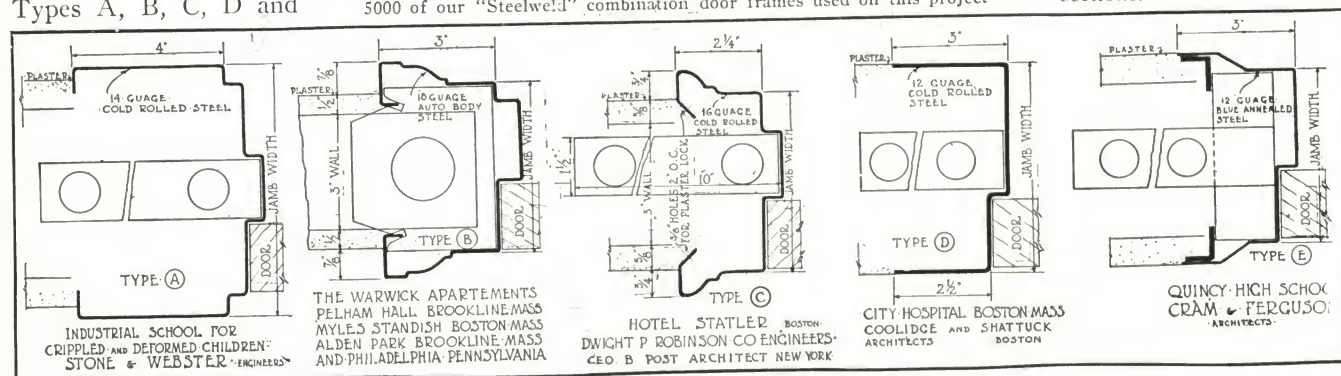
Hardware templates must be furnished us with the order and with the general plans and specifications for the building.

We manufacture many types of special steel door frames and invite you to send us your problems in this line. Send for sample sections.



Statler Hotel and Office Building, Boston, Mass.

GEO. B. POST, Architect DWIGHT P. ROBINSON & Co., Builders
5000 of our "Steelweld" combination door frames used on this project



J. G. BRAUN

Casement and Window Sections

537-541 West 35th Street
NEW YORK, N. Y.

609-615 So. Paulina Street
CHICAGO, ILL.

1088 Howard Street
SAN FRANCISCO, CAL.

Product

CASEMENT and WINDOW SECTIONS.

For Stair Nosings and Edgings, see page A680; for Steel Mouldings, see pages A748-749; for Perforated Sheets, see page C2807.

Catalogue

Our Catalogue No. 25 on steel mouldings contains many other sections useful for window construction.

A copy will be sent the architect, builder or owner upon request.



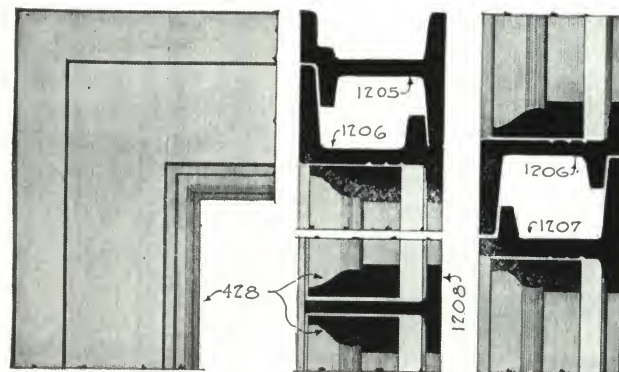
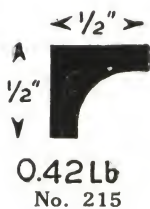
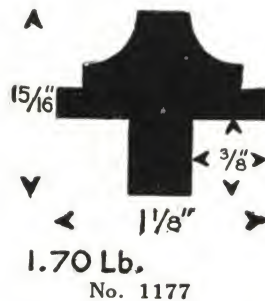
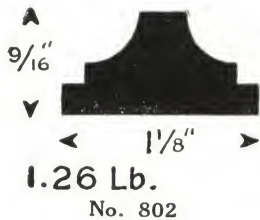
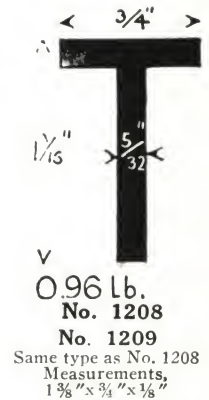
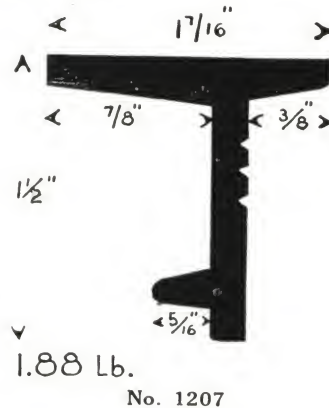
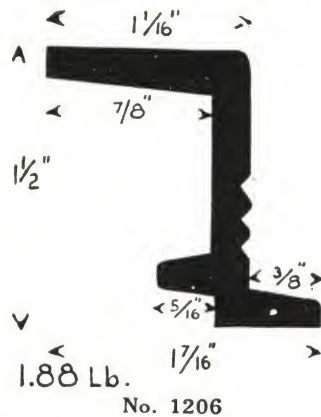
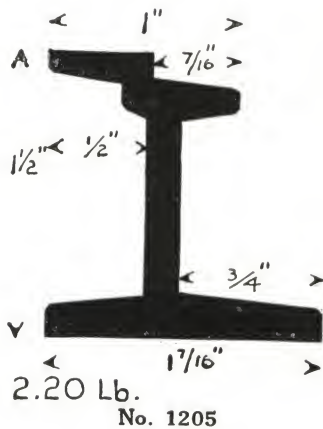
Features

These sections are of the two-point contact type and suitable for all windows; casement type, double hung, austral type, in- or out-opening. The large chamber makes windows constructed with them rigid, airtight and watertight.

Wide members make for ease of application and tight fit of hardware.

A special feature is the grooves in sections Nos. 1206 and 1207. Adherence of glazing and setting compound makes windows doubly weathertight.

Casement and Window Sections



Detail of Casement Sections
Scale 6 in. = 1 ft.

ESTABLISHED 1884

THE PHILADELPHIA SUPPLIES CO., INC.

SUCCESSORS TO P. DEISSLER & BRO.

All-metal Window Frames and Pivoted Window Ventilators1741 North Sixth Street
PHILADELPHIA, PA.**Products**

Sole manufacturers of the P. Deissler & Bro. patented PIVOTED VENTILATORS.

METAL FRAMES for church windows and the leaded glass trade.

BASEMENT WINDOW VENTILATORS for masonry or wood construction.

Also Skylights, Domes, and all other kinds of wrought iron work used in the leaded glass trade.

Improved Type All-metal Built-in Window Frames

Frames are made of steel or wrought iron as desired. They are built in as the building is in course of construction and make a rigid and everlasting weather-proof job. They are made in all styles—square, round or gothic top, and in any size or weight material desired. Used for leaded, plate, wire, ribbed or prism glass. Finish is either painted or galvanized.

Frames are made for storm glass outside and leaded glass inside or for single glazing.

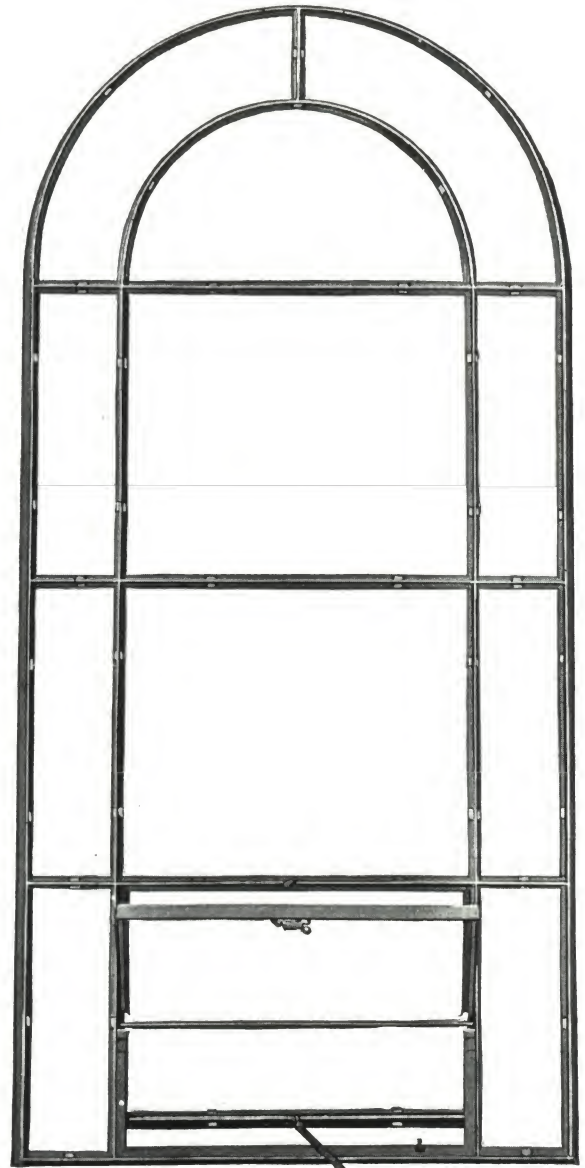
Ventilators can be put in the top, center or bottom of frames, and the inside swinging frames can be removed for glazing.

"Deissler" Improved Pivoted Ventilators

These ventilators have been specified for over 40 years as the standard church window ventilator. They

are made of steel or wrought iron angles for single or double glazing and can be used for leaded, plate, wire, ribbed or prism glass. The inside frame of ventilators can be taken out and bars put in to suit the design. Finish is either painted or galvanized.

Where ventilators are in reach they are provided with spring lock at the top and lug at the bottom with strap for adjusting extent of opening. Ventilators out of reach should be specified with bottom heavy, self-closing; these are for the intermediate and bottom sections of windows. They are equipped with lock, pulley, bracket and chain fastener attached to the ventilator and are operated from the side with a chain. This eliminates the objection of cords or chains obstructing the design or view of the window.

**Two Stock Designs of Frames That Are Reasonable in Price**

We also make special designed metal frames—any style, size or weight material desired

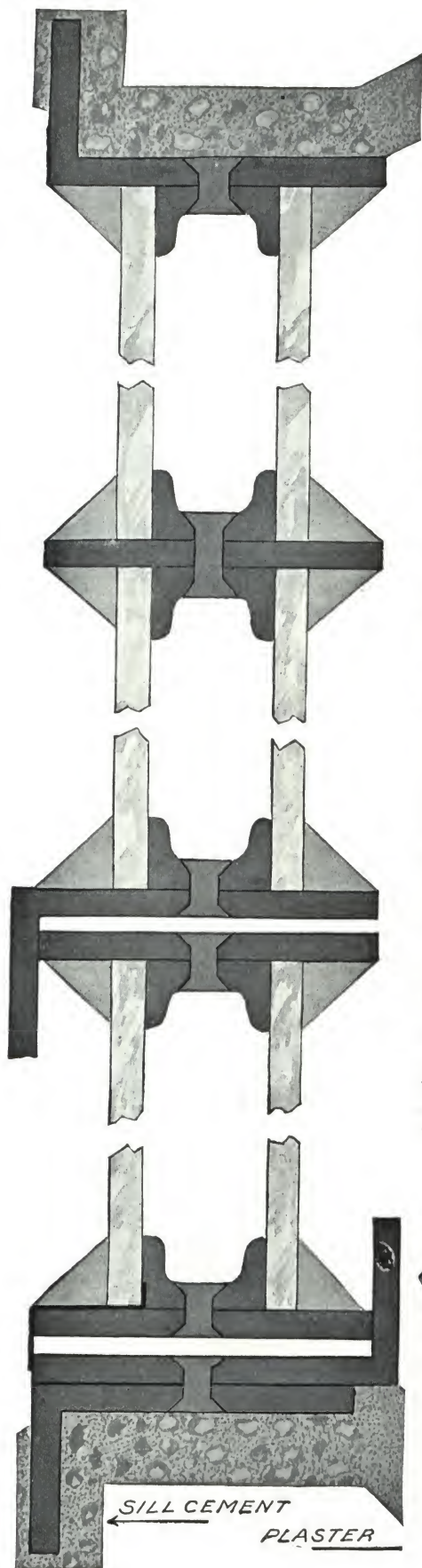


Fig. 1—Sectional View
(Full size)

Fig. 1. Sectional View (Full Size)

Illustrates a section of a metal frame for outside storm sash and inside leaded glass glazing. The double, double bottom ventilator shown is pivoted in the center to swing in at the top. Specify Catalogue No. 10 for double bottom ventilators where operation of sash is by spring lock at top and adjusting lug at the bottom; for the bottom heavy self-closing type adjusted by chain at the side specify Catalogue No. 38.

Fig. 2. Sectional View (Full Size)

Illustrates a section of a Te-iron metal frame for single glazing. Type illustrated is for building into masonry openings but it can be made with angle iron all around and screwed into rough wood openings. Can also be used where wooden frames have a rabbet in which case the angle iron on the outside is not required as the frames have turned ends on the mullion bars which can be screwed direct to the wood.

The ventilator is also for single glazing and pivoted in the center to swing in at the top.

Specify Catalogue No. 1 ventilator for the bottom; No. 2 for the middle, and No. 3 for the top. Hardware can be furnished the same as described for the Nos. 10 and 38 Double, Double Bottom Ventilators described above.

Information Required for Estimates

All-metal Window Frames—Send blue prints and specifications with list of bidders. Any charge for these will be gladly remitted.

Pivoted Window Ventilators—The quality of ventilators and style wanted; and if for leaded glass, give bar sizes.

The sizes should be taken from the outside of angle iron, giving the width first, then the height. For rabbeted work, sizes should be taken full size.

In grooved mullions or jambs, the sizes should be taken daylight size.

State if ventilators are to be placed in top, middle or bottom of window, and if they fit in wood all around; and, also, if they are to be painted or galvanized.

For domes, skylights or iron work, send sketches.

Sizes, shapes and quantities vary so considerably, that it is impossible for us to issue a reliable price list. We will be glad to prepare a special estimate on receipt of specifications and quantities.



Patented 1926

No. 38 Bottom Heavy Self-closing Ventilator

Details of P. Deissler & Bro. Pivoted Ventilators and Metal Frames

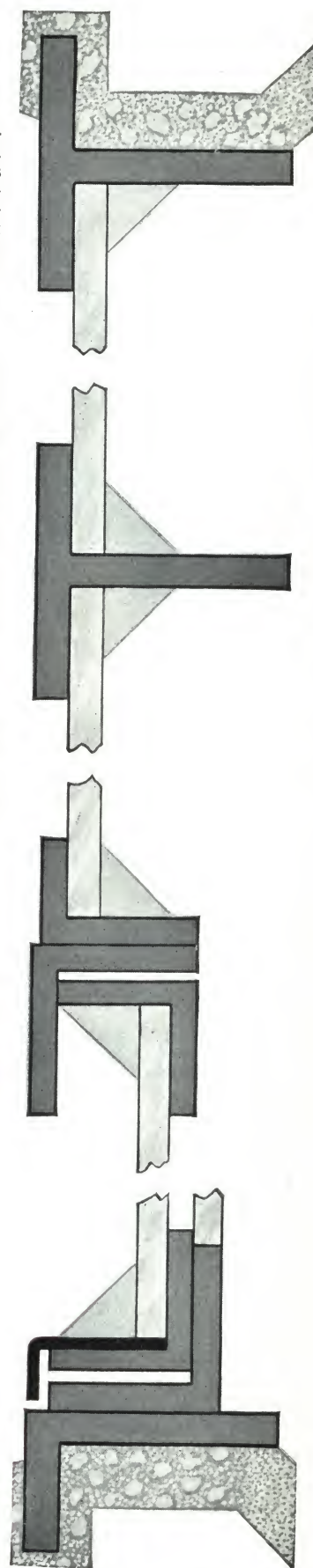


Fig. 2—Sectional View
(Full size)

Fully Weatherproof, All-metal Basement Window Ventilators for Masonry and Wood Construction

These ventilators have many advantages over the old style as they make a permanent, weatherproof job and have no hinges to get out of order. They have a spring snap catch at the top and pivot at the bottom (see sectional views).

These ventilators are made for single or double glazing and pane glazing.

When specifying steel basement windows notify us, sending us the necessary blue prints, specifications, and

Ventilators for Masonry and Wood Construction

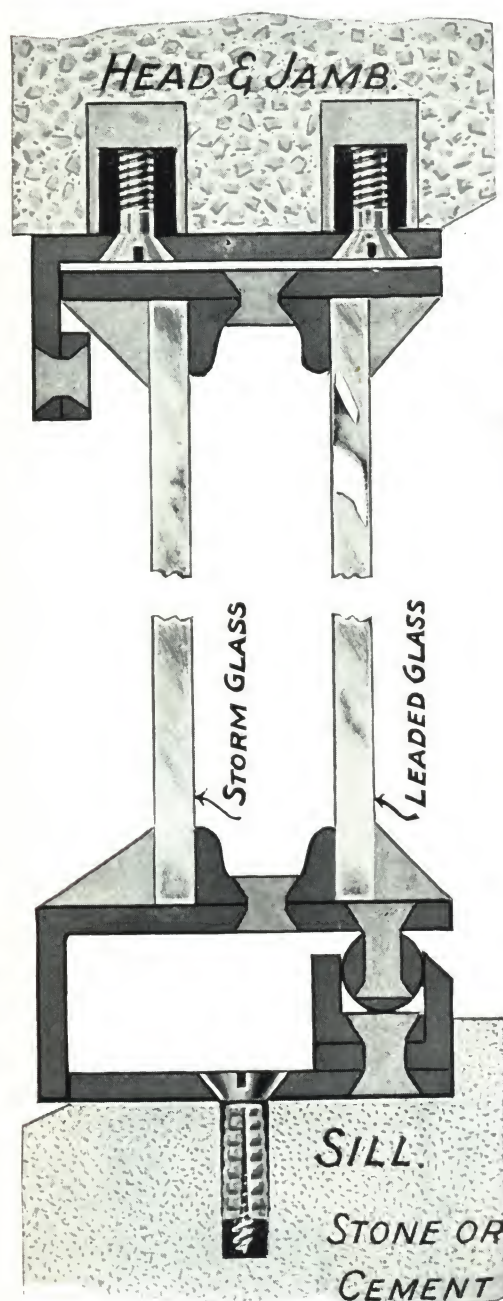
list of bidders and we will remit any set charge for same.

No. 36 Basement Window Ventilator—Substantially made with horizontal stiffening bars. Extension arms which hold ventilators open ride through slotted frame, and when ventilator is closed they fit snugly into the frame.

Equipped with brass lock and made for leaded glass.

No. 37 Basement Window Ventilator—This frame is constructed on the same principle as the No. 36 for opening and closing and is made for pane glazing.

Made for single or double glazing as shown in the sectional views below. Frames painted or galvanized.



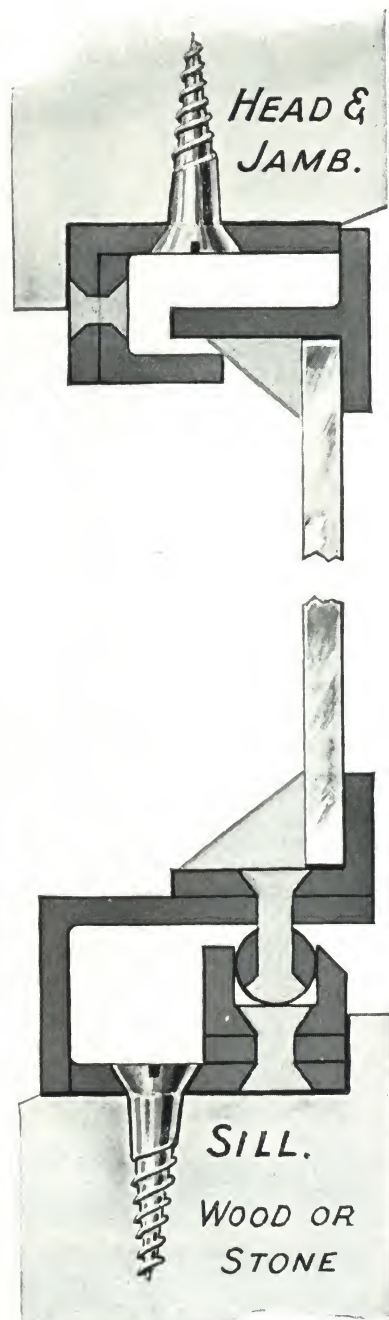
Full Size Sectional View Style No. 55

For Nos. 36 or 37 ventilators. For double glazing set in groove. Made for masonry construction only



No. 37 Ventilator for Pane Glazing

No. 36 has horizontal stiffening bars only and is made for leaded glass



Full Size Sectional View Style No. 54

For Nos. 36 or 37 ventilators. For leaded glass. Single glazing made to set in wood or stone.

For basement window for pane glazing, specify No. 53

THE WILLIS MANUFACTURING COMPANY

INCORPORATED 1891

Manufacturers of Hollow Metal Windows and Tin Clad Fire Doors

HOME OFFICE and FACTORY
GALESBURG, ILL.

Products

HOLLOW METAL WINDOWS of all types; TIN CLAD FIRE DOORS and Hardware.

Approvals

All types of Willis hollow metal windows and tin clad fire doors have been tested and approved by the National Board of Fire Underwriters.

Hollow Metal Windows

The Willis hollow metal window is made in all types including, double hung, single pivoted, double pivoted, top hinged, casement and stationary. Double hung with pivoted, hinged or stationary transoms.

Our approved mullion may be employed when it is necessary to use more than one single unit in an opening.

Tin Clad Fire Doors

Two-ply and three-ply, wood core, tin clad doors of the sliding or swinging type for any kind of opening.

Specifications for Hollow Metal Windows

All hollow metal windows shall be those manufactured by THE WILLIS MANUFACTURING COMPANY of Galesburg, Ill., or such other make that will comply in every respect with their design and construction.

Metal used throughout shall be No. 24 gauge tight coated galvanized, as required by the Underwriters' Laboratories, Inc., and shall be copper bearing. Heads, jambs and all sash rails shall be constructed of one piece of metal each, excepting back covers. All covers to be carefully and securely locked to their respective members. Heads and jambs shall have a moulded brick or staff bead and shall be properly constructed for building into brick, stone or terra cotta walls. All members must be carefully formed and miters neatly cut, lapped and riveted. Where two sash members lap on an exposed surface, the under member shall be offset the thickness of the metal to permit of a smooth and even surface to insure perfect operation of sash.

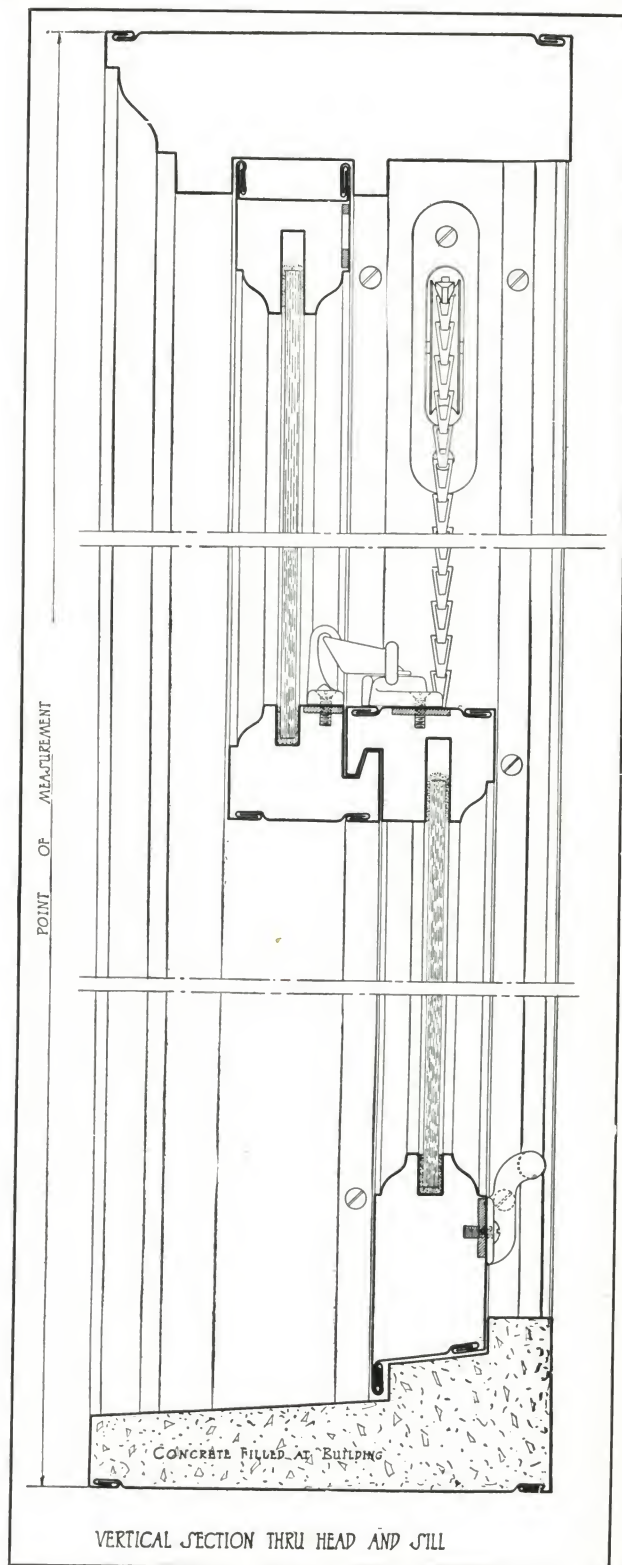
Pulley stiles shall each be formed accurately to provide for a perfect operation of the sash. Each jamb to have a weight pocket of ample size to permit of easy application of the sash weights. Weight pockets to have a removable cover which will fit tight and which will not offer obstruction to the sash in their operation.

Sash rails to be neatly mitered and riveted. All sash to be carefully fitted into the frames at the factory to insure perfect operation and a weathertight job. Meeting rails to lock tightly together when both sash are closed to insure strength and weathertightness. Glass rabbets on all side and bottom rails to be $\frac{3}{4}$ in. deep and on top rails $1\frac{1}{2}$ in. deep. Sash to be divided with muntin bars into lights as required by the Underwriters' Laboratories, Inc., or as shown on the plans. Muntins to have removable caps to permit of glazing without removing sash from the frames. The outside section of the muntin to be securely fastened to the sash rails by rivets and reinforced every 12 in. with a steel, tapped plate. The inside muntin section to be secured to the outside section by means of screws passing through the reinforcing plates. Both sections of the muntin to be moulded to conform with the sash rails.

Hardware to consist of substantial ball bearing pulleys fastened in place in the jambs by means of screws passing through plates riveted on the inside of jambs. Sash shall be hung on heavy sherardized sash chain, approved by the Underwriters' Laboratories, Inc., and counterbalanced with sectional weights. All pulleys shall be placed in jambs in such a manner that they may be removed and replaced without disturbing other parts of the window. Sash shall be equipped with pole socket, bar lifts and underwriters' approved malleable iron lock, dead black, bronze or brass plated finish. Plates to be attached inside sash rails with rivets for attaching hardware. Sash shall be glazed with $\frac{1}{4}$ -in. wire glass (specify kind) thoroughly embedded in putty. All metal shall have one shop coat of an approved metallic paint before leaving the factory.

All windows shall be constructed in accordance with the specifications of the National Board of Fire Underwriters and shall meet their requirements in every respect. All win-

dows shall bear both Underwriters' and manufacturers' labels.
Note: In sending in specifications be sure to furnish all necessary information such as type of window wanted, brick opening size, style of head, whether square or segment, division of glass in sash and kind of glass wanted.



Details Willis Hollow Metal Window

CAMPBELL METAL WINDOW CORPORATION

Pershing Square Building, NEW YORK, N. Y.

BALTIMORE, MD., Bush and Hamburg Streets

Campbell Solid Metal Windows

Model No. 26-W Double Hung—All parts of the sash and frame, as indicated on detail drawings, are formed of No. 12 gage blue annealed steel, the balance of No. 16 gage. Sash weights are single-unit castings. Chains are of steel, hot galvanized, with galvanized connectors to sash and weights. Rubbing strips on each jamb at ends of meeting rails are of bronze. Screws are of steel with standard 10-24 machine thread and heads as detailed. Cast iron sills and stools furnished for this model, if desired.

Model No. 25-W Double Hung—Materials entering into the construction of Model No. 25-W are essentially the same as described for Model No. 26-W with the exception that the sash members are made of No. 14 gage steel and parts of the frame (as indicated on detail drawing) are formed of No. 20 gage blue annealed steel; staff bead of No. 12 gage steel. Sills are of No. 12 gage drawn steel.

Assembly—Sash frames have mitered and welded corners. Glazing stops are mounted with screws on interior. Members forming jambs and head boxes are welded together. The frames are shipped with sash, pulleys and chains installed.

Weathering—Sill, meeting rails and head are fitted with metallic flexible weather stops. Vertical guides and sash members are fitted with metallic flexible interlocking weather stops within the boxes.

Guarantee—The amount of infiltration of air through standard double hung windows is guaranteed not to be more than 1/2 cu. ft. of air per foot of sash perimeter per minute when subjected to a static air pressure equivalent to the pressure exerted by a wind of 25 miles per hour.

Adjustment—Sash have concealed adjusters to prevent sash members from rubbing on exposed face of jambs and scraping paint.

Finish and Hardware—All steel in windows, except inside glass stops and inside cover plates, is galvanized after fabrication.

All finish hardware is solid bronze, polished and unlacquered.

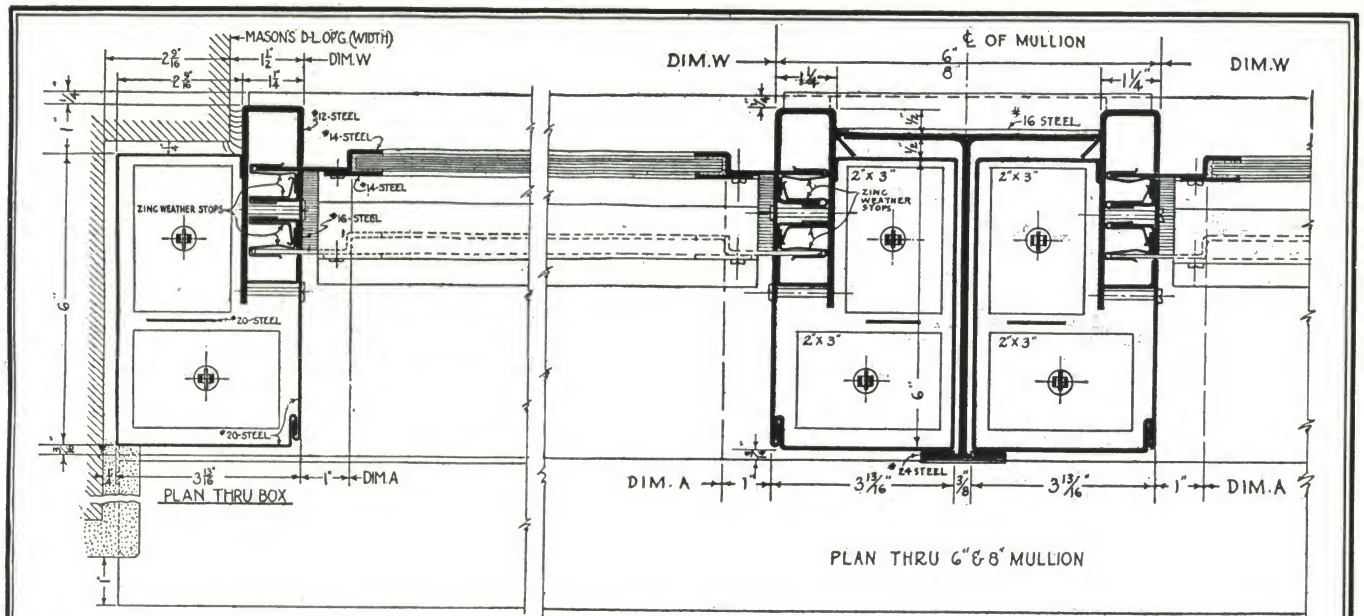
Labels—Where required, windows are made in accordance with the regulations of the National Board of Fire Underwriters and bear their label.

Bronze Windows

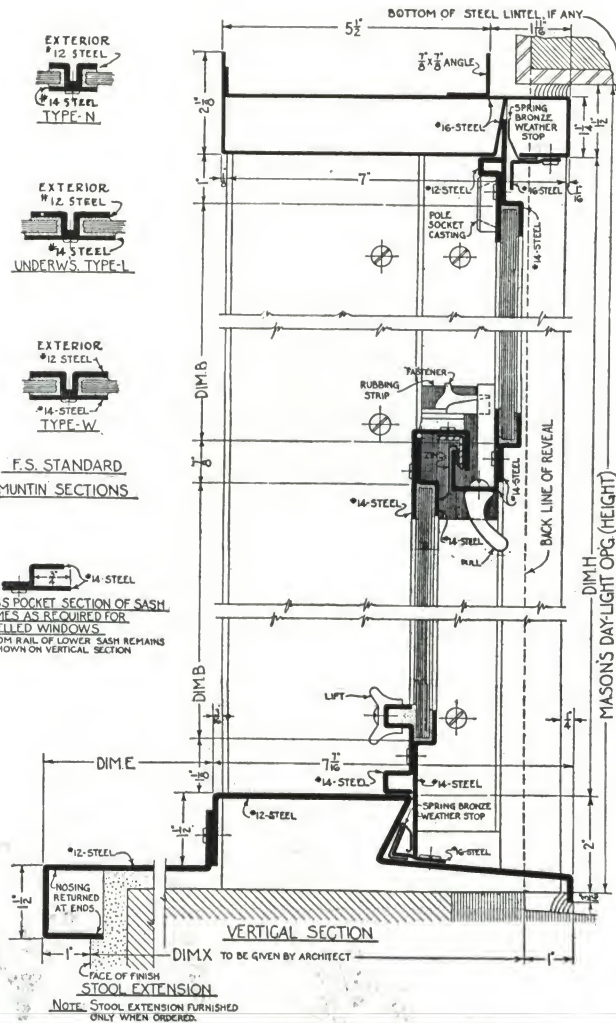
All types are made in bronze if desired.

A Few of the Recent Prominent Buildings Equipped with Campbell Windows

BUILDING AND LOCATION	ARCHITECT	BUILDER	WINDOWS
Columbia-Presbyterian Medical Center, New York, N. Y.	James Gamble Rogers	Marc Eidlitz & Son, Inc.	5570
Graybar Building, New York, N. Y.	Sloan & Robertson	Todd, Robertson, Todd Eng. Corp.	3784
Manger Hotel and Addition, New York, N. Y.	H. Craig Severance	Bing & Bing	3201
Park Central Apartment Hotel, New York, N. Y.	Gronenberg & Leuchtag	55th St. and 7th Ave. Corp.	3018
New York Central Railroad, New York, N. Y.	Warren & Wetmore	Jas. Stewart & Co., Inc.	2967
Hotel Statler, Boston, Mass.	Geo. B. Post & Sons	Dwight P. Robinson & Co., Inc.	2628
St. Louis Telephone Building, St. Louis, Mo.	Mauran, Russell & Crowell and I. R. Timlin	Westlake Construction Co.	2384
Insurance Exchange, Chicago, Ill.	Graham, Anderson, Probst & White	John Griffiths & Son Co.	2200
Salmon Tower, New York, N. Y.	York & Sawyer	C. T. Wills, Inc.	2177
Barclay-Vesey Telephone Building, New York, N. Y.	Voorhees, Gmelin & Walker	Marc Eidlitz & Son, Inc.	1933
General Motors Building, New York, N. Y.	Shreve & Lamb	G. Richard Davis & Co., Inc.	1853
Savoy-Plaza Hotel, New York, N. Y.	McKim, Mead & White	Geo. A. Fuller Co.	1781
551 Fifth Avenue, New York, N. Y.	Fred F. French Co.	Fred F. French Co.	1750
Subway Terminal Building, Los Angeles, Calif.	Schultze & Weaver	P. J. Walker	1743
Buhl Building, Detroit, Mich.	Smith, Hinchman & Grylls	Davis & McGonigle Co.	1585
Jewelers Building, Chicago, Ill.	Giaver & Dinkelberg	Starrett-Dilks Co.	1557
Industrial Trust Building, Providence, R. I.	Walker & Gillette	Starrett Brothers	1462
Paramount Theatre Building, New York, N. Y.	Rapp & Rapp	Thompson Starrett Co.	1414
Book Tower, Detroit, Mich.	Louis Kamper	Starrett Dilks Co. of Michigan	1396
Consolidated Gas Company, New York, N. Y.	Thos. E. Murray, Inc.	Kenn-Well Construction Co.	1346
Netherlands-Sherry Hotel, New York, N. Y.	Schultze & Weaver	Shroder & Koppel, Inc.	1306
Harriman Building, New York, N. Y.	Cross & Cross	Geo. A. Fuller Co.	1257
Detroit Telephone Building, Detroit, Mich.	Smith, Hinchman & Grylls	R. G. Christman & Co.	1205
Empire Trust, New York, N. Y.	Warren & Wetmore	Max J. Kramer Co.	1200
Chase National Bank, New York, N. Y.	Graham, Anderson, Probst & White	C. T. Wills, Inc.	1156
Insurance Company of North America, Philadelphia, Pa.	Stewardson & Page	Stone & Webster	1146
Cleveland Telephone Building, Cleveland, Ohio	Hubbell & Benes	Lundoff-Bicknell Co.	1057
Ingraham Building, Miami, Fla.	Schultze & Weaver	Turner Construction Co.	1029
Tribune Tower, Chicago, Ill.	Howells & Hood	Hegeman-Harris Co.	1023
International Telephone Building, New York, N. Y.	Buchman & Kahn	A. E. Lefcourt Realty Holdings	1000
Union Central Life Annex, Cincinnati, Ohio	Garber & Woodward	Ferro Concrete Construction Co.	943
Cincinnati Inquirer Building, Cincinnati, Ohio	Lockwood, Green Co.	George A. Fuller Co.	875
Philtower, Tulsa, Okla.	Keene & Simpson and Edw. Buehler Dilk	Long Construction Co.	844
Evening Post Building, New York, N. Y.	Horace Trumbauer	Thompson Starrett Co.	918
Saks-Fifth Avenue Store, New York, N. Y.	Starrett & Van Vleck	Cauldwell-Wingate Co.	822
Pennsylvania Power & Light Company, Allentown, Pa.	Helmle & Corbett	Hegeman-Harris Co., Inc.	788
Mercantile Exchange, Chicago, Ill.	A. S. Alschuler	Paschen Brothers	750
National City Bank, New York, N. Y.	McKim, Mead & White	Geo. A. Fuller Co.	738
Architects Building, Addition, New York, N. Y.	Ewing & Allen	Post & McCord	708
Home Savings Bank, Albany, N. Y.	Dennison & Hirons	John Dyer, Jr.	672
State National Bank, Albany, N. Y.	Henry Ives Cobb	Foundation Co.	616
Mitsui Main, Tokyo, Japan	Trowbridge & Livingston	Jas. Stewart & Co., Inc.	561
American Radiator Building, New York, N. Y.	Raymond M. Hood	Hegeman-Harris Co., Inc.	551
Seaman's Bank for Savings, New York, N. Y.	Benjamin W. Morris	Wm. L. Crow Construction Co.	495



PLAN SECTION OF STOOL EXTENSION

NEW YORK CENTRAL RAILROAD BUILDING
NEW YORK, N.Y.2967 Campbell Metal Windows
WARREN & WETMORE - ARCHITECTS
JAMES STEWART & CO. INC. - BUILDERSDRAWN BY
SWEET'S CATALOGUE
SERVICE, INC.STANDARD DETAILS OF CAMPBELL SOLID METAL WINDOW
DOUBLE HUNG MODEL N° 25 WSCALE 3 IN. DRWG
EQUALS 1'-0"
DATE: AUG. '27 1

THE KAWNEER COMPANY

Solid Nickel-Silver Windows

NILES, MICH.

BRANCH OFFICES

ATLANTA, GA., 129 Peachtree Street
 BOSTON, MASS., 38 Chauncy Street
 CHICAGO, ILL., 222 W. Adams Street
 CINCINNATI, OHIO, Building Exchange Building, 622-626 Broadway
 CLEVELAND, OHIO, Builders Exchange, 3rd floor, Rose Building
 BUFFALO, N. Y., 951 Ellicott Square Building

DETROIT, MICH., 615 Griswold Street
 KANSAS CITY, MO., 903 Grand Avenue
 MILWAUKEE, WIS., 490 Broadway
 NEW YORK, N. Y., 233 Tenth Avenue
 PHILADELPHIA, PA., 10 N. Fourth Street

KAWNEER MANUFACTURING COMPANY OF CALIFORNIA

(SUBSIDIARY)

BERKELEY, CAL.

BRANCH OFFICE, 1135 Loew's State Building, LOS ANGELES, CAL.

More than 130 Distributors who carry stock are located in most of the Principal Cities in the United States and Canada. Stock is also carried at our New York and Philadelphia Branches

Products

WEIGHT HUNG, STANDARD CASEMENT, SPECIAL TRANSOM CASEMENT and PIVOTED TYPE WINDOWS made of Solid Nickel-Silver.

VENTILATOR BRACKETS for controlling drafts from weight hung windows.

For Store Fronts made of solid copper, see pages B1763-1765; for Reversible Window Fixtures, see page B2057.

Architectural Service

Information concerning Kawneer windows will gladly be furnished on request. A serviceable catalogue featuring our solid nickel-silver window has been published for the convenience of architects. The manufacturers will be glad to mail a copy of this catalogue or full size details.

Our Engineering Department will gladly co-operate with architects in solving problems concerning special window construction.

Rustless Metal Windows

Kawneer windows are made in solid nickel-silver to meet the requirements of permanency for the better class of buildings. They are made from heavy cold rolled mouldings, all joints being mitered or coped and securely welded. With our method of forming mouldings we are able to build these windows weathertight. This reduces fuel costs and eliminates the use of weather strips. Upkeep costs are restricted to a minimum. Kawneer nickel-silver windows do not require painting on the outside but may be finished to correspond with decorative schemes.

Types

Kawneer Solid Nickel-Silver Windows are offered in standard weight hung, out swinging casements, special transom casement and pivoted types. Practically any style of the various types may be had. If desired they can be made with muntins, and in groups with mullions of corresponding metal.



U. S. Mortgage & Bond Co., Detroit, Mich.
 HARRY S. ANGELL, Architect



Walter Cline Residence,
 Wichita Falls, Tex.
 J. F. LAUCK, Kansas City, Mo.,
 Architect
 VOLKER & DIXON, Associates



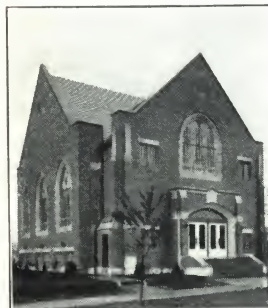
St. Augustines Parish Bldg.,
 Kalamazoo, Mich.
 CRAM & FERGUSON, Boston, Mass.,
 Architects
 LEROY & NEWLANDER, Kalamazoo,
 Associates



Lima Trust Co.,
 Lima, Ohio
 WEARY & ALFORD, Chicago,
 Ill., Architects

Kawneer

SOLID NICKEL SILVER
 WINDOWS



Ewing Avenue Evangelical Church, South Bend, Ind.
 FREYERMUTH & MAUER,
 Architects



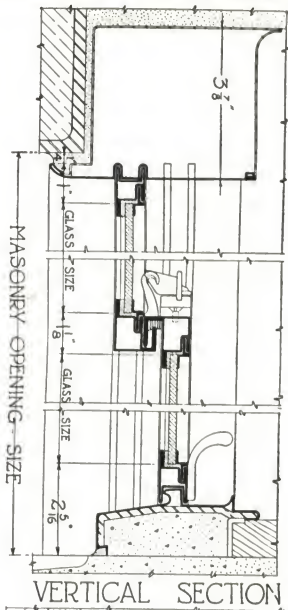
Allen Memorial Medical Library,
 Cleveland, Ohio
 WALKER & WEEKS, Architects



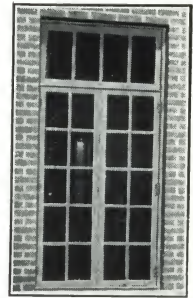
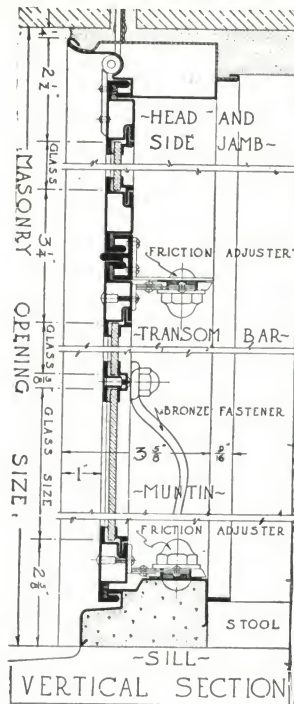
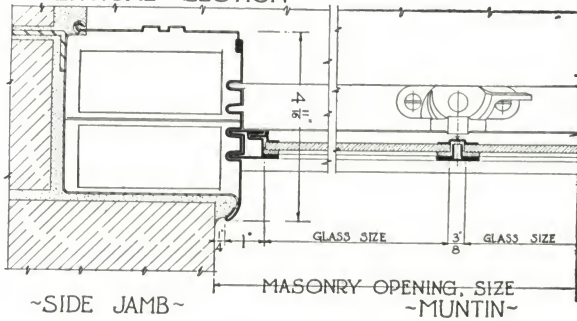
Tripoli Temple Mosque,
 Milwaukee, Wis.
 CLAS, SHEPHERD & CLAS, Architects



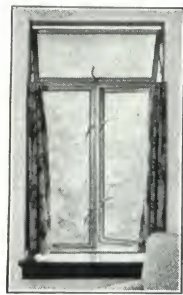
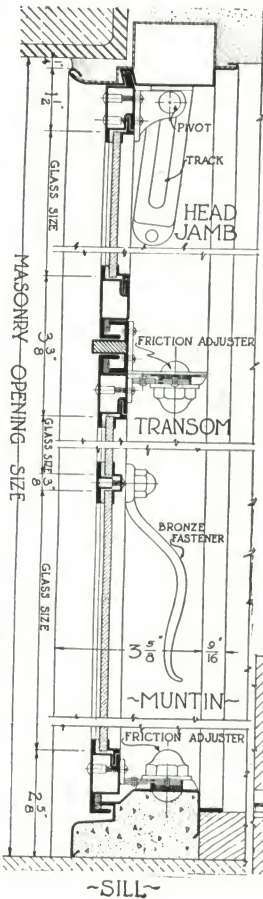
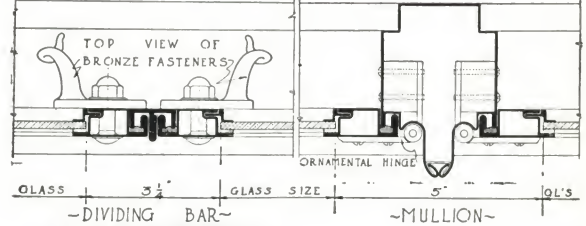
Woonsocket Fire House,
 Woonsocket, R. I.
 W. F. FOUNTAINE, Architect



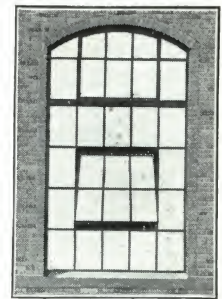
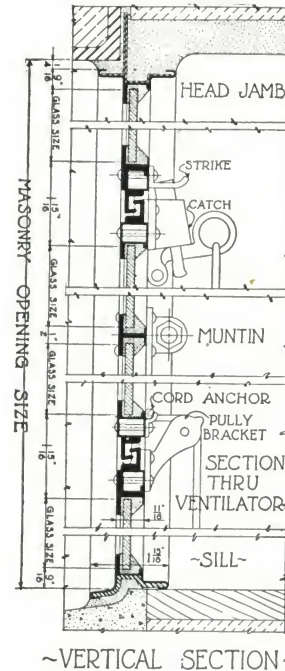
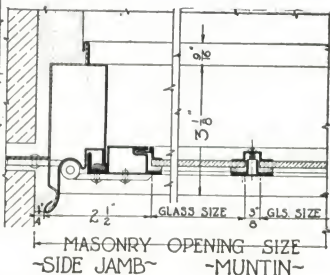
Detail of Kawneer Solid Nickel-Silver Weight Hung Window



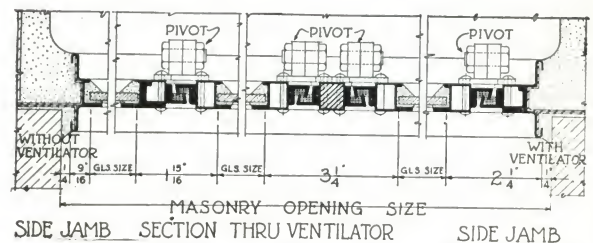
Detail of Kawneer Solid Nickel-Silver Special Transom Casement Window



Detail of Kawneer Solid Nickel-Silver Casement Window



Detail of Kawneer Solid Nickel-Silver Pivoted Type Window



S. H. POMEROY CO., INC.

Manufacturers of Double Hung Metal Windows

FACTORY AND GENERAL OFFICES

282-296 East 134th Street, NEW YORK, N. Y.

LOCAL REPRESENTATIVES

BOSTON, MASS., SKILLMAN & SUNDERLAND Co., 1042 Little Building
 BUFFALO, N. Y., E. H. WOOD, 316 Jackson Building
 CHARLOTTE, N. C., W. FRED CASEY & Co., 205 West First Street
 CINCINNATI, OHIO, L. D. ZELLNER, Mercantile Library Building
 CLEVELAND, OHIO, MILLS Co., Wayside Road and Nickel Plate R. R.
 DETROIT, MICH., J. W. ROLLINSON, 712 Polk Directory Building
 WASHINGTON, D. C., and BALTIMORE, MD., A. B. GILBERT, 712 Insurance Building

LOS ANGELES, CAL., CALMO ENGINEERING Co., 2302 E. 48th Street
 PHILADELPHIA, PA., THOS. S. GASSNER Co., 4545 Wayne Avenue
 PITTSBURGH, PA., LARSEN, BROWN & Co., 507 Ferguson Building
 RICHMOND, VA., JAMES S. ARCHER, 202 Davis Building
 ST. LOUIS, MO., H. C. MORRISON Co., 1956 Railway Exchange Building
 TAMPA, FLA., STOVALL & ARCHER, 5 Brantley Building

A Pioneer Manufacturer of Metal Windows

The S. H. POMEROY CO. INC., was a pioneer manufacturer of metal windows. It has been engaged in perfecting window design and adaptability for over 30 years, during which time many prominent installations have been made. It now offers its—

"Superior Type" Heavy Metal Double Hung Window

Superior Metal—This window is made throughout of hot dipped galvanized copper-bearing steel. It is painted with a special galvanized iron primer made to our order.

Note: Committee A-5 American Society for Testing Materials:

"We have now reached a point where we may definitely conclude that copper-bearing metal shows marked superiority in rust-resisting properties as compared to non-copper-bearing metal of substantially the same general composition . . . under atmospheric exposure."

Superior Distribution of Metal—Structural and wearing portions of frame and sash of No. 16 and No.

18 gauge metal, viz.: sill, No. 16 gauge; pulley stiles, head and vertical rails of sash, No. 18 gauge; jamb boxes and cross rails of sash, No. 20 gauge.

Superior Weathering—Two-point contact inside and out entire perimeter of both sash, making double weathering.

Superior Light—Due to small sash and frame members, maximum sight glass area is obtained.

Width of standard muntin 1 in., Underwriters' muntin 1 3/4 in.

Superior Appearance—Compare the slender lines, the simplicity and dignity of design with other metal windows. Note the absence of rivet and screw heads, bolts, etc. All exposed screw heads on interior are countersunk.

Superior Economy—In the "Superior" window we offer to the building public, wherever located, a double hung metal window of unequaled merit and at a price so surprisingly close to wood windows that their use must now become universal.



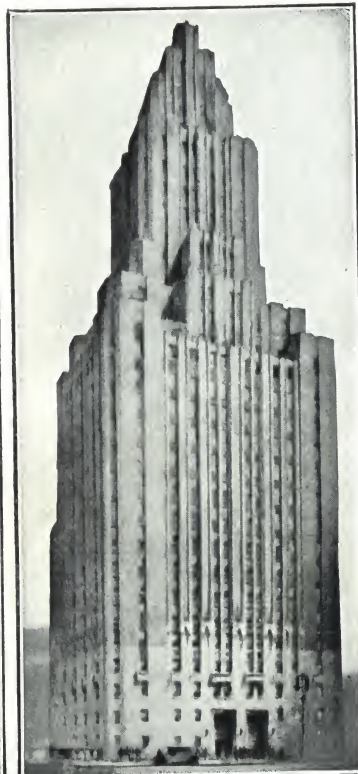
Warwick Apartment Hotel, 6th Avenue and 54th Street, New York, N. Y.

GEO. B. POST & SONS, Architects
1352 windows



Hotel Lincoln, 44th to 45th Street and Eighth Avenue, New York, N. Y.

SCHWARTZ & GROSS, Architects
2104 windows



No. 1 Fifth Avenue Building, New York, N. Y.

HELMF, CORRETT & HARRISON, Architects
SUGERMAN & BERGER, Associates
970 windows

Air Infiltration

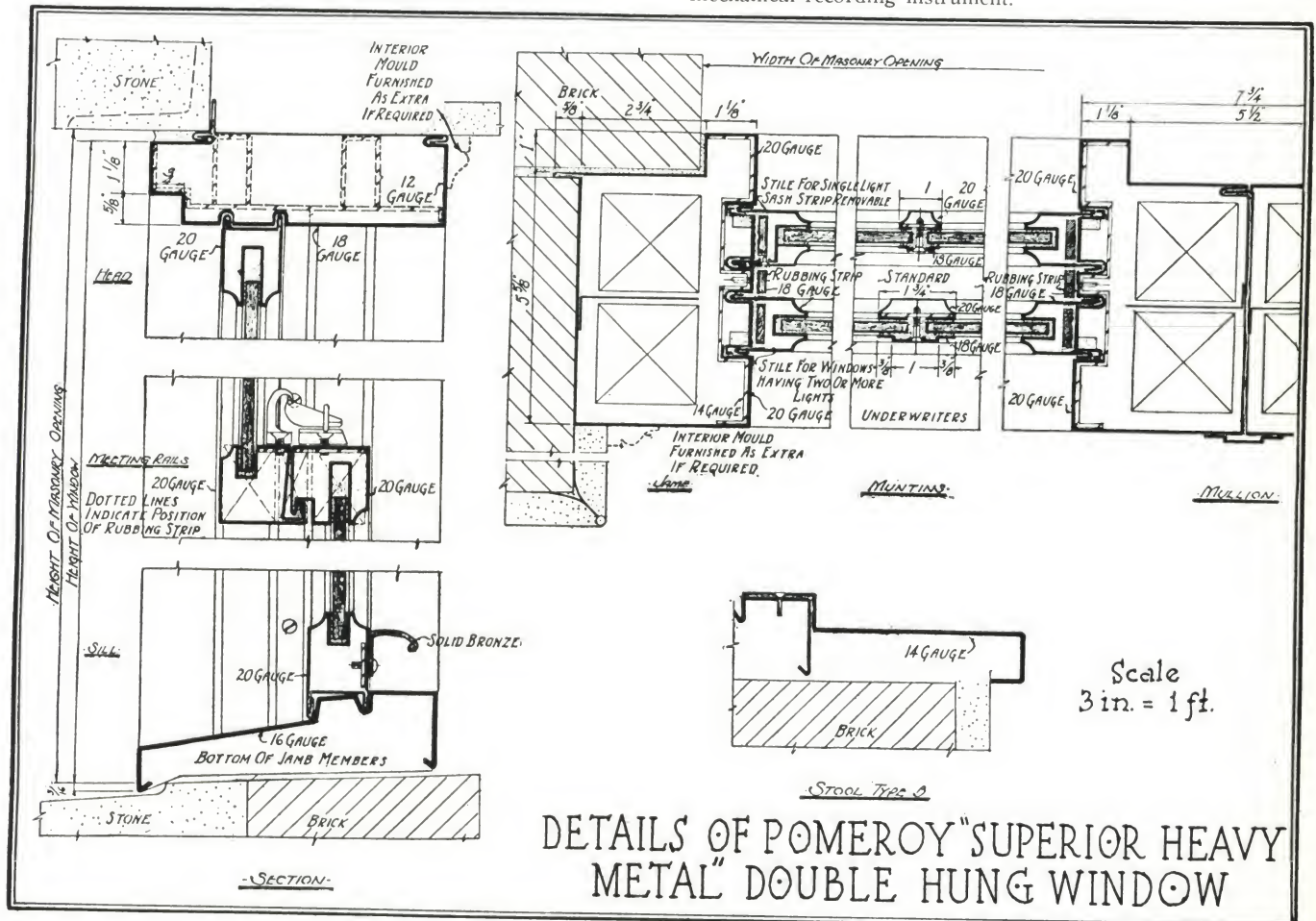
This window has been designed and constructed with the idea of insuring against excessive infiltration of air.

Subjected to test made at the University of Wisconsin by Professors Edward Anderson and G. C. Wilson, under the supervision of Professor G. L. Larson, in a manner similar to that described in the Journal of the American Society of Heating and Ventilating Engineers, June, 1924, the amount of infiltration of air through a standard double hung window proved

to be less than two-thirds of a cubic foot of air per foot of sash perimeter per minute when subjected to static air pressure equivalent to air pressure exerted by a wind of twenty-five miles per hour.

This minimum amount of infiltration of air is accomplished without any added weatherstripping, device or appliance, with their additional cost.

This amount of air leakage is not discernable to a person standing on the room side of a window without the aid of a mechanical recording instrument.



DETAILS OF POMEROY "SUPERIOR" HEAVY METAL DOUBLE HUNG WINDOW

Specification for "Superior" Type Heavy Metal Double Hung Window

Scope—Furnish and install, where shown on drawings, double hung windows of heavy metal "Superior" Type, as manufactured by S. H. POMEROY CO., INC., of New York City.

Material—All windows to be constructed throughout of copper-bearing hot dipped galvanized steel. Sills shall be of No. 16 gauge, jambs of No. 20 gauge, pulley stiles No. 18 gauge, heads No. 18 gauge, side rails of sash and inside muntin caps No. 18 gauge, cross rails of sash No. 20 gauge.

Frame Construction—Head, sill and jambs shall be constructed of one piece of metal, exclusive of pulley stiles and closure strips. All members shall be formed straight and true, neatly mitered, lapped and properly interlocked to their respective intersecting parts. Exterior hanging stile shall be flat and 1 1/8 in. in width. The interior of jamb shall be flat and 3 3/8 in. wide. The depth of frame from inside to outside of hanging stile shall be 6 5/8 in. Pulley stiles shall be formed with deep weathering grooves and shall be removable to permit of access to weight boxes and pulleys, and held in position by flat head countersunk screws. These screws shall pass through heavy reinforcing plates spanning the inside of jamb box. With the exception of these screws no other screw heads, nuts, bolts or rivets shall appear on the inner face of the jamb or soffit of the head.

Sash Construction—Sash shall be moulded and of tubular design 1 1/4 in. thick. Side rails shall project not more than 1 1/4 in. beyond the inner face of the jamb, making the total distance from masonry jamb to sight line of glass 2 1/2 in. Stiles and rails shall be constructed of one piece of metal moulded and neatly mitered, lapped and properly welded and interlocked. Side rails shall be of open construction with each flange being formed with a returned edge projecting into and operating in

the weathering grooves of pulley stiles. Top and bottom sash rails shall be formed with flanges which shall engage in weathering grooves in the soffit of the head and those formed in the sill. Meeting rails shall not be more than 1 3/4 in. in depth and constructed with flanges forming interlocking contact. Glass rabbets in side and bottom rails shall be 3/4 in. deep. Those occurring in top rails of upper and lower sash shall be 1 3/8 in. deep. Where sash are to be glazed with one light of glass the side rails shall be constructed with removable inside glazing beads which shall be held in place with flat head countersunk machine screws.

Muntins—Exterior muntin bar shall be moulded and reinforced with No. 14 gauge steel lugs. Interior caps shall be flat and held in place by flat head countersunk machine screws passing through the reinforcing lug of the exterior member.

Hardware Equipment—Frames shall be equipped with solid steel bronze bushed pulleys, contained in Nos. 12 and 14 gauge steel housings. Sash shall be hung on substantial sherardized steel sash chain and properly counterbalanced by cast iron weights. Sash shall be equipped with one pair of solid moulded bronze lifts, one malleable iron plated sash lock and pole socket.

Painting—Frames and sash throughout shall be given one shop coat of manufacturer's special prepared metallic primer before delivery.

Note: If Underwriters' label is desired the following paragraph should be incorporated:

"Windows shall be constructed in accordance with the requirements of the National Board of Fire Underwriters and shall bear their label of approval, as well as the label of the manufacturer."

Note: If it is desired to construct this window of bronze or copper, please write for specification.

VOIGTMANN METAL WINDOW CORPORATION

TELEPHONE
2-0156

Reed and Fulford Streets
KALAMAZOO, MICHIGAN

Products

VOIGTMANN ROLLED STEEL WINDOWS, Double Hung.

VOIGTMANN HOLLOW METAL WINDOWS, Double Hung.

Tested and approved by the Underwriters' Laboratories, Inc.

Improved Features

All Voigtman Windows are now made with patented, removable jamb feature which greatly simplifies the hanging of sash and permits of easy access to weight boxes. This feature also eliminates all exposed screws and difficult sash adjustment. All Voigtman Windows are also equipped with improved weathering features which combine ease of sash operation and weathertightness.

Voigtman Model No. 12 Rolled Steel Window

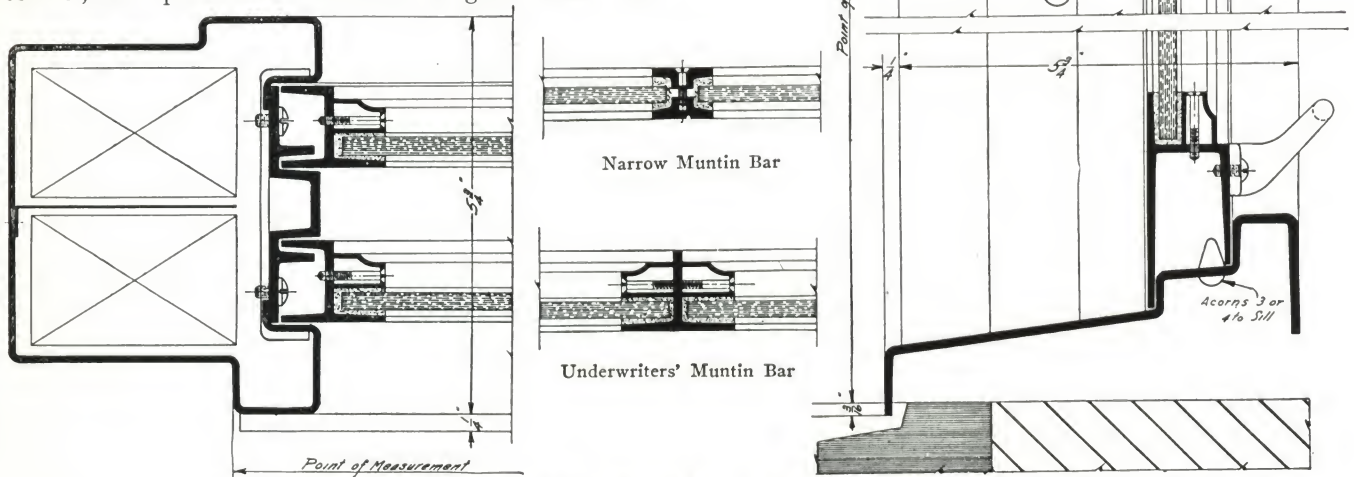
This window is the result of thirty-three years of Voigtman experience in metal window building. It is made of heavy gauge materials and combines correct architectural design with great durability. This, in conjunction with its weatherstripping features, makes it especially suitable for all high class, modern buildings. Sash, sill, head and removable weight pocket are made of heavy hot rolled steel running in thickness from 10 to 12 gauge. Balance of frame is made of 14 gauge steel galvanized after fabrication. Glazing stops are neatly mitered and welded at the factory, to be held in place with counter sunk screws effecting a glazing stop finish in neatness and design not heretofore accomplished. Rolled steel sash operating in rolled steel weathering grooves assure perfect fit, excellent weathering, along with noiseless and easy operation.

Voigtman Model No. 24 Hollow Metal Window

This window possesses the same Voigtman quality and the many other desirable features of the Model No. 12 window. It was developed to meet the demand for a lower cost window without a sacrifice to strength and durability. Although possessing neat members, its strength is provided for by the number of correct reinforcing bends made in the metal during the forming operations. This model is a pleasing type, architecturally correct, and permits a maximum of glass area. All



Barker Bros. Building, Los Angeles, Cal.



Details of the Voigtman Model No. 12 Double Hung Window

frame and sash members are made of No. 24 gauge, tight coated, galvanized steel. The sash weights are hung with extra heavy steel chain. This window can be made of 20-oz. cold rolled copper, or bronze if desired. Sash operate easily and are weathertight.

Hardware

These specifications apply to both Model Nos. 12 and 24: Voigtmann special removable pulleys, sash lock, lifts and pole socket. Furnished either in solid bronze or malleable iron, brass plated. Special hardware furnished if desired.

The Company

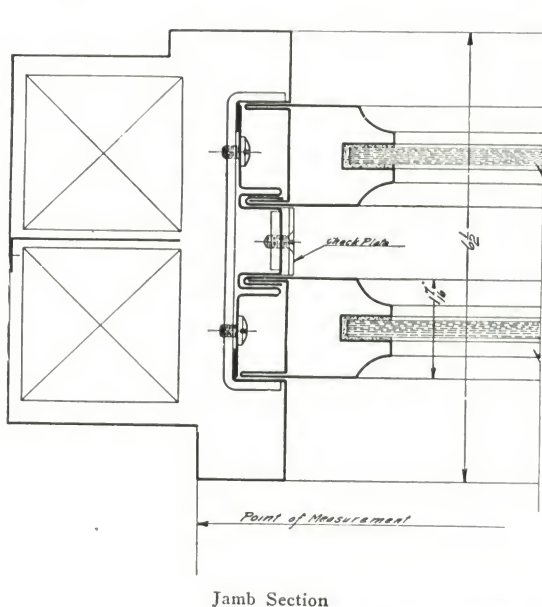
VOIGTMANN METAL WINDOW CORP. was the first to make metal windows and now offer the experience of thirty-three years of continuous, successful manufacture. The plant facilities and grade of skilled workmen employed are such as to guarantee the highest grade of product and deliveries according to schedule. An opportunity to estimate your work will be given prompt and careful attention.

A Few 1926 Voigtmann Installations

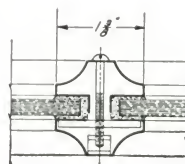
Including number and type of windows installed:
 Chamber of Commerce, Indianapolis, Ind., 604 steel
 John D. Spreckles, San Diego, Cal., 487 steel
 Congress Building, Miami, Fla., 503 steel
 Michigan-Lake Building, Chicago, Ill., 364 steel
 First National Bank, Easton, Pa., 272 steel
 Colonial National Bank, Roanoke, Va., 327 steel
 Amarillo Building, Amarillo, Tex., 702 steel
 Chester Williams Building, Los Angeles, Cal., 541 steel
 Buckeye State Building & Loan, Columbus, Ohio, 445 copper
 Medical Arts Building, Houston, Tex., 490 steel
 Delmar-Euclid Hotel, St. Louis, Mo., 260 steel
 Sheridan Hotel, Minneapolis, Minn., 341 steel
 Pacific States Telephone Building, Seattle, Wash., 201 steel
 Roosevelt Hotel, Miami, Fla., 498 steel
 Lynch Building, Jacksonville, Fla., 421 steel
 Illinois Women's Athletic Club, Chicago, Ill., 250 steel
 Lima Trust Building, Lima, Ohio, 173 copper
 Washington Trust Co., Washington, Pa., 234 steel
 Georgian Hotel, Evanston, Ill., 153 steel
 Pickering Building, Kansas City, Mo., 161 steel
 Detroit Hotel, Detroit, Mich., 135 steel
 Richland Hotel, Mansfield, Ohio, 200 steel
 Anderson Building, San Bernardino, Cal., 172 steel
 Petroleum Building, Houston, Tex., 275 steel
 Parke-Davis Administration Building, Detroit, Mich., 294 steel
 South Western Bell Telephone Building, Fort Worth, Tex., 199 steel



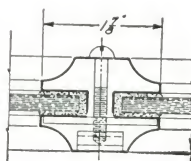
American Insurance Union Citadel, Columbus, Ohio
1710 copper windows



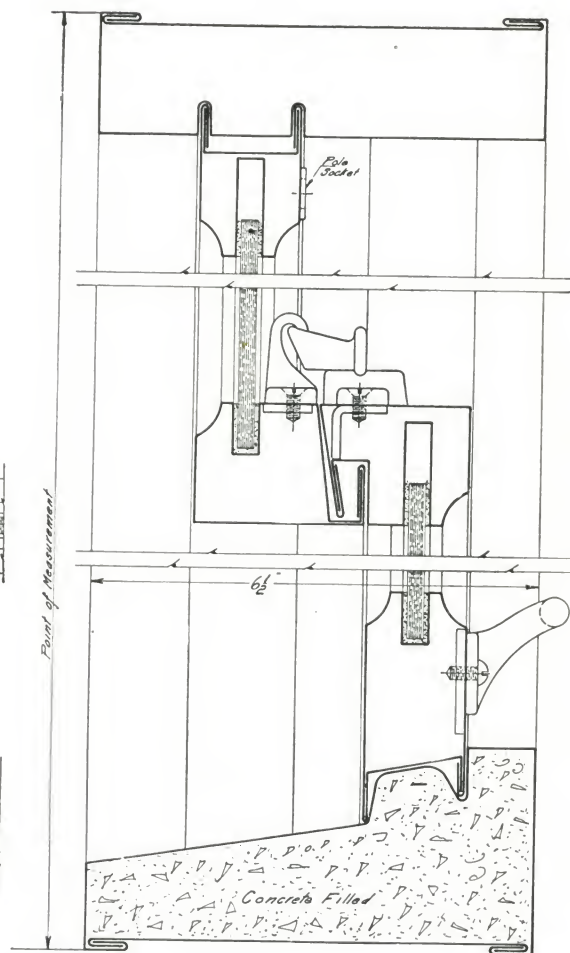
Jamb Section



Narrow Muntin Bar



Underwriters' Muntin Bar



Vertical Section

Details of the Voigtmann Model No. 24 Double Hung Window

WM. H. JACKSON COMPANY

Windows of Bronze

2 West 47th Street
NEW YORK, N. Y.

TELEPHONE, BRYANT 8430

FOUNDRY AND SHOPS, 335 Carroll Street, BROOKLYN, N. Y.

318 North Michigan Avenue
CHICAGO, ILL.

TELEPHONE, DEARBORN 8450

Products

BRONZE CASEMENT WINDOWS.

BRONZE STANDARD DOUBLE HUNG WINDOWS.

BRONZE FIRE UNDERWRITERS DOUBLE HUNG WINDOWS.

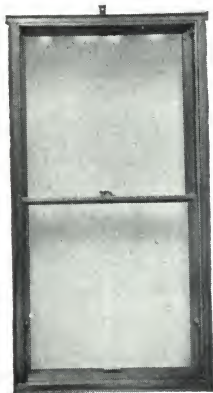
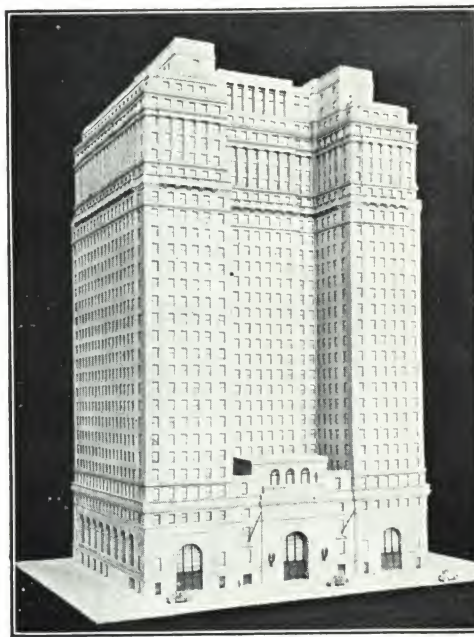
For Ornamental Bronze and Iron Work, see page A774; for Stone Mantels, see page B1369; for Tile and Swimming Pools, see page B1481.

Jackson Windows

Jackson Windows are designed to meet the most exacting demands of architects and engineers. They are made airtight and watertight without the use of weatherstrips and are easy to install.

Bronze for Permanence

Permanence is the outstanding characteristic of Jackson Windows. The enduring bronze of which these windows are made and their perfection of manufacture give them an unlimited term of service.

Type H
Bronze Double
Hung Window

Fidelity-Philadelphia Trust Company Building, Philadelphia, Pa.

SIMON & SIMON, Architects

2650 Jackson Bronze Windows for the entire building, also ornamental bronze work, will be installed in this new Philadelphia landmark

Economical

This quality of permanence, together with the fact that they require no maintenance, make Jackson Windows of solid bronze ultimately less expensive than other types.

For example, the maintenance of an ordinary iron window will, in a short number of years, amount to more than the added price of a bronze window at the time of installation. In addition, the weathertightness of Jackson Windows decreases the cost of fuel. The iron window after a period of a few years begins to deteriorate and becomes more and more expensive to maintain, while the bronze window is in as perfect condition as when first installed and calls for no expense or care.

Catalogues and Service

Catalogue No. 21, "Jackson Windows of Bronze," will be sent on request.

Full size drawings will be sent also if required.



Type E Bronze Casement Window for the Union & New Haven Trust Co., New Haven, Conn.

CROSS & CROSS, Architects

Some Recent Installations of Jackson Bronze Windows

BUILDING	LOCATION	ARCHITECT
Fidelity-Philadelphia Trust Co.	Philadelphia, Pa.	Simon & Simon
Burlington Trust Co.	Moorestown, N. J.	Simon & Simon
Central Savings Bank	New York, N. Y.	York & Sawyer
Federal Reserve Bank	New York, N. Y.	York & Sawyer
Transportation Building	New York, N. Y.	York & Sawyer
Bank of Hawaii	Honolulu, Hawaii	B. G. Goodhue Associates
Guaranty Trust Co.	New York, N. Y.	Cross & Cross
Chicago Tuberculosis Sanitarium	Chicago, Ill.	Otis & Fuller
First National Bank	Portchester, N. Y.	Mowbray & Uffinger
Legislative Building	Olympia, Wash.	Wilder & White
Drexel & Company	Philadelphia, Pa.	Day & Klauder
State Bank	Albany, N. Y.	Henry Ives Cobb
Royal Insurance Company	New York, N. Y.	Starrett & Van Vleck
Buckeye State Building & Loan Co.	Columbus, Ohio	Hopkins & Dentz
Graybar Building	New York, N. Y.	Sloane & Robertson
Equitable Trust Co.	New York, N. Y.	Trowbridge & Livingston
Union Institution for Savings	Boston, Mass.	Thomas M. James Co.
Mrs. G. R. Dodge Residence	Madison, N. J.	Geekie-Naughton, Inc.
Senator James Couzen Residence	Bloomfield Hills, Mich.	Albert Kahn
Mrs. Florence Twombly Residence	New York, N. Y.	Warren & Wetmore

THE ADAMS COMPANY

Manufacturers of Steel Windows and Steel Garage Doors

109 West 6th Street
DUBUQUE, IOWA

Products

ADAMS STEEL WINDOWS:

Dwelling Type
Basement and Laundry Type
Industrial Type
Architectural Type

ADAMS STEEL GARAGE DOORS.

Also manufacturers of Adams Fireplace Screens, Fireplace Grates, Andirons, Fire Sets, Metal Fireside Baskets, and complete line of Fireplace Furniture; Floor Drains, Bell Trap Cesspools, Underground Garbage Receivers, Wheel Guards, Chimney Caps, Revolving Chimney Tops, Cistern Covers, Cast Flue Thimbles, Coalhole Covers, and Ventilation Grates.

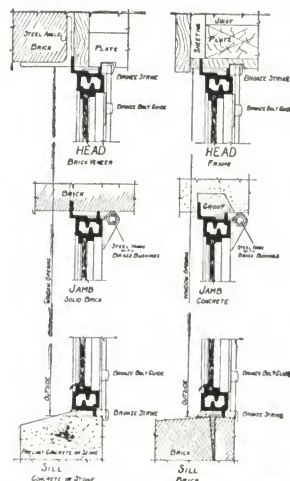
For Adams Fireplace Dome Dampers, Ash Pit Doors, Ash Dumps and Coal Chutes, see page A622; for Adams Metal Frame Window Screens, see page B1195.

Adams Steel Windows

Industrial Type—This style of window made with ventilator vertically pivoted, horizontally pivoted, top pivoted, bottom pivoted and projector type.

Dwelling Type—The illustration below is one of the attractive designs which we suggest for homes.

Window fitted with bronze adjusters and cremone bolts.



Installation Detail of Case-moment Type Windows



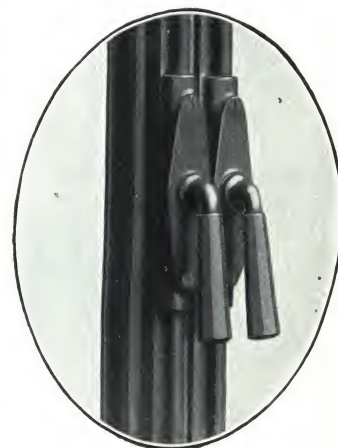
Adams Steel Window for Dwelling

Glazing—Windows are glazed with wire clips or steel glazing beads using special steel putty.

Construction—The sash and frame are made from heavy rolled, special formed solid steel. All joints are electrically welded to insure perfect rigidity. Extra strong steel hinges with brass bushings are riveted to frame and sash. Hinges have heavy steel hinge pins which are easily removed. This feature makes the glazing of the sash very simple.

Screen or wire guard may be easily attached.

Anchor angles are furnished bolted to each frame if wanted.



Detail of Cremone Bolts

STOCK SIZES, BASEMENT AND LAUNDRY WINDOWS, CASEMENT TYPE

	No. of lights	Size of lights, in.	Outside measurements		Wt., lb.
			Width	Height	
Basement One light high	4	8 x 12	36 1/2	15 1/2	35
	4	8 x 16	36 1/2	19 1/2	38
	4	8 x 20	36 1/2	23 1/2	42
	2	14 x 20	31 1/2	23 1/2	40
Laundry, two and three lights high	8	8 x 20	36 1/2	44	55
	12	8 x 20	36 1/2	64	65

Adams Steel Garage Doors

Stock size 8' 0" x 8' 0". Special sizes to order.

The stiles and rails of these doors are made from heavy rolled, solid steel, Special U-shaped channel, with all joints electrically welded insuring extra rigidity.

The bottom panel is wood filled and provided with steel kick plates.

The upper panels being glazed, are divided by solid steel T bars, which are drilled for wire glazing clips. To make doors fireproof, 1/4-in. wire glass should be used.

Brass hinges with steel pins are provided as standard.

Carriage track is supplied if desired.

Catalogues

Catalogues, construction and installation details mailed upon request.

Special Work

Special steel windows, garage doors and screens made to order. Superior quality in material, workmanship and service.

Specifications

Complete specifications and typical details, also designs for any special construction furnished upon request.

CRITTALL CASEMENT WINDOW COMPANY

10989 Hearn Avenue
DETROIT, MICH.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue
CLEVELAND, OHIO, Builders' Exchange

ATLANTA, GA., 1520 Healey Building
CINCINNATI, OHIO, 708 Gerke Building

LOS ANGELES, CAL., 616 So. Anderson Street
CHICAGO, ILL., 105 West Monroe Street

Products

CRITTALL SOLID STEEL AND BRONZE UNIVERSAL CASEMENT WINDOWS.

CRITTALL STANDARDIZED CASEMENTS.

CRITTALL REVERSIBLE WINDOWS.



TRADE-MARK

Catalogs

Architects are welcome to the following catalogs:

No. 6-26 Universal Casements (76 pages)

No. 1-26 Standardized Casements (32 pages)

No. 1-24 Reversible Windows (20 pages)

CRITTALL SOLID STEEL AND BRONZE CASEMENTS

Uses—For banks, public buildings, residences, churches, universities, office buildings, clubs, hospital operating rooms, etc.

Material—The weight of sections, heavy or medium, shall be determined by manufacturer's best standards as set forth on page 46 of Catalog 6-26. All steel used in the manufacture of these sash shall be Crittallloy—the copper bearing steel—containing not less than 0.15% nor more than 0.30% copper in order to resist rust. All bars shall be hydraulically straightened and free from hammer marks or other imperfections.

Painting—All steel shall receive two coats of rust resisting paint, each coat baked on separately.

Weathering—The sections shall be so designed as to give double contact on all sides without the use of pressed or screwed on fillets or strips of any kind.

Welding—All corners shall be mitered and electrically welded. Plates to receive hardware must be securely welded to the casement sections.

Hardware—All hardware shall be solid bronze, government mixture, toned a dark coinage color, this color secured without the use of plating or chemicals.

(Transoms in [describe location] shall be fitted with mechanical operators to operate from floor.)

Note: Specially designed hardware in bronze or hand wrought iron may be specified when desired.

Glazing—All sash shall be fitted with *solid* rolled steel glazing stops for glazing from the inside. Glazing stops shall be mitered at the corners and shall be held in place by countersunk brass screws. (Alternate: All sash shall be fitted with copper covered spring clips for putty glazing from the outside.)

Design—Sash shall be made to the design and sizes shown on the elevations and details. Ventilating units are marked on elevations with dotted diagonal lines; all other units to be fixed or stationary.

Erection—These windows shall be set by the manufacturer and all joints between the steel sash and the collateral construction are to be made tight with the use of Crittall Mastic Cement neatly pointed on the exterior.

(Describe here whether the windows set in $\frac{3}{8}$ -in. rabbeted stone, wood or cast iron frames, or are fitted with angle fin for setting directly into masonry, or are to set into rabbeted No. 12 gauge pressed metal frames to be furnished by the casement manufacturer but to be built in as the walls go up.)

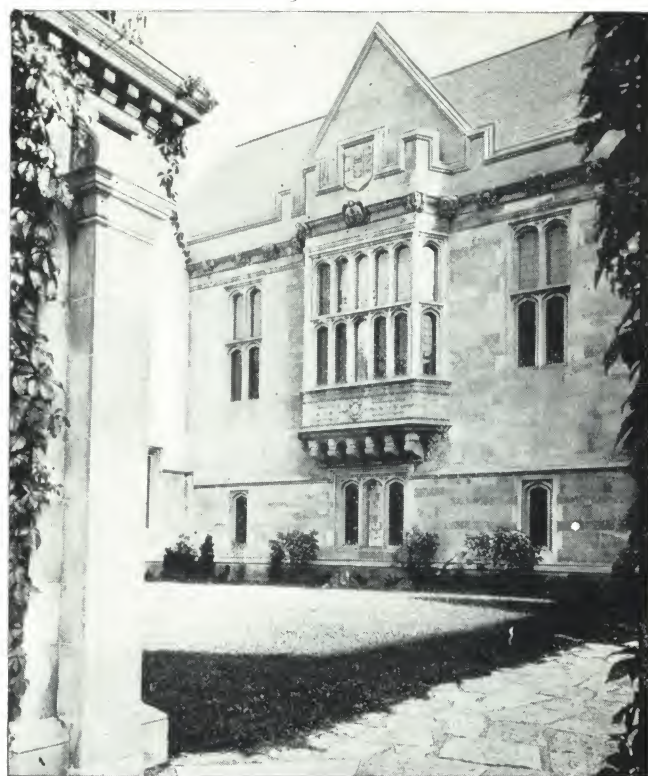
CENTRAL NATIONAL BANK
OF PASADENA, PASA-
DENA, CAL.
BENNET & HASKELL,
Architects



In appreciation of the merit of this building, the Southern California Chapter of the American Institute of Architects awarded a Certificate of Honor to Bennet & Haskell



WETHERBY-KAYSER SHOE CO., LOS ANGELES, CAL.
CHARLES F. PLUMMER, Architect



SOCIAL CENTER BUILDING, UNIVERSITY OF ILLINOIS, URBANA, ILL.
HOLABIRD & ROCHE, Architects

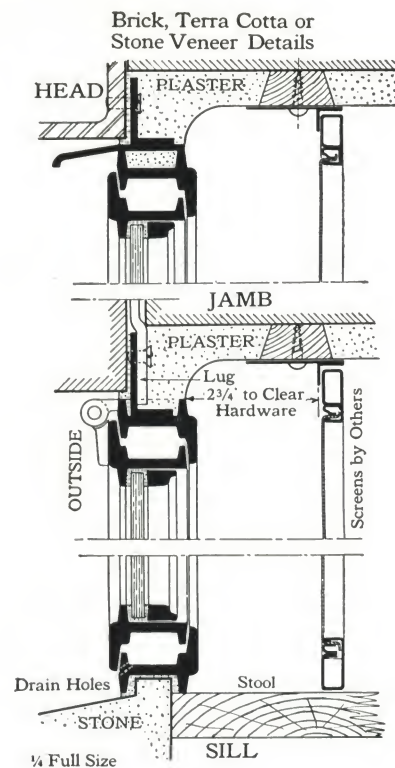
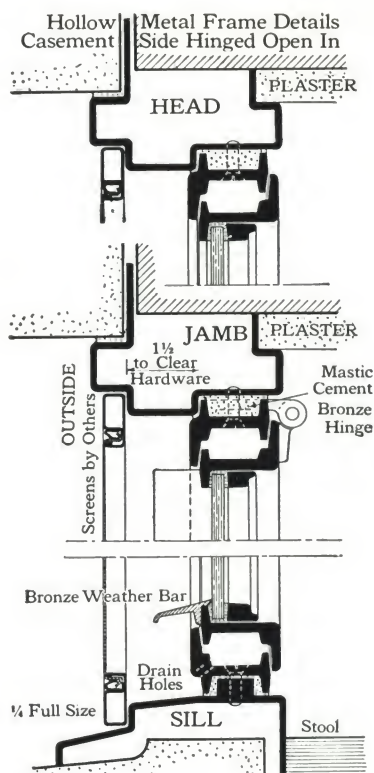
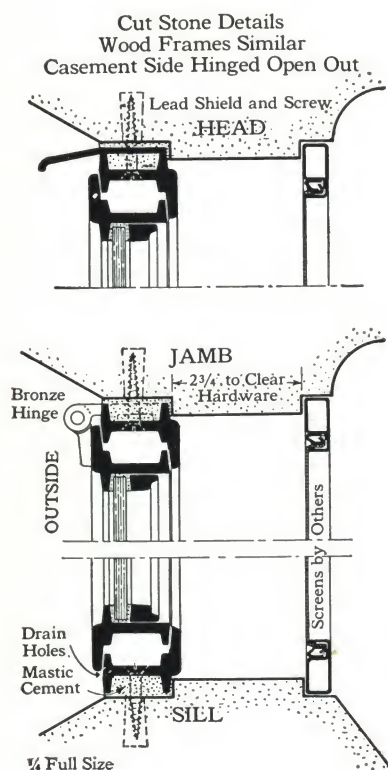
A FEW TYPICAL INSTALLATIONS
OF
CRITTALL STEEL CASEMENTS



ST. JOHN CANTIUS CHURCH, CLEVELAND, OHIO
POTTER & GABELE CO., Architects



STOUDER THOMPSON RESIDENCE, CLEVELAND HEIGHTS, OHIO
PHILLIP LINDSAY SMALL, Architect



Details—The details shown above can be varied to suit any given conditions. Wood frames, mullions and transom bars may be used in a detail very similar to the cut stone shown.

In place of the No. 12 gauge hollow metal frames shown in the second detail, ornamental cast iron frames may be used where expense is not a primary consideration.

The third detail is economical and suitable wherever a narrow sight line is sought.

Special Hardware—While standard hardware is of solid bronze, of Government mixture, toned a dark statuary color, in pleasing and substantial designs, specially designed hardware may always be obtained when desired.

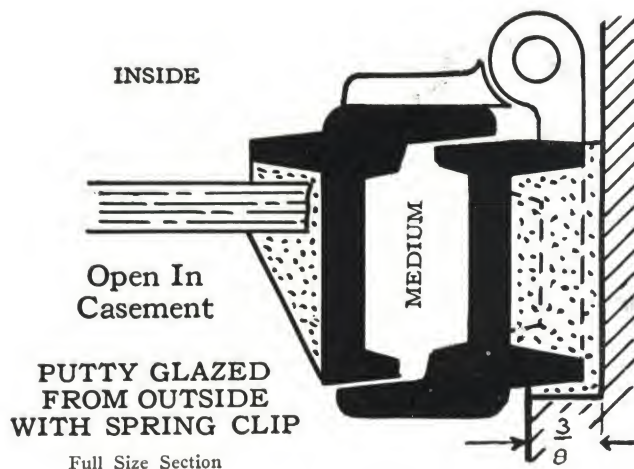
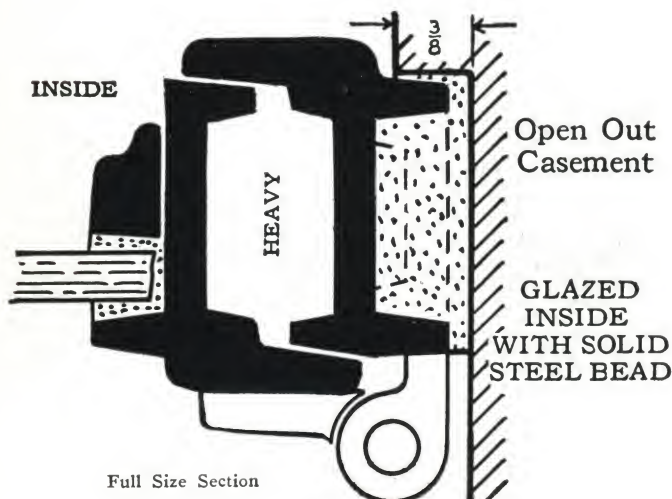
Such special hardware may be of bronze, of hand wrought iron, or of bronze nickel, silver or gold plated, to our own or to the architects' designs.

Operating Devices—Mechanical operating devices are available to meet all requirements.

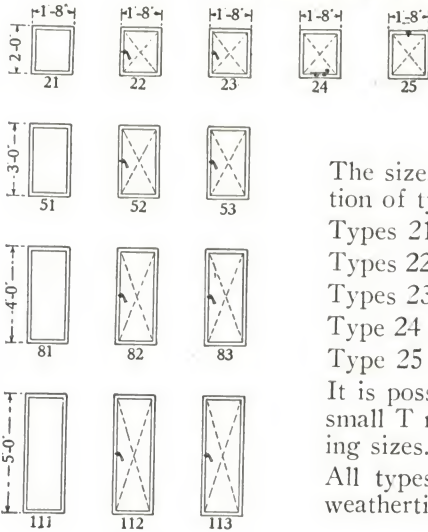
These can range from a simple but effective cam stay for the pole operation of a hinged-at-top-to-open-out casement to a power driven operator for groups of sash.

Shades, Screens and Draperies—In laying out the windows it is always advisable to make provision for shades (if used), drapes and screens and it is recommended that the casement manufacturer be consulted in reference to these three items while the job is still in a preliminary stage.

Co-operative Service—The CRITTALL CASEMENT WINDOW COMPANY has six branch offices in principal cities and has over fifty representatives. There is usually a branch office or representative near an architect, eager to be of service in the way of details, drawings and suggestions.



CRITTALL STANDARDIZED CASEMENTS



Sizes and Types

The sizes shown at the left are standard and the operation of types is as follows:

Types 21, 51, 81, 111 are stationary.

Types 22, 52, 82, 112 are hinged at side to open out.

Types 23, 53, 83, 113 are hinged at side to open in.

Type 24 is hinged at top to open out at bottom.

Type 25 is hinged at bottom to open in at top.

It is possible to join two or more types by means of a small T mullion or transom bar, to secure various opening sizes.

All types, whether opening in or out, are *guaranteed* weathertight.



Type 82

Uses

These casements are designed for projects where the architect desires to use the best. Economy is affected by standardization but quality is maintained. Residences, churches, clubs, libraries and similar buildings may use these windows to advantage.

Hardware

All handles are of solid bronze of Government Standard. They are well designed and finished and are toned a dark statuary bronze color. Stays are bronze finished, adjustable friction type, and are fitted at the head of each casement.



Quality

Standardized casements are of the same quality as Crittall custom built casements with minor adaptations for standardization. They are made of the medium section illustrated in full size on the preceding page. They may be glazed with either large lights of plate glass or with leaded glass in small panes.



CRITTALL REVERSIBLE WINDOWS

Uses—For office buildings, public buildings, schools, hospitals, etc.

Material—All steel used in the manufacture of these sash shall be copper bearing steel and shall be free from hammer marks.

Weathering—The solid sections must give double contact on all sides without screwed on strips.

Welding—All corners shall be electrically welded.

Hardware—Shall be solid bronze of Government mixture, finished a dark coinage color. It shall include a lever handle at the main sill, a pole catch at the meeting rail, and shade brackets and shade cord stop pulleys on each leaf.



Glazing—All sash shall be fitted with steel angle glazing stops for glazing from the inside.

Design and Construction—The sash shall be so designed and constructed that the ventilators will reverse for cleaning from the inside. Each leaf shall operate independently.

Painting—All steel shall receive two coats of rust resisting paint, each coat baked on separately.

Labeled Windows—All sash on (give location) shall bear the label of the National Board of Fire Underwriters. Sash shall be divided by muntins so that no pane of glass exceeds 720 sq. in. in area and no one dimension (either width or height) shall exceed 54 in.

GENFIRE STEEL COMPANY

(THE GENERAL FIREPROOFING BUILDING PRODUCTS)

Manufacturers of Steel Windows and Doors

YOUNGSTOWN, OHIO

For Branch Offices, see page B1294

Products

STEEL CASEMENT WINDOWS; STEEL BASEMENT WINDOWS; STEEL CASEMENT DOORS; STEEL PIVOTED WINDOWS; COMMERCIAL and ARCHITECTURAL TYPES PROJECTED WINDOWS; CONTINUOUS WINDOWS; INDUSTRIAL DOORS and FRAMES.

Also Mechanical Window Operators.

For Waterproofings, Dampproofings and Technical Paints, see pages A62-63; for Metal Lath, Channels, Corner Bead, Self-Sentering, Trussit, Expanded Metal,

Steel Joists, Steel Tile and Metal Building Specialties, see pages B1294-1297.

Genfire Windows

All types of Genfire Windows are made from hot-rolled sections of highest grade steel and are given one dip coat of English oxide of iron and oil paint in factory. Double weathering contact in all types assures weather-tightness. Malleable iron hardware is standard equipment but bronze is furnished at slight additional cost.

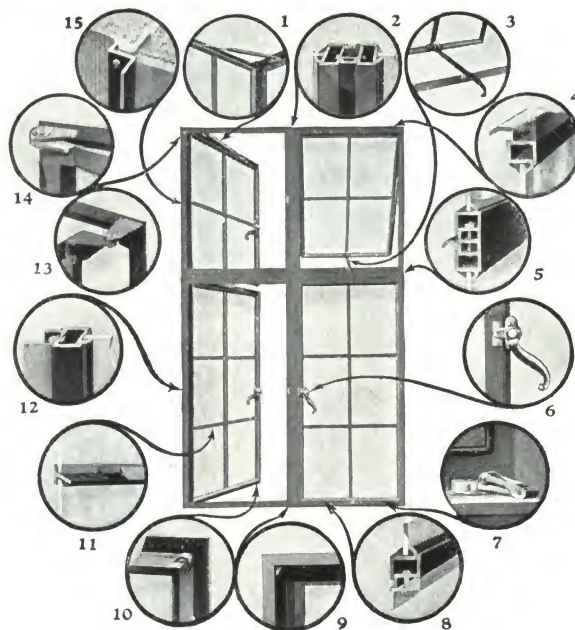
Genfire New Type Standard Steel Casement Windows and Doors

Genfire Standard Steel Casements—A quality product in every sense of the word with double weathering contacts, welded and smooth-ground joints, continuous muntins, bronze bushings in hinges and many other refinements. Having the fewest parts to assemble, Genfire casements are economical in first cost, installation and maintenance.

Genfire Casement Doors—These doors harmonize perfectly with the casement windows for the various fittings may be used in combinations. A cremone bolt on one leaf and top and bottom bolt on the other assures weather-tightness when closed and allows the use of one door for general passage. Each leaf has three heavy hinges welded to frame.

Construction Details

- (1) *Adjustable friction stay* holds the casement open in any desired position, is entirely concealed inside the weathering at the top of casement when closed. Shipped unattached.
- (2) *Vertical mullion*. This simple mullion provides a neat paneled appearance inside.
- (3) *Steel push bar* can be furnished with BT-114 unit (without friction stay and cam handles).
- (4) *Continuous head drip* showing shape and proper position when attached. Its practical sturdy construction insures proper weathering and joins the units solidly together when assembled in combinations.
- (5) *Transom bar* used when two or more units are combined one above the other, forming a drip over lower sash and providing rigidity in combination of units.
- (6) *Cam handles* are shipped separately. Furnished in malleable iron for both right and left hand. Solid bronze handles of same design if desired at slight extra cost.
- (7) *Flexo-stay adjuster*, for use under screen, operates with the casement from the inside without opening screen. Will hold sash open in any desired position. Standard friction stay at top is omitted when flexo-stays are used. Furnished in bronze or black finish.
- (8) *Continuous sub-sill section* provides extra weather protection at the sill and unites combinations in solid mass.
- (9) *Corners of frame* are mitted and electrically welded with welds inside concealed from view.
- (10) *Corners of sash* welded same as frame.
- (11) *Spring wire glazing clips* hold glass any thickness firmly in place. Provision made for bed and face putty. Outside glazing gives neat interior finish.
- (12) *Jamb angle* provides secure anchorage into masonry wall construction and makes wooden frame unnecessary.
- (13) *Cleaning hinges* are supplied if desired. Bronze bushed heavy steel pins.
- (14) *Standard heavy hinges* are spot-welded to frame and sash. Bronze bushed heavy steel pins.
- (15) *Anchored* in any type of wall construction.



WIDTHS OF WINDOW OPENINGS FOR GENFIRE CASEMENTS

Number of units	Lights wide in each unit	Total number of lights wide	Width of window opening
1	1	1	*1'- 1 1/8"
1	2	2	1'- 7 3/8"
2	2	4	3'- 2 3/4"
3	2	6	4'-10 1/4"
4	2	8	6'- 5 1/4"
5	2	10	8'- 0 7/8"
6	2	12	9'- 8 3/4"
7	2	14	11'- 3 3/8"
8	2	16	12'-11"

*One light wide units only furnished in 3 and 4 light heights without Friction Stay.

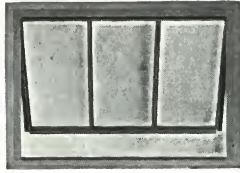
HEIGHTS OF WINDOW OPENINGS FOR GENFIRE CASEMENTS

Number of units	Single unit or combination of two units	Total number of lights each	Height of window opening
1	Single Unit	1	0'-11 3/8"
1	Single Unit	2	2'- 1 3/8"
1	Single Unit	3	3'- 0 5/8"
1	Single Unit	4	3'-11 1/4"
2	3 lights and 1 light	4	3'-11 1/4"
1	Single Unit	5	4'-11 1/4"
2	4 lights and 1 light	5	4'-11 1/4"
2	3 lights and 2 lights	5	5'- 2 1/8"
2	5 lights and 1 light	6	5'-10 1/8"
2	4 lights and 2 lights	6	6'- 1 3/8"
2	5 lights and 2 lights	7	7'- 0 1/8"

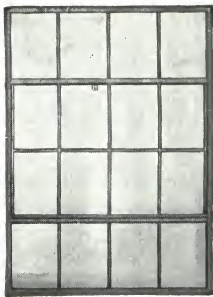
Genfire Steel Basement Windows

These windows are made in four standard sizes as shown below. They are furnished complete for installation and there are no hinges or locks to buy, no fitting of sash to frame or priming coat of paint necessary.

May be installed in concrete, masonry, wood or any other type of construction.

**BASEMENT WINDOW SIZES**

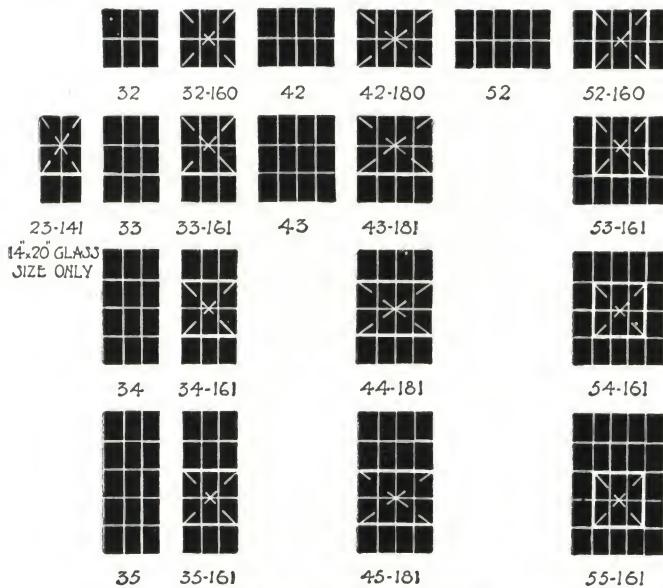
Glass size, in.	Lights wide	Window opening ft.-in.
10x12	3	2-9 $\frac{5}{8}$ x1-3 $\frac{1}{8}$
10x20	3	2-9 $\frac{5}{8}$ x1-11 $\frac{1}{8}$
14x20	2	2-7 $\frac{3}{8}$ x1-11 $\frac{1}{8}$
12x18	3	3-3 $\frac{3}{8}$ x1-9 $\frac{1}{8}$

Genfire Pivoted Windows

The various sizes of pivoted windows fill practically all building needs.

Glass size in stationary portion 12x18 or 14x20 in.; all lights at top and bottom of ventilator are 1 in. shorter and lights at side of ventilator are 1 in. narrower than in stationary portion.

The twenty-five types of sash shown below are available from all our warehouses and can be combined with standard mullions to fit all sizes of window openings.

**Types of Pivoted Windows**

Ventilators indicated by cross-dashed lines are horizontally pivoted 2 in. above center.

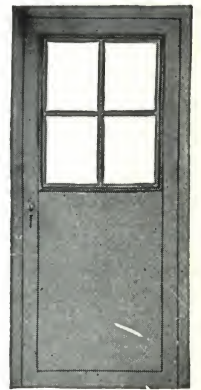
How to Read Unit Type Number

First figure denotes number of glass panels wide
Second figure denotes number of glass panels high
Third figure denotes number of ventilator
Fourth figure denotes number of glass panels in ventilators
Fifth figure denotes distance (in lights) of ventilator from bottom of sash

Genfire Projected Windows

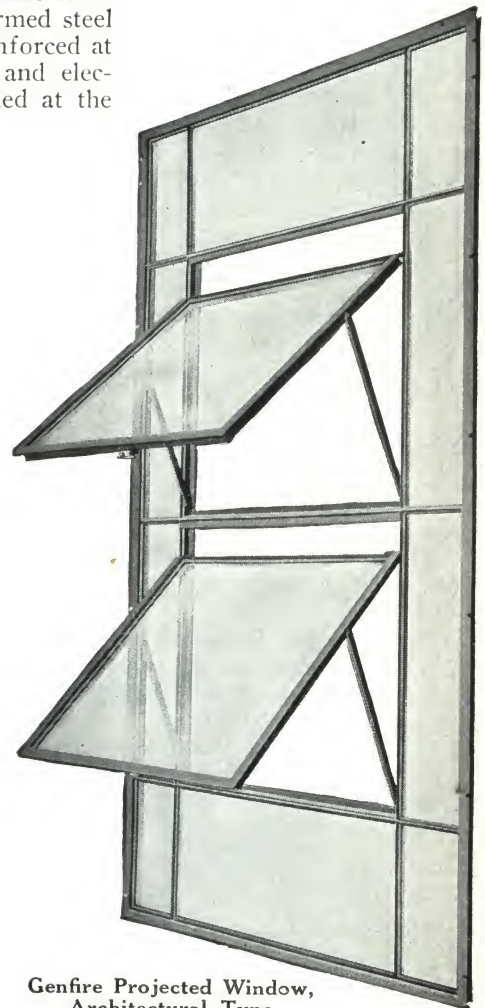
Commercial Type—Wherever the practical advantages of projected windows are sought, the commercial type is specified.

These windows harmonize perfectly with the pivoted windows so that they may be used for the office section of an industrial plant with complete conformity with the external design.

Genfire Utility Doors and Frames

These doors are available with sash or solid panels, in four standard stock sizes which can be used singly or in combination for door openings of different dimensions. The hardware equipment supplied with each unit converts the standardized door panels into either the swing or sliding type, as required.

Genfire Utility Doors are made from carefully formed steel sections, reinforced at the corners and electrically welded at the joints.

**Genfire Projected Window, Architectural Type**

Architectural Type—This type of window emphasizes proportion as well as the practical.

In keeping with the greater suggestion of massiveness, its outside frame is a heavy channel. All corners of the frame and ventilator are welded and ground.

Complete details contained in handbook, "Architectural Details."

INTERNATIONAL CASEMENT CO., INC.

Solid Rolled Steel and Bronze Casement Windows and Austral Windows
JAMESTOWN, N. Y.

SALES OFFICES

NEW YORK, N. Y., 101 Park Avenue
ST. LOUIS, MO., Chemical Building
ATLANTA, GA., Bona Allen Building

CHICAGO, ILL., 844 Rush Street
CLEVELAND, OHIO, Insurance Center Building
LOS ANGELES, CAL., Transportation Building
SAN FRANCISCO, CAL., Hearst Building

BOSTON, MASS., 201 Devonshire Street
MINNEAPOLIS, MINN., Phelps Building
DAYTON, OHIO, Mutual Home Building

Products

INTERNATIONAL CASEMENTS and WINDOWS in solid rolled steel and drawn bronze; COTSWOLD CASEMENTS and DOORS; AUSTRAL SOLID STEEL WINDOWS.

Also Casement Hardware and Leaded Glass.

Specifications for International Steel Casement Windows Set to Rabbeted Wood Frames or Cut Stone

Solid rolled steel casement windows as manufactured by INTERNATIONAL CASEMENT CO., INC., or equal in the opinion of the architect. Steel sections of suitable design and weight, metal to metal contact, no loose strips. Bars hydraulically straightened, corners accurately machined, electrically welded and cleaned free from flux.

Casement manufacturer shall furnish and apply at the factory all hardware and operating devices, which shall be of solid bronze. Side hinged casements swinging out 5-ft. high and over shall have double grip bolt in addition to fastener, and side hinged casements swinging in 4 ft. 6 in. high and over shall be similarly equipped. Transoms out of reach from floor shall have operators that can be worked from the floor.

Sash shall be fitted with moulded steel glazing beads (glass stops) set with brass screws. Corners mitered and neatly fitted. All steel work cleaned free from rust and scale, painted two coats rust resisting paint, each coat separately baked on.

The casement window contractor shall set the casement sash. Frames to be bedded and pointed (inside and out) with approved mastic cement, finished in a workmanlike manner and guaranteed absolutely weathertight. If set to stone rabbets, lead expansion shields to be used.

Not included: glass, glazing, painting after erection, screens or preparation for same.

Specifications for International Composite Windows Set to Masonry Reveals

Sub-frames of pressed steel No. 12 gauge [No. 11 gauge, ingot iron] of size and contour as shown by scale details. If both dimensions exceed 7 ft. they shall be assembled at the factory, taken down and shipped knocked down. If under this size, corners shall be electrically welded and cleaned free from flux.

Steel work painted two heavy priming coats of rust resisting paint, each coat separately baked on.

The sub-frames are to be delivered to the building site by the casement manufacturer but must be set and built in by the mason. The masonry contractor will be required to set frames plumb and level, in close contact with masonry reveal at sides and head, and resting solidly on sill. After setting, wood spreaders or braces shall be placed in the frames to keep them true and square.

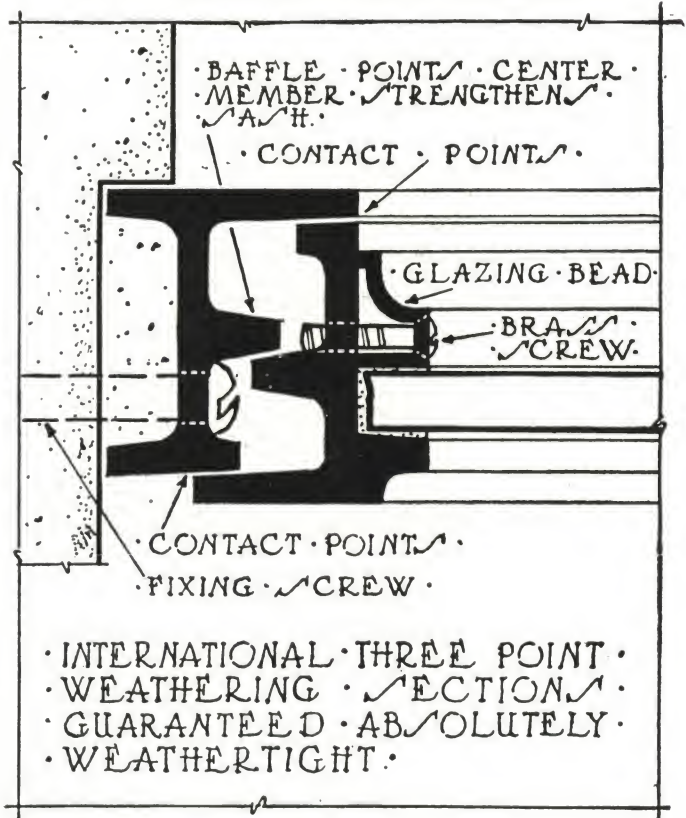
Calking—The calking between masonry and sub-frame to be covered under separate heading.

Casement Sash—Shall be of suitable design and weight, etc. (Copy specification.)

Literature and Drawings

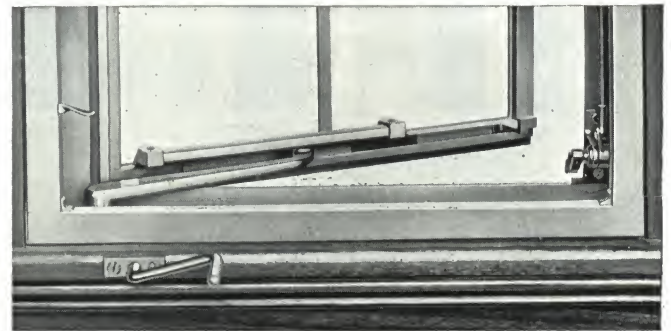
The following catalogues contain scale and full size details, photographs and measured drawings:

- No. 6. International Austral Windows.
- No. 7. International Casements (224 pages).
- No. 10. International Cotswold Casements.



Ellison Window Operator

The Ellison window operator for out-swinging casement windows, either wood or steel, is designed to operate through the stool of the window without opening the screen.



It is pleasing in appearance, simple and rugged in construction and foolproof in operation.

Built with ample strength to open and close the largest casement, self-locks in any position, and absolutely prevents rattling.

INTERNATIONAL COTSWOLD CASEMENTS AND DOORS

In Standard Types and Sizes

Cotswold Casement Specification

(1) Casements of Cotswold type, made from heavy two-point steel section (not Cottage Sections) hinged at side opening outwards painted two coats of rust resisting paint, each coat separately baked on, hung on drop forged steel pivots bronze bushed and fitted with solid bronze hardware of standard design.

(2) Furnish leaded glass of standard sizes and design, first quality D.S.A. glass $\frac{1}{2}$ -in. lead comes, all horizontal comes steel reinforced.

(3) If steel muntins are required omit paragraph 2 and specify steel muntins to be furnished.

(4) The whole to be set by sash contractor and guaranteed weathertight.

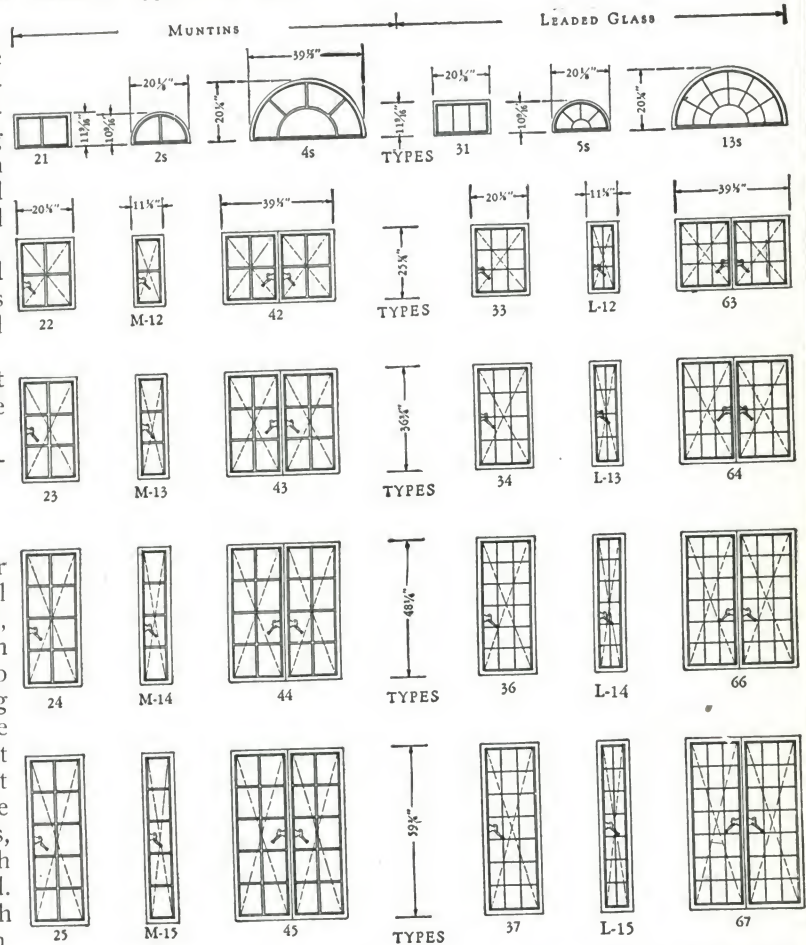
Cotswold Door Specification

(1) Doors of Cotswold type (either "L" or "M") made of heavy two-point steel sections, hinged at side opening outwards, painted two coats of rust resisting paint, each coat baked on separately, hung on drop forged steel pivots bronze bushed, having bronze intermediate hinges and fitted on the first opening leaf with bronze cremone bolt which can be operated from inside or out and secured on inside by a safety catch. The other leaf being fitted with two bronze bolts, friction adjusters being supplied on each leaf. Galvanized kick panels to be provided.

(2) (For "L" type only). Furnish leaded glass of standard sizes and design, first quality D.S.A. glass $\frac{1}{2}$ -in. lead comes, all horizontal comes steel reinforced.

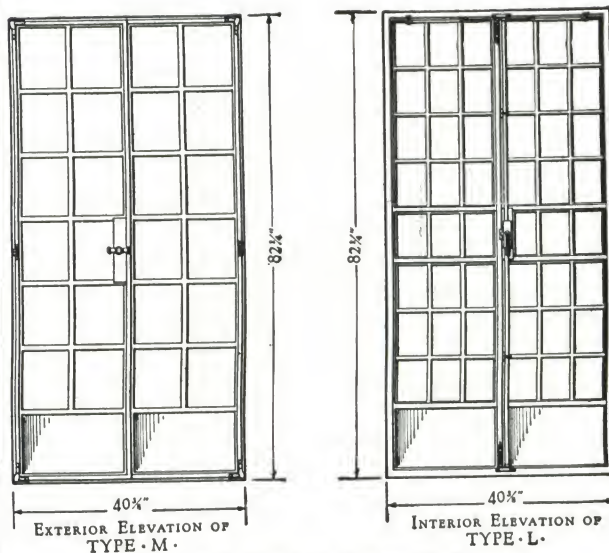
(3) (For "M" type only). Doors to be divided into panes with rolled steel tee muntins.

(4) The whole to be set by sash contractor and guaranteed weathertight.

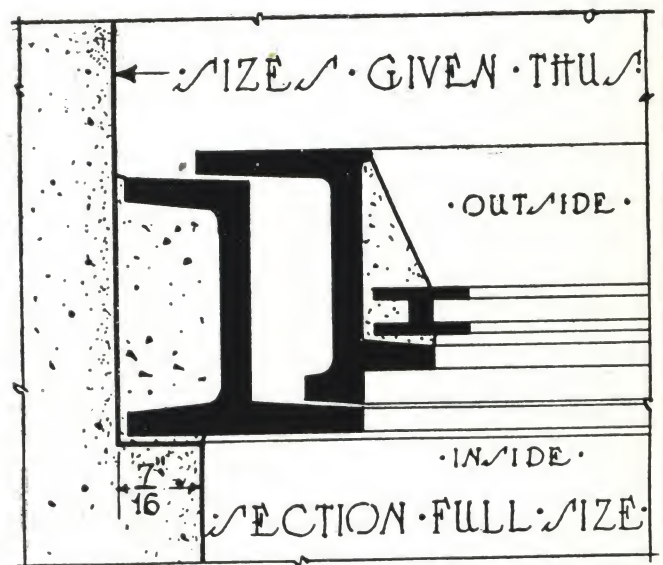


ALL THE TYPES SHOWN ABOVE (EXCEPT 21-25-45-31-55 AND 135 WHICH ARE FIXED SASH) ARE HINGED TO OPEN TO THE RIGHT OR LEFT OR THEY CAN BE SUPPLIED AS FIXED SASH. COMBINATIONS OF VARIOUS TYPES CAN BE MADE BY THE USE OF STEEL MULLION AND TRANSOM BARS.

Types and Sizes of Cotswold Casements



Types and Sizes of Cotswold Doors



The above full size detail applies to Cotswold doors and casements. The corresponding fixed light section consists of a channel section of similar outline and gives the same sight line. Glazing angles are provided on doors type "L" only and are optional on the casements of leaded light type. All other types have putty glazing.

· INTERNATIONAL · AUSTRAL · WINDOWS ·
· IN · STEEL · AND · BRONZE · FOR · OFFICE ·
· BUILDINGS · & · SCHOOLS ·



Girls' Senior High School, Atlanta, Ga.
EDWARDS & SAYWARD, Architects

International Austral Windows

Specifications—

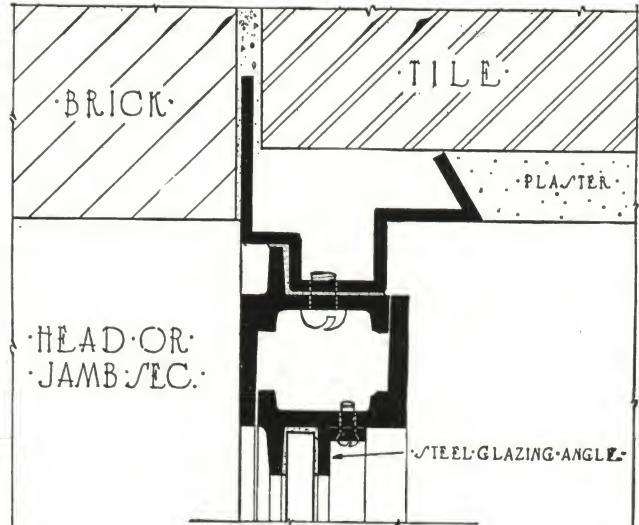
Windows where marked on plans to be copper-bearing steel with Austral balance arms as manufactured by the INTERNATIONAL CASEMENT CO., INC., Jamestown, N. Y. Sub-frames of No. 12 gauge steel, with welded corners, painted two priming coats, each coat separately baked on, to be delivered to building site, but same to be set up, built in and calked by mason contractor.

Sash to be of special shapes, made of copper bearing steel. All bars hydraulically straightened, corners electrically welded and cleaned from flux.

Frames and sash carefully fitted to insure absolute weathertightness. Fit with steel glazing beads (glass stops) set with brass screws. Clean all steel work free from rust and scale and paint two heavy priming coats, each coat separately baked on.

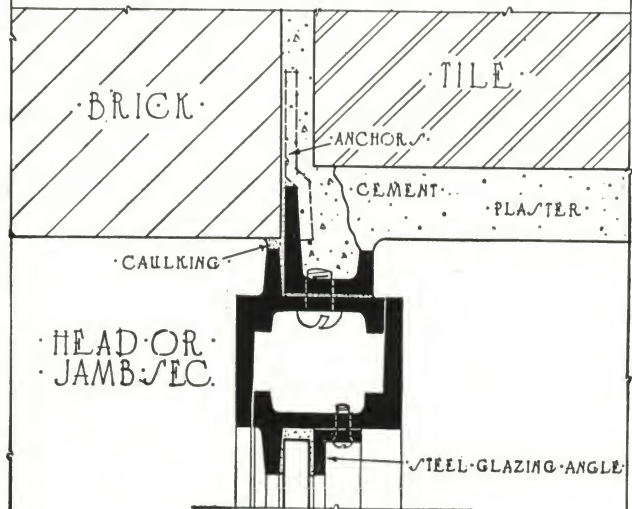
This contractor shall furnish all necessary hardware and fittings as follows: galvanized drop-forged steel window cleaner's bolts, shade brackets for both upper and lower sash with roller guides to hold cords. Polished cast bronze automatic cam catch and pull.

The sash shall be erected by this contractor after the plastering is completed. Same to be bedded and pointed in mastic cement and secured to subframe by machine screws. All to be finished in a workmanlike manner and guaranteed weathertight.



· NO. 12 · GA. · PRESSED · STEEL ·
· FRAME · BUILT · INTO · MASONRY ·
· OPENINGS · FOR · INTERNATIONAL ·
· AUSTRAL · ROLLED · STEEL · SASH ·

· ONE · HALF · FULL · SIZE ·
· DETAILS ·



· NO. 86 · ROLLED · STEEL ·
· CHANNEL · SECTION · SET ·
· WITH · INTERNATIONAL ·
· AUSTRAL · ROLLED · STEEL ·
· SASH ·

Fenestra

The Blue Book *of* Steel Windows

Local Representative

JOHN WILLIAMS COMPANY

811 First National Bank Bldg.

TAMPA, FLA.

Phone 3214

Detroit Steel Products Company

2250 East Grand Boulevard

Detroit, Michigan

1928

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DETROIT STEEL PRODUCTS COMPANY

Manufacturers of Fenestra Steel Windows

2250 East Grand Boulevard, DETROIT, MICH.

Fenestra

(1) Experience and Facilities

Fenestra, the Latin word for "window," is also the registered trademark of the first steel window made in America. Since 1907, the DETROIT STEEL PRODUCTS COMPANY has manufactured these windows under exclusive patents covering the Fenestra joint, a process of interlocking steel bars in such a manner that strength increases at the point of intersection. The company has always enjoyed an exceptional reputation for financial soundness and is recognized as one of Michigan's strongest industrial concerns. Its product has been used on many of the largest structures in the United States. Besides the main plant covering 14½ acres in Detroit, branch plants are maintained at Oakland, California, and Toronto, Canada. The product is sold through 14 branch offices, direct agents in all the principal cities, dealers in towns of every size, and a world-wide export organization. Canadian sales are handled through the Canadian Metal Window and Steel Products Company, Ltd., of Toronto.

(3) Designing Service

To assist in the proper designing of steel windows for architectural structures, we maintain an Architectural Service Department composed of architects with special training in the correct use of Fenestra in all types of monumental buildings. A word to your local Fenestra representative will place this department at your disposal without charge or obligation, with either direct personal service in your own drafting room or through intelligent co-operation from headquarters in Detroit.

(4) Research Service

The daylighting and ventilating results, which may reasonably be expected from any given arrangement of windows, can now be predetermined with considerable accuracy through methods developed over a period of years by our Department of Engineering Research in conjunction with the Engineering Research Department of the University of Michigan. On major operations where the type and character of fenestration play an important part in the design of the building, we shall be glad to consider the special problems involved and give you the benefit of our research along these lines. No cost or obligation is involved as this service is rendered in the interest of better use of natural forces in the daylighting and ventilating of industrial structures.

(2) Scope of This Catalogue

While the DETROIT STEEL PRODUCTS COMPANY is fully equipped to manufacture solid steel windows, doors, partitions and operators of every type and character, it is manifestly impossible to show in any catalogue the hundreds of special designs which this company can supply.

This catalogue, therefore, covers only such designs as have been accepted throughout the steel window industry and approved by the Department of the Interior as the stock and standard products normally used in building.

On individual operations where windows of special design are absolutely required, layouts and detail drawings are supplied without added cost.

To secure the most practical and economical window designs, we strongly recommend consultation with our branch offices and agents *at the time the building is designed.*

(5) Erection Service

The FENESTRA CONSTRUCTION COMPANY, a subsidiary of the DETROIT STEEL PRODUCTS COMPANY, offers builders the service of an organization especially equipped and trained for the erection and field painting of Fenestra windows. *Under separate contract*, this company will assume complete responsibility for the delivery, handling, erection and painting of Fenestra products and will guarantee satisfaction from the time the material leaves the factory until it is installed in the building. Twelve erection supervisors and twenty-seven experienced field superintendents are constantly employed in this work all over the United States.

General Information—Read Carefully

(6) Nomenclature

Numbers designating various types of Fenestra Windows are translated as follows: first digit—number of lights in width; second digit—number of lights in height; third digit—number of ventilators or swing leaves; fourth digit—number of lights in each ventilator or leaf; fifth digit—number of lights between ventilator or swing leaf and the sill of the window. Thus a casement type 4528 indicates a unit 4 lights wide, five lights high with two 8-light swing leaves at the sill. A Horizontally Pivoted type 35161 indicates a unit 3 lights wide, 5 lights high with one 6-light ventilator 1 light above the sill.

(7) Dimensions

In all Fenestra except casements and basements, the window dimension is always equal to the clear opening. In other words, that part of the window frame which is embedded in the wall is not considered in the window dimensions. On casement windows the window

opening dimension is ¼ in. larger than the window dimensions, for clearance. On basement windows dimensions are overall. See details.

(8) Stock Types

Stock types of Fenestra Windows—those types which are made up and carried in warehouses—are indicated in this book by solid outline drawings, *shaded*. Standard types—those types which are not made up but for which bars are already cut and in stock at Detroit—are shown in solid outline, *not shaded*. Listed Special Windows are shown in *broken* outline. Stock types are always preferable from the standpoint of economy and quick shipment. Standard types are next best.

(9) Installation

All window openings should be so designed that steel windows may be installed after the walls are up. This is the most economical, as well as the most practical method of erection and obviates many difficulties frequently

encountered when an attempt is made to set the windows as the building progresses. Rebates, clearances and angles as shown have been accepted as the best building practice and such details should be followed closely.

Steel windows are not structural members and under no circumstances should any portion of the building structure be allowed to rest on the windows.

(10) Glazing

Standard glass dimensions for horizontally pivoted units are: 12x18 in. and 14x20 in.; but glass in ventilators which abut on the top, sides or bottom of the ventilator must be trimmed 1 in. along the abutting edge. See accompanying diagram. It is desirable to cut glass full to the specified dimension.

Casement and Architectural Projected glass sizes are indicated on the plates showing types and sizes of standard units.

Ordinarily, the DETROIT STEEL PRODUCTS COMPANY does not do glazing but any Fenestra representative can refer you to reputable concerns who make a specialty of glazing steel windows. A sufficient quantity of spring glazing clips accompanies every order of Fenestra windows, without added cost. After the windows have been bed puttied and glass inserted, the clips are used together with face putty to hold glass in place. On casement windows use two clips for each light. On horizontally pivoted windows use four clips for each fixed light, and six clips for each ventilator light.

Plate glass is desirable for casements though double strength clear glass may be used. The standard method of glazing architectural projected windows is with $\frac{1}{4}$ in. glass or double strength glass, held by glazing angles or

glazing bead. On horizontally pivoted windows $\frac{1}{4}$ in. factory ribbed or wire glass or $\frac{1}{8}$ in. ribbed, or double strength glass may be used.

(11) Putty

Wood sash putty never should be used with steel windows. Steel casement putty or any other high grade of steel window putty should be used, and is obtainable locally. Putty may be ordered from Fenestra dealers or from company warehouses in 25, 50 and 100 pound drums. Use $\frac{1}{2}$ pound per square foot of glass area.

(12) Basement Windows

Fenestra Basement windows are sold exclusively through dealers. Thousands of dealers in all parts of the country carry them in stock for immediate delivery. Any responsible dealer can secure them by writing to the home office at Detroit.

(13) Lists and Schedules

We recommend that all steel windows, doors, partitions or operators be accurately listed and located either in schedules on plans or in specifications. If more than one type of the same product be desired, each type should be listed and located separately. In the case of mechanical operators, it should be clearly indicated whether the ventilators are to be operated from one or more stations and whether in single or in multiple runs. These details assure greater accuracy in estimates.

(14) Fillets to Increase Strength

Most of the bars used in the manufacture of Fenestra steel windows, doors and partitions, are of solid, open hearth steel, hot rolled to special Fenestra designs. All such bars are rolled with heavy fillets in all re-entrant angles. These fillets increase the strength and rigidity of the bars, making them much stronger than similar sections of pressed metal.

(15) Protection of Hardware

We strongly recommend that hardware be stored carefully in the original packages and that it be attached *only* after the windows, doors or partitions have been erected, glazed and painted.

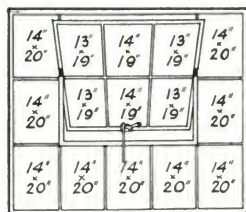
(16) Galvanizing

Where specified at the time the order is taken, Fenestra Architectural and Industrial Windows can be supplied, hot galvanized. (Certain parts, such as glazing angles and side arms, electro-galvanized.) Mechanical operators may also be secured, galvanized, under the same conditions with the exception of powers which are painted with aluminum paint.



Bed Puttying

Inserting Glazing Clips



(A) STEEL CASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(A-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(A-2) General

Steel Casement Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(A-3) Material

(A-3a) Casement Sections—All sections shall be specially designed, hot rolled, solid steel casement bars with heavy fillets in all re-entrant angles.

All frame members and the stiles and rails of each swing leaf shall be rolled with a $\frac{1}{8}$ " baffle.

Muntins shall be T bars.

(A-3b) Mullions—All mullions shall be hot rolled, solid steel T bars.

Note: Use when two or more Casements are placed side by side or one above another in the same opening.

Note: Pressed metal or built up sections should not be used for either vertical or horizontal mullions.

(A-4) Construction

(A-4a) Frames and Swing Leaves—Frames and the stiles and rails of swing leaves shall be baffled Z bars mitered at all corners and electrically butt welded. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two-point, flat contact weathering between swing leaves and frame.

(A-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at intersections. Joints at frames, stiles and rails shall be mortise and tenon, air hammer riveted.

Note: Intersections of casement window muntins are made substantially as described on Fenestra Page 44.

Note: Muntins may be omitted to permit glazing in single lights or leaded glass. If desired so specify. We do not supply leaded glass.

(A-4c) Vertical Mullions—Vertical mullions shall be $1\frac{3}{8}$ " deep. Provide bolts for frame attachment.

(A-4d) **Horizontal Mullions**—Horizontal mullions shall not be less than 2¼" deep with tip of protruding web bent downward to form a drip. They shall be continuous from jamb to jamb. Provide bolts for frame attachment.

(A-4e) **Copper Head-Drip**—Wherever swing leaves extend to head of frame, provide a continuous 20-gauge, cold rolled, copper drip.

Note: Copper drip is shipped unattached. See details Fenestra Page 11.

(A-4f) **Jamb and Head Fins**—

Note: We recommend that for all masonry construction jamb and head fins be specified to provide added anchorage and form wind stop. Where used, Casements must be built into the masonry work (not installed in prepared openings). See note (A-8). (See detail Fenestra Page 11.) Their added cost is warranted. If desired so specify. If not included specify that jamb and head anchor clips shall be furnished.

(A-4g) **Sill and Jamb Anchor Clips**—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(A-5) Attached Hardware

Note: Attached at factory.

(A-5a) **Side Hinges**—All side hung swing leaves shall be hung on two (2) heavy, extension (cleaning) hinges of special, solid rolled, steel with heavy re-entrant angle fillets. Hinge pins (non-removable) shall be of solid bronze accurately fitted into flanged, bronze bushings.

Note: Bronze pins and bushings provide 100% bronze bearing at all moving points.

(A-5b) **Top Hinges**—Top hung swing leaves in transoms shall be hung on heavy steel hinges with bronze pins.

(A-5c) **Locking Handle Brackets**—Ornamental locking handle brackets shall be cut from special, solid rolled, steel sections and both riveted and welded to the swing leaf styles.

(A-5d) **Operator Provisions**—Bottom rails of all side hung swing leaves shall be provided with tapped holes, standardized as to size and location to take any of the six types of casement operators.

Note: See (A-6c).

(A-5e) **Strikes (for Side Hung Swing Leaves)**—Provide bronze strike plates attached to frames.

(A-6) Detached Hardware

Note: See Fenestra Page 6.

(A-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(A-6b) **Locking Handles (for Side Hung Swing Leaves)**—Ornamental locking handles, so designed as to produce a cam action, shall be:

- (1) Handle 198 (malleable iron with dull black, rust-resisting finish) (dark oxidized bronze).
- (2) Handle 699 (dark oxidized bronze).

Note: Select as to design and material. No. 699 at slight added cost over No. 198. Bronze at added cost over iron.

Handles shall be attached to handle brackets with bronze hexagonal headed bolts tap-screwed into steel, spring, friction clevises.

Note: Clevis assures constant and even tension which prevents handle from becoming loose.

All handles at latch shall be provided with notched heads to permit restricted ventilation.

(A-6c) **Operators (for Side Hung Swing Leaves)**—

Note: Select as required.

Note: All casements are furnished with the "Standard" operator. Where desired, any of the types listed "Optional" may be substituted at a reasonable added cost.

(1) **Standard: Sliding Stay** (malleable iron with dull black rust-resisting finish).

(2) **Standard: Peg and Stay** (bronze peg, malleable iron stay with dull black rust-resisting finish, stay plate and stay bracket).

Note: In oxidized bronze for both 1 and 2 Standards at slightly added cost.

(3) **Optional: Thumb Screw Stay** (malleable iron with dull black rust-resisting finish, oxidized bronze friction plate, guide and thumb screw).

(4) **Optional: Gear Type Underscreen** (malleable iron with black rust-resisting finish or oxidized bronze).

(5) **Optional: Surface Type Underscreen** (malleable iron with dull black rust-resisting finish).

Note: In oxidized bronze at slightly added cost.

(6) **Optional: Flush Type Underscreen** (oxidized bronze).

(A-6d) **Operator (for Top Hung Transom Sash)**—

(1) **Standard: Peg and Stay** (malleable iron with dull black rust-resisting finish).

(A-7) Mastic

The Casement Manufacturer shall furnish a sufficient quantity (one pound to ten lineal feet) of mastic to form a weather-tight frame bed, at head, jambs and sill (and mullions).

(A-8) Erection

Note: In brick masonry construction wherever casements are built into the brickwork (not in prepared openings) without wood bucks, include in the masonry specification a clause that the mason shall use every precaution against springing or racking the casements out of shape.

Note: Where desired, the FENESTRA CONSTRUCTION Co., under a separate contract will erect Casements windows in prepared openings. (See Paragraph 5, Fenestra Page 1.) If required so specify.

(A-8a) All casement windows shall be set plumb and true, properly aligned and securely anchored before glazing.

(A-8b) All mullions shall be rigidly bolted to frames.

(A-8c) Set all frames in mastic neatly applied in a narrow beading where they come in contact with the building construction (or steel mullions). Use one pound of mastic to 10 lineal feet.

(A-8d) Apply all hardware in accordance with the manufacturer's directions.

Note: Give second coat of paint and glaze before applying finish hardware.

(A-9) Painting

All casement windows shall be given one dip-coat of grey lead and oil paint by the manufacturer before shipment.

Note: The following should be provided for in the painting specifications:

Note: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(A-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(A-10a) **Glass**—Glass shall be (¼" thick plate) (double strength).

Note: Single strength glass is not recommended.

(A-10b) **Putty**—Putty shall be Fenestra Steel Casement Putty.

Note: This is a special, high-grade, steel window putty which assures quick setting. Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(A-10c) **Glazing**—All casement windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Casement Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See Paragraph (A-9).

(A-11) Provisions for Screens

Note: Fenestra Pages 12 and 13 give suggestions for screening provisions. Include in the Carpentry Specifications, the necessary clauses covering stops and wood trim. Space between screen and casement frame must not be less than 2½".

(A-12) Screens

Note: Metal or wood screens, sliding, hinged or rolling may be used as desired. Screens are not included by the Casement Manufacturer and should, therefore, be provided for under another division of the specification.

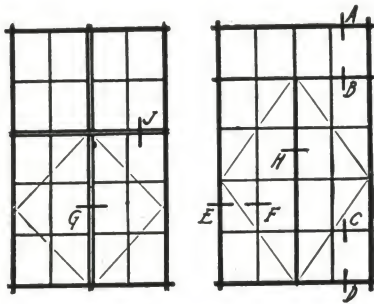
(A-13) Shade and Drapery Brackets

Note: Shade and drapery brackets are not attached to the steel casement frame and are, therefore, not provided by the Casement Manufacturer. Suggestive provisions are made in Fenestra Pages 12 and 13.

SYMMETRICAL COMBINED WIDTHS

Standard widths	Units wide	Panes wide	Panes wide per unit	Vert. mull.
1 ft. 7¾ in.	1	2	2	0
3 ft. 1½ in.	1	4	4	0
3 ft. 2¾ in.	2	4	2, 2	1
4 ft. 7½ in.	1	6	6	0
4 ft. 10¾ in.	3	6	2, 2, 2	2
6 ft. 3½ in.	2	8	4, 4	1
6 ft. 4½ in.	3	8	2, 4, 2	2
6 ft. 5¾ in.	4	8	2, 2, 2, 2	3
7 ft. 10½ in.	3	10	2, 6, 2	2
7 ft. 10¾ in.	3	10	4, 2, 4	2
8 ft. 1¾ in.	5	10	2, 2, 2, 2, 2	4

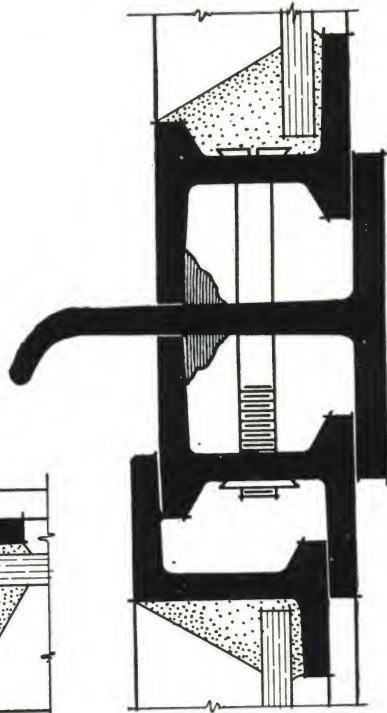
Use these widths with any heights.



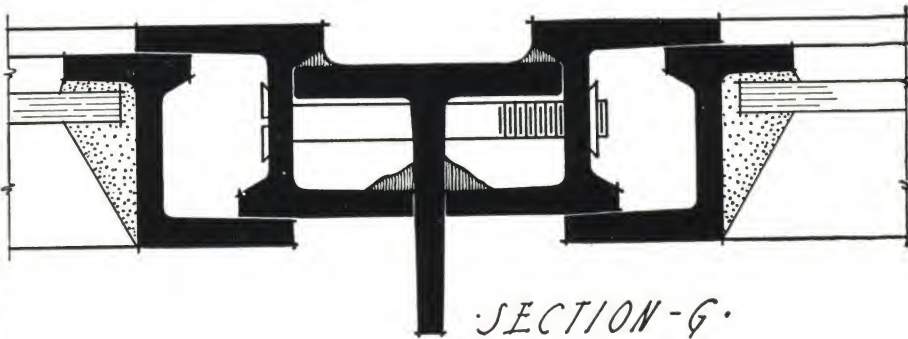
•TYPICAL ELEVATIONS•



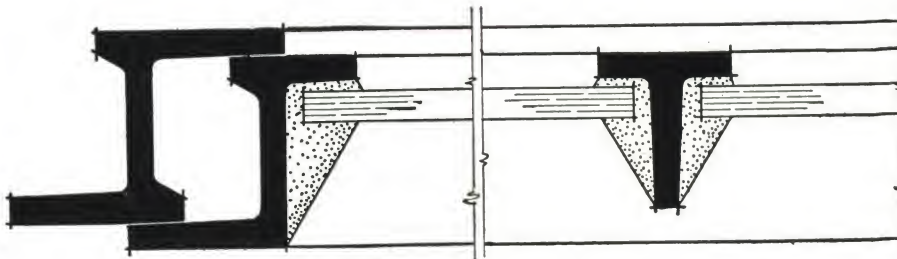
SECTION-H.



SECTION-J



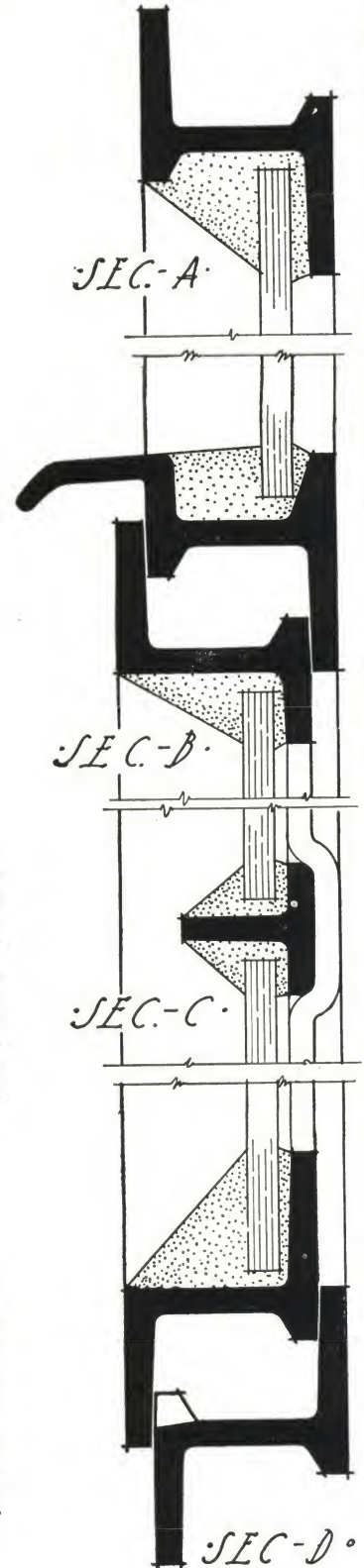
SECTION-G.



SECTION-E.

SECTION-F.

SCALE-FULL-SIZE.



SEC-A.

SEC-B.

SEC-C.

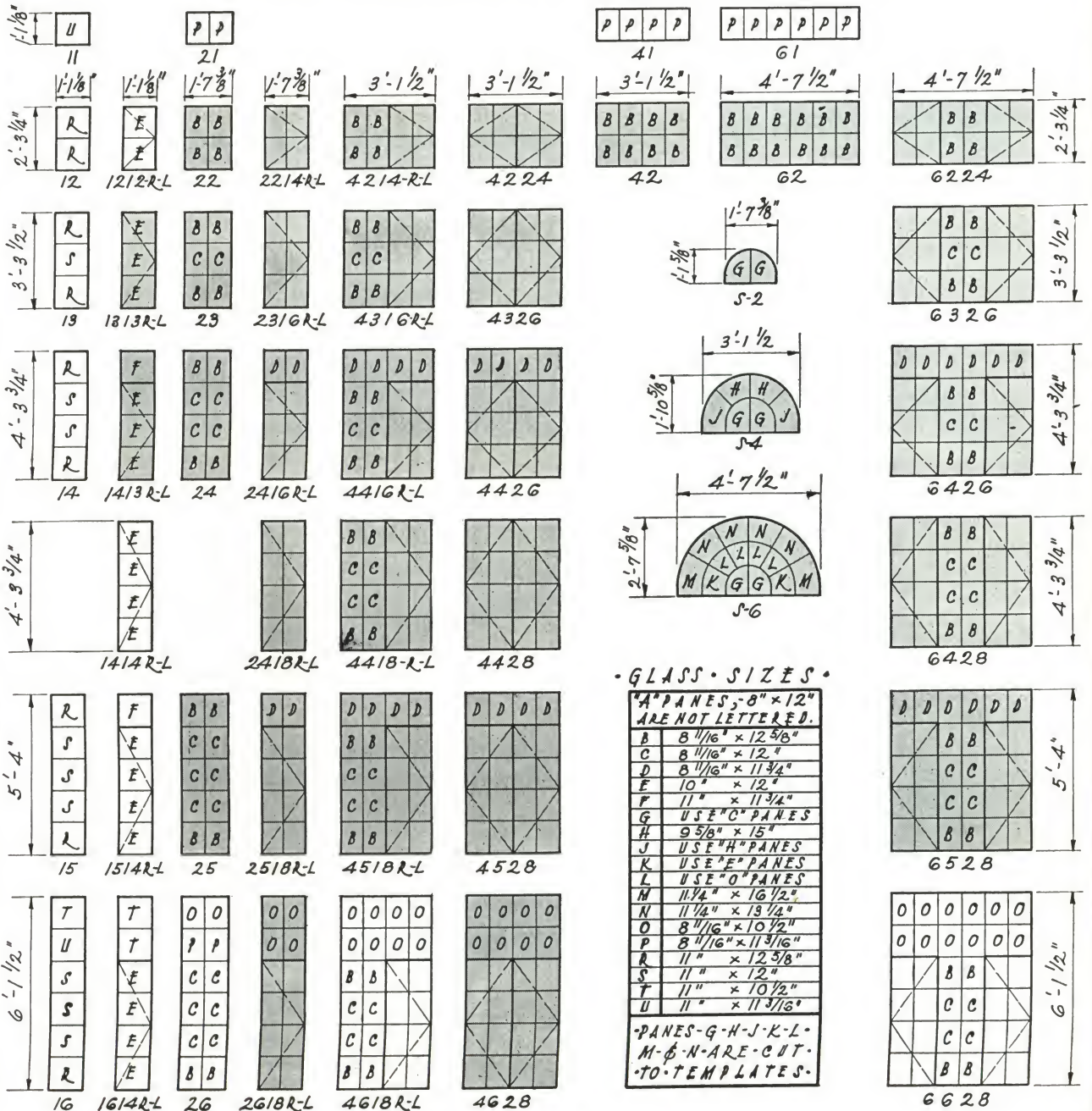
SEC-D.

Fenestra
August 1927

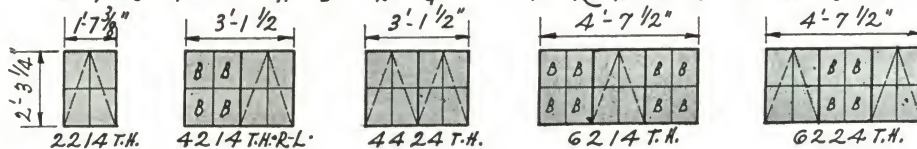
Steel Casement Windows
Typical Cross Sections

Plate No
A-101

STANDARD AND STOCK TYPES - STOCK TYPES SHOWN WITH SHADED BACKGROUND



TOP HUNG TRANSOMS



NOTE

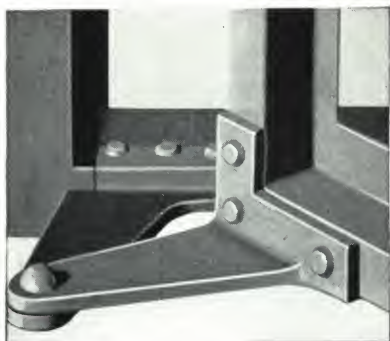
HANDING OF CASEMENTS IS DETERMINED BY THE HINGE LOCATION VIEWED FROM OUTSIDE. HINGED AT RIGHT IS A RIGHT HAND CASEMENT; ETC.

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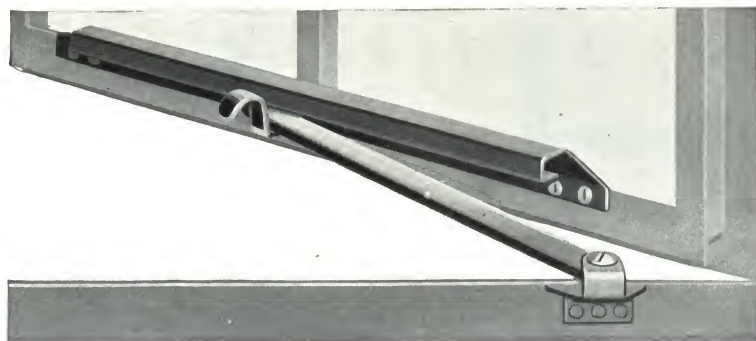
Steel Casement Windows
Types and Sizes

Plate No
A-102

CASEMENT FITTINGS AND HARDWARE



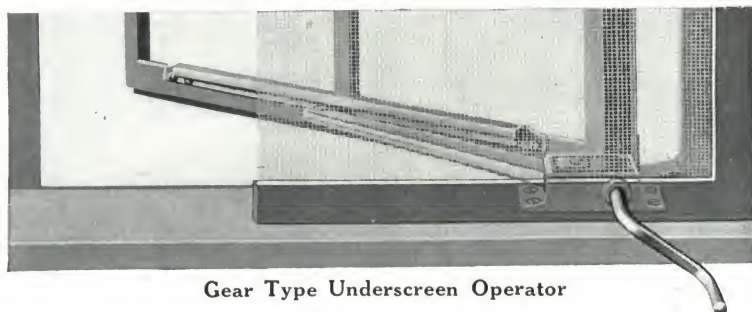
Extension (Cleaning) Hinge



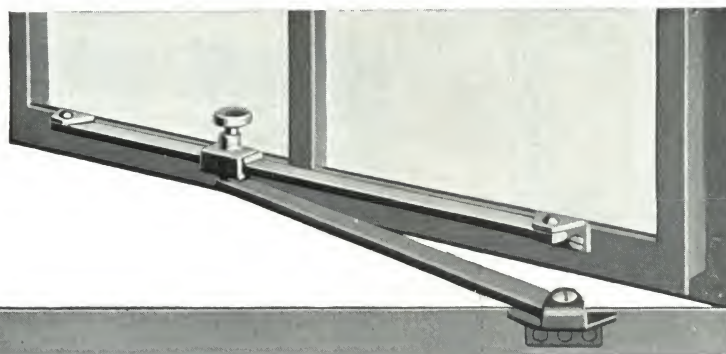
Sliding Stay Operator



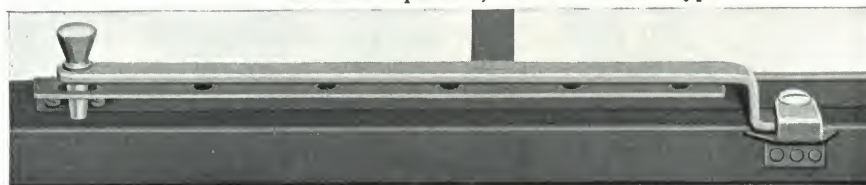
Bronze Handle, No. 699



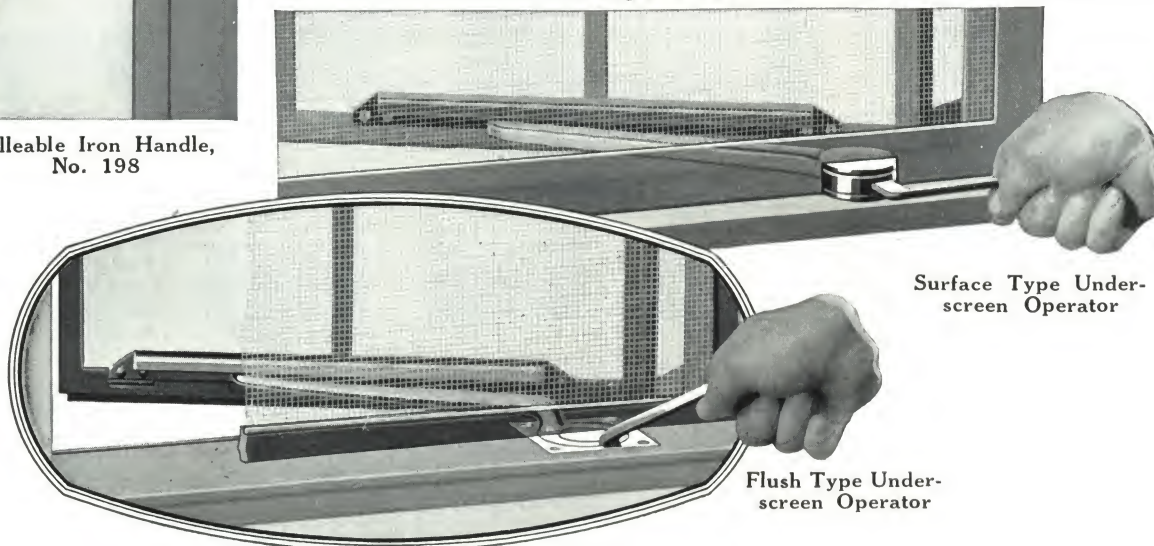
Gear Type Underscreen Operator



Friction Operator, Thumb Screw Type

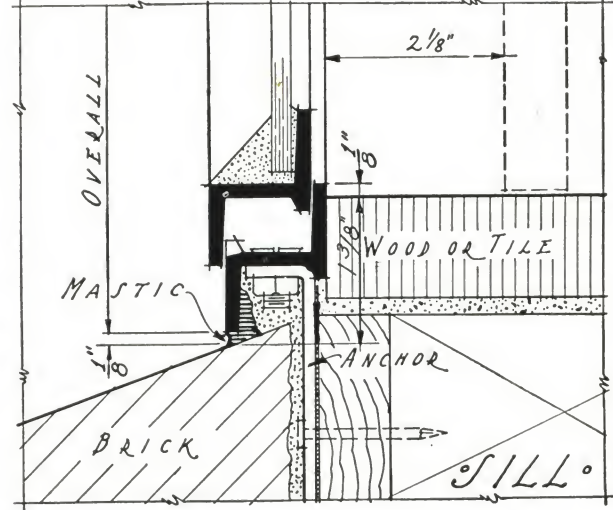
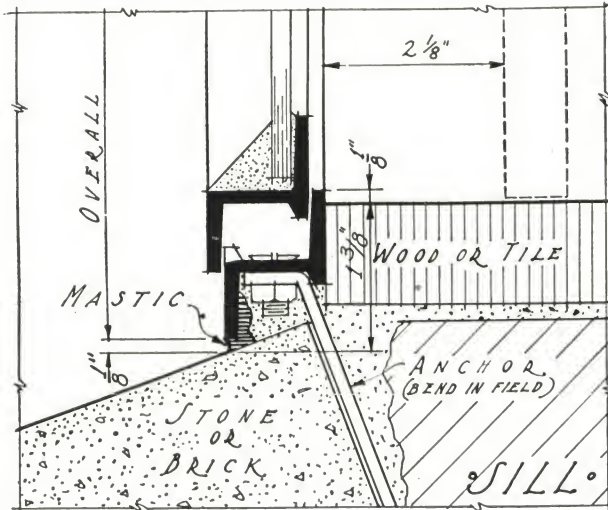
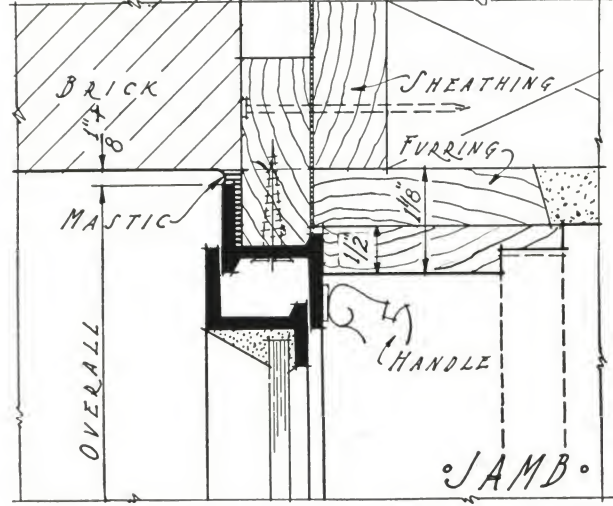
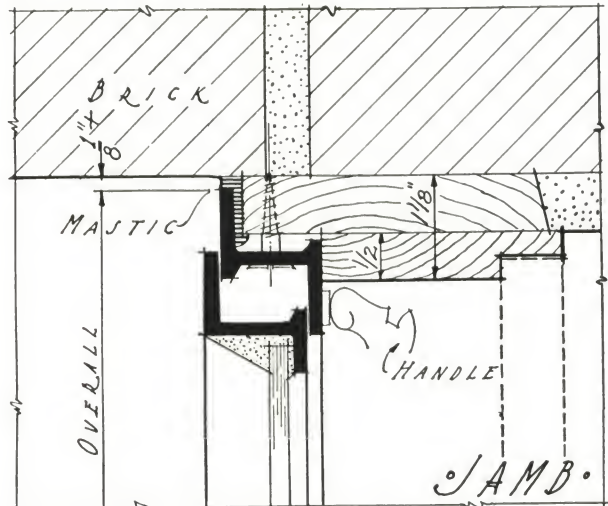
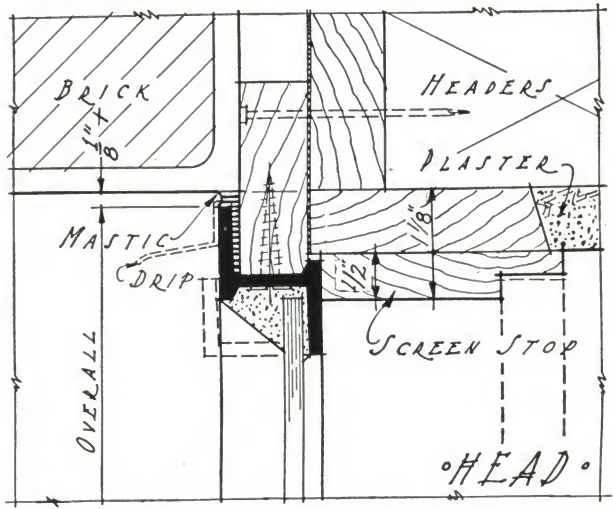
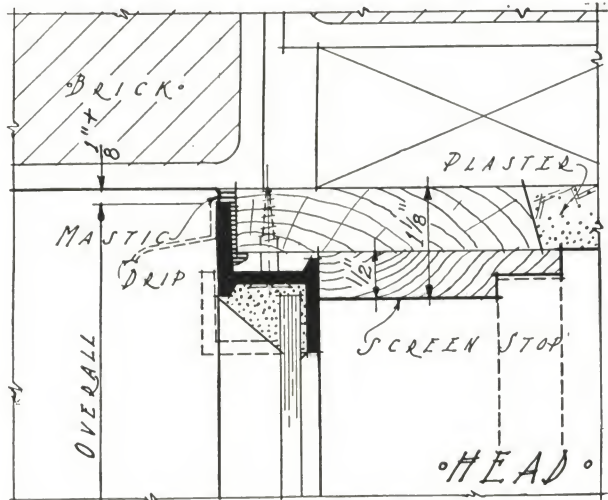
Malleable Iron Handle,
No. 198

Peg and Stay Operator

Surface Type Under-
screen OperatorFlush Type Under-
screen Operator

• SOLID • BRICK •

• BRICK • VENEER •



• SCALE: HALF • FULL • SIZE •

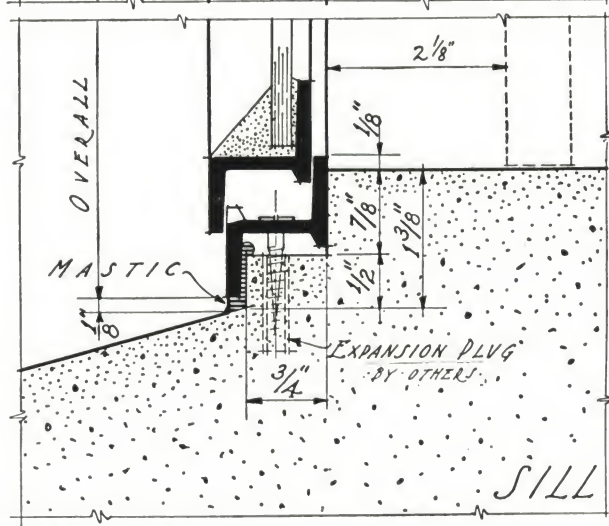
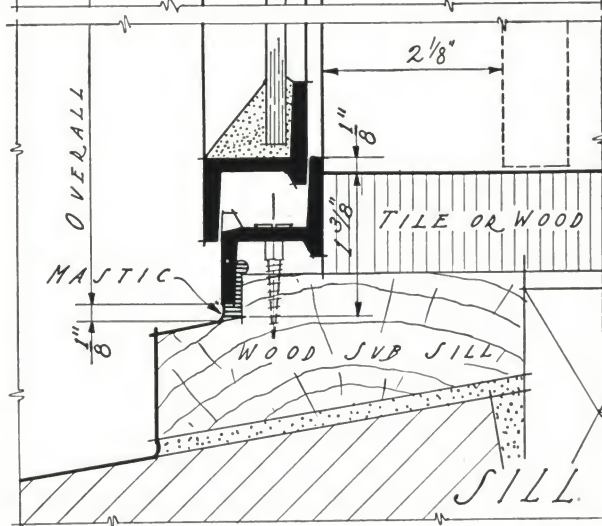
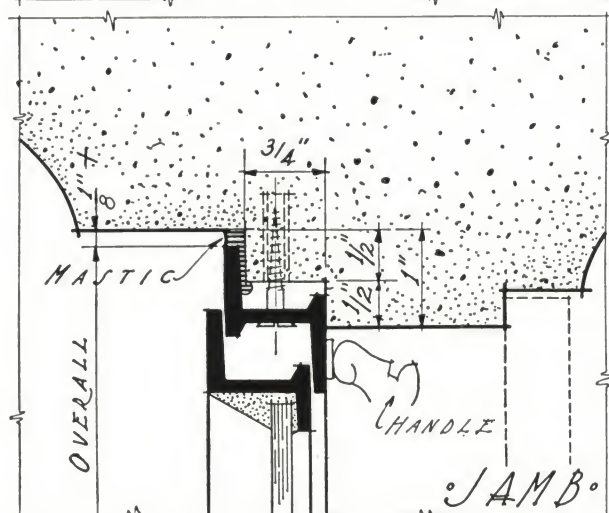
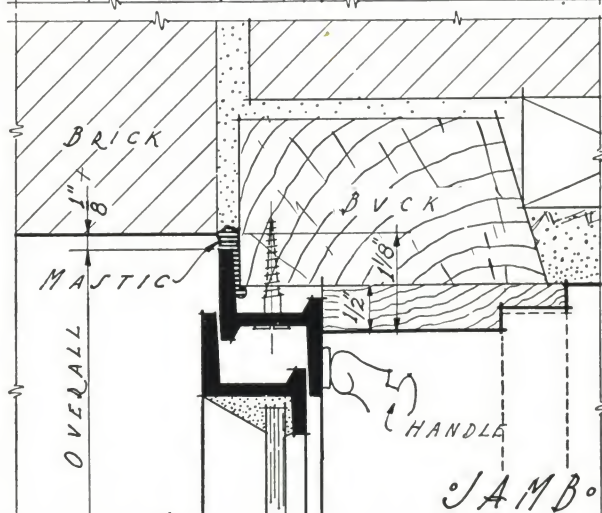
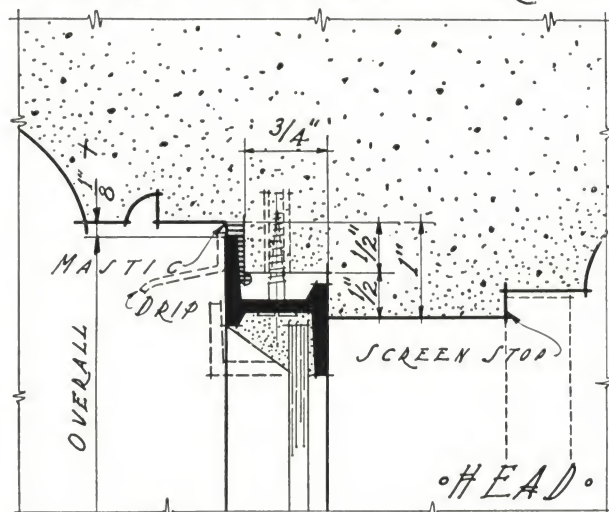
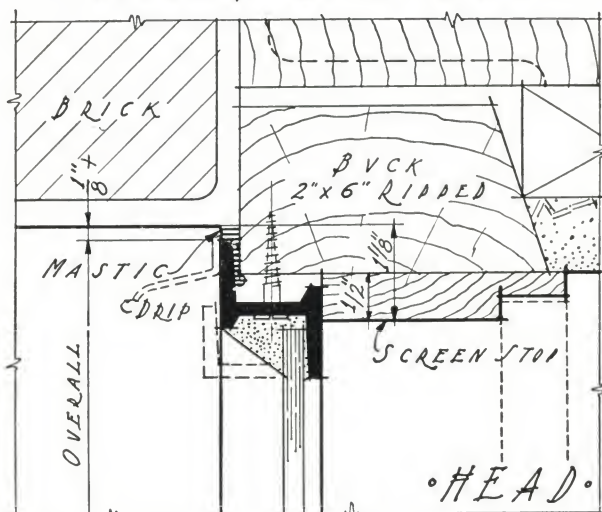
Fenestra
August 1927

Steel Casement Windows
Installation Details

Plate No
A-103

• CONCEALED • WOOD • BVCK •

• SOLID • STONE • TRIM •



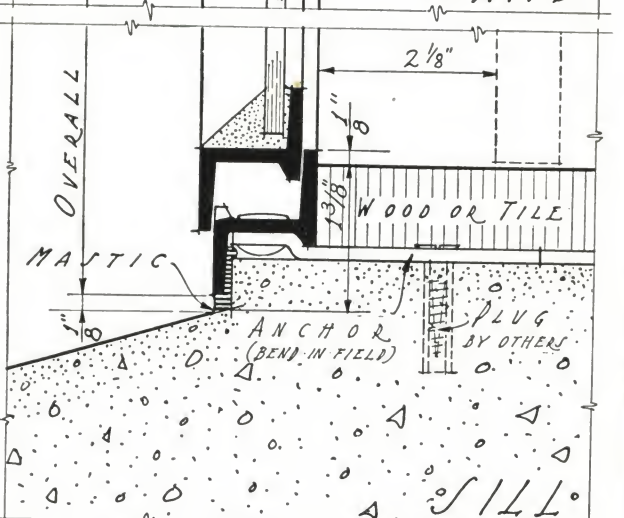
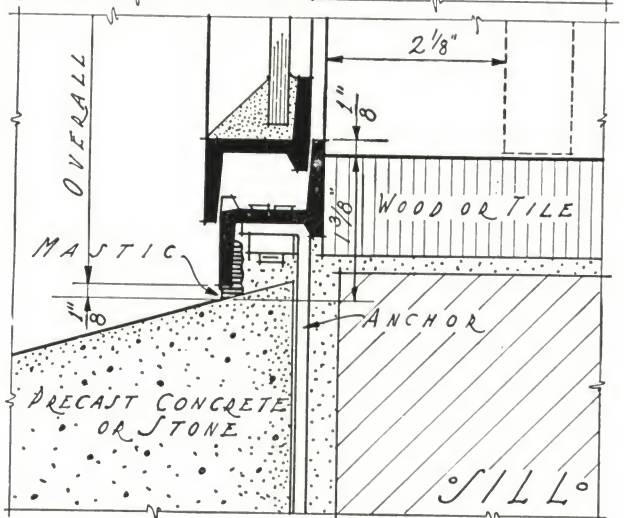
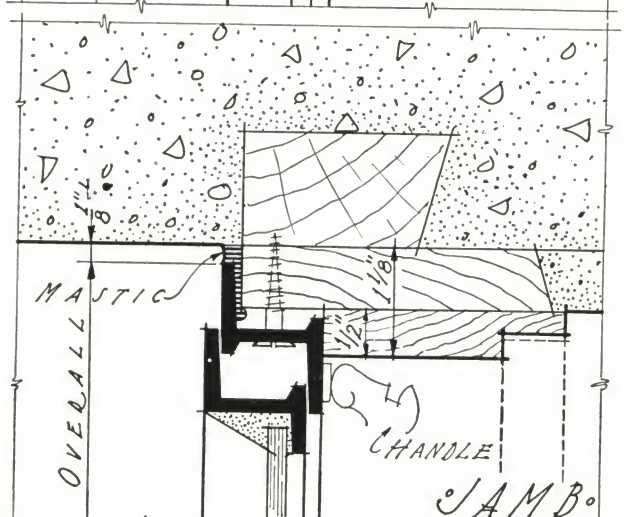
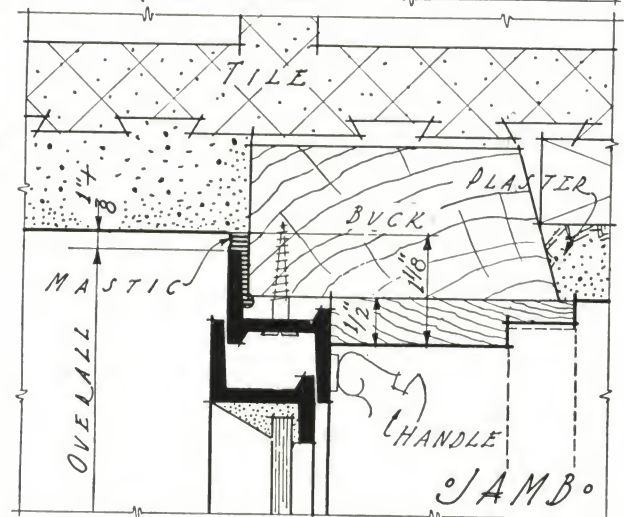
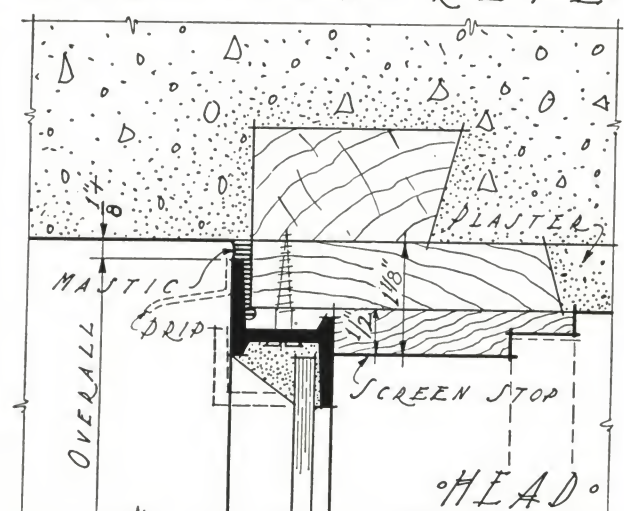
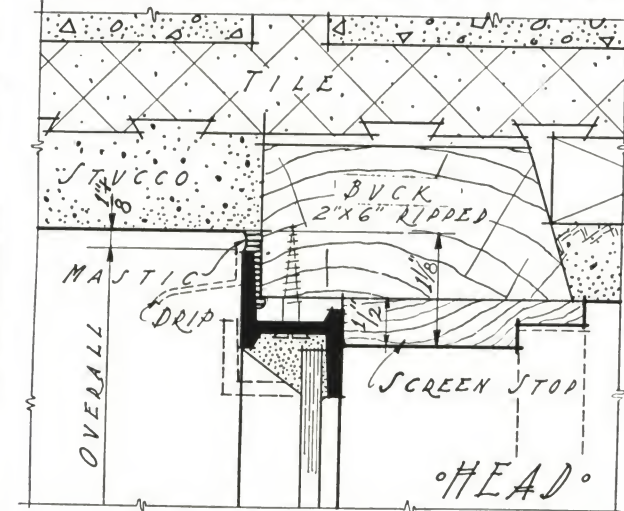
• SCALE: HALF • FULL • SIZE •

Fenestra,
August 1927

Steel Casement Windows
Installation Details

Plate No
A-104

TILE AND STUCCO • CAST CONCRETE



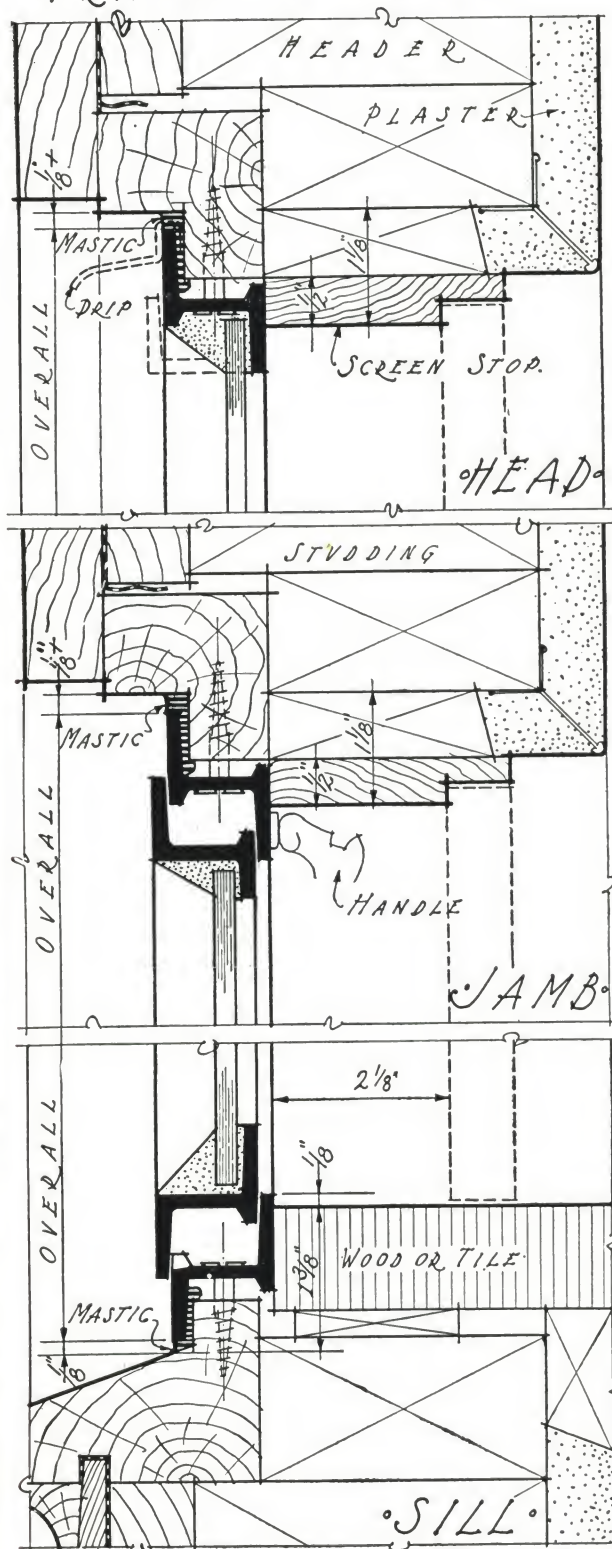
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Fenestra
August 1927

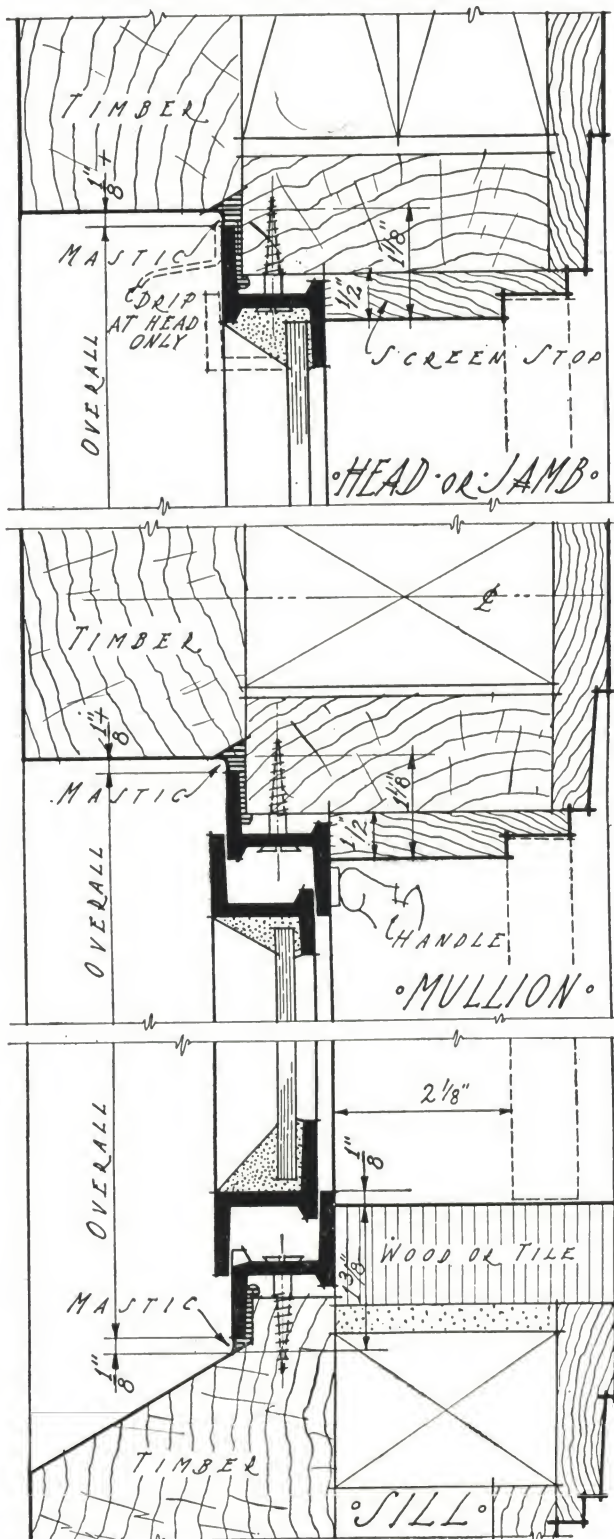
Steel Casement Windows
Installation Details

Plate No
A-105

• FRAME • CONST. •



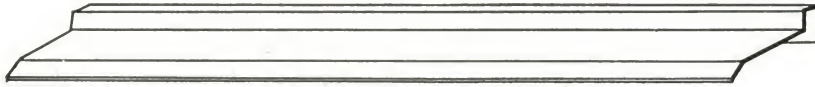
• HALF • TIMBER •



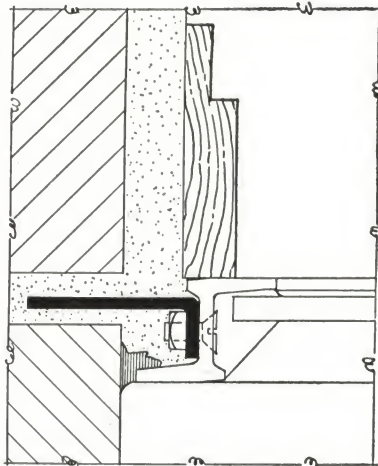
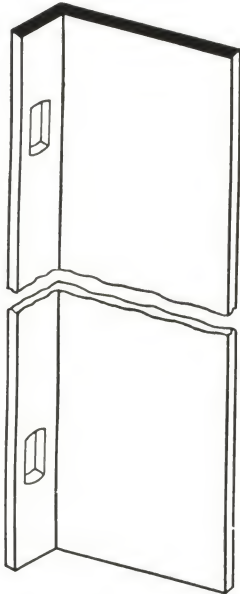
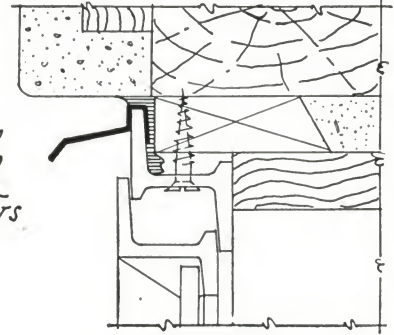
Fenestra
August 1927

Steel Casement Windows
Installation Details

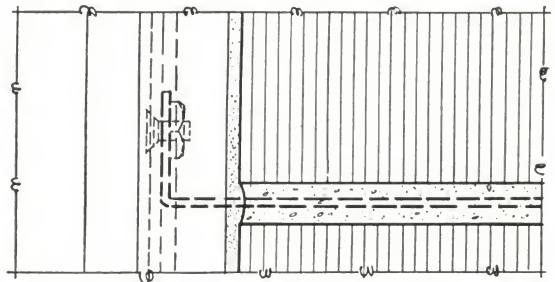
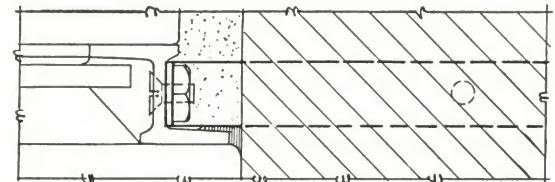
Plate No
A-106



NO. 20 GAUGE COLD ROLLED COPPER DRIP TO BE USED WHERE VENT LEAVES EXTEND TO HEAD OF FRAME. SNAPS OVER FRAME SECTION WITHOUT BOLTS OR RIVETS

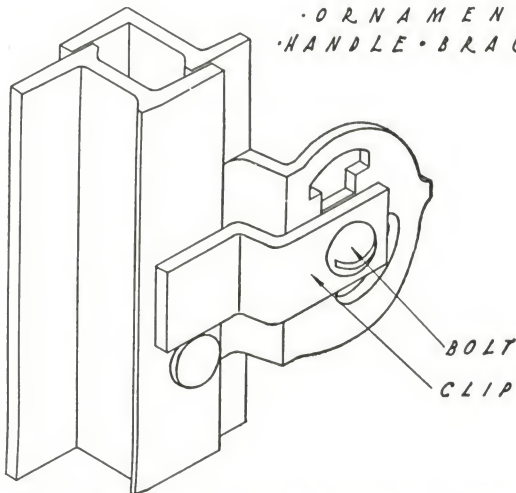


CONTINUOUS, SOLID ROLLED STEEL FIN TO BE BOLTED TO JAMBS AND HEAD WHERE FRAMES ARE BUILT INTO MASONRY. SUPPLIED AT A SLIGHT ADDED COST, TO PROVIDE GREATER ANCHORAGE AND FORM A WIND STOP.

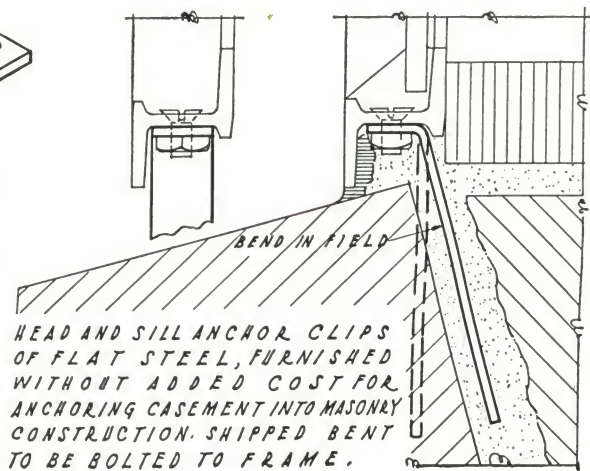
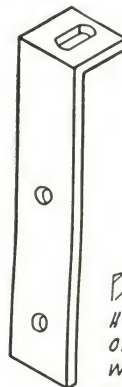


JAMB ANCHOR CLIPS OF FLAT STEEL FURNISHED WITHOUT ADDED COST WHERE CONTINUOUS STEEL FIN IS NOT SPECIFIED. SHIPPED FLAT TO BE BOLTED TO FRAME AND BENT TO FIT NEAREST BRICK, TILE OR STONE JOINT.

• ORNAMENTAL •
HANDLE • BRACKET •



STEEL LOCKING CLIP BOLTED TO ORNAMENTAL HANDLE BRACKET BEFORE CASEMENTS ARE SHIPPED TO KEEP SWING LEAVES TIGHT SHUT UNTIL HARDWARE IS ATTACHED. IF LOOSENED FOR PAINTING OR ATTACHMENT OF ANCHORS, CLIP SHOULD BE RETIGHTENED AT ONCE TO PREVENT ENTRANCE OR DAMAGE.



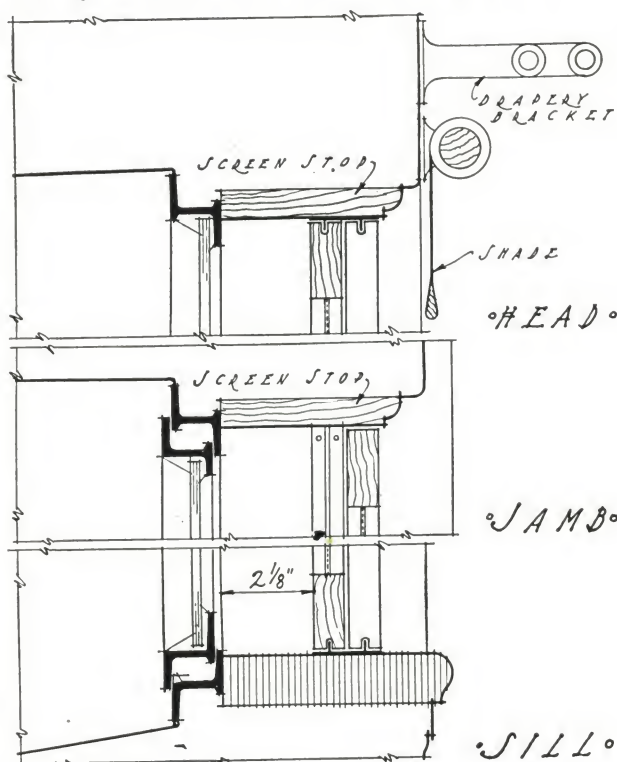
HEAD AND SILL ANCHOR CLIPS OF FLAT STEEL, FURNISHED WITHOUT ADDED COST FOR ANCHORING CASEMENT INTO MASONRY CONSTRUCTION. SHIPPED BENT TO BE BOLTED TO FRAME.

Fenestra,
August 1927

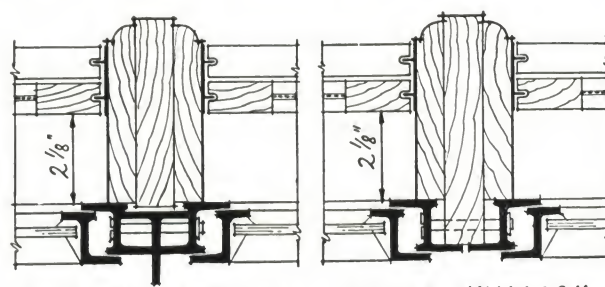
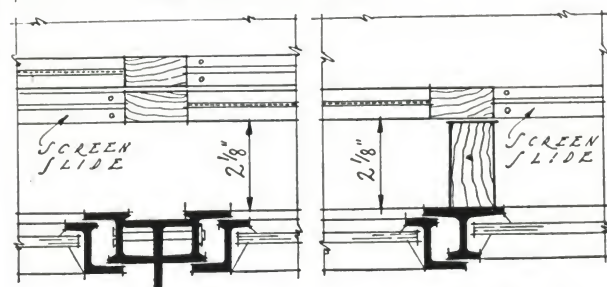
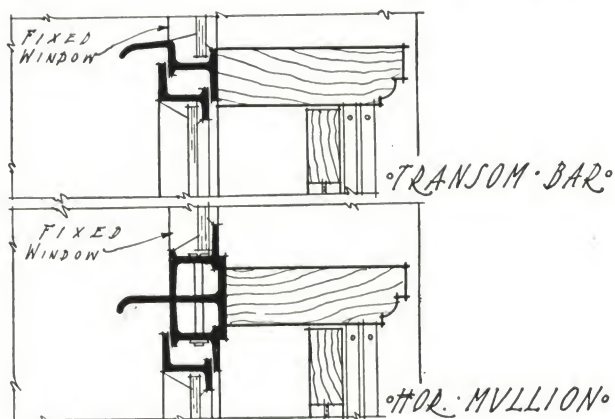
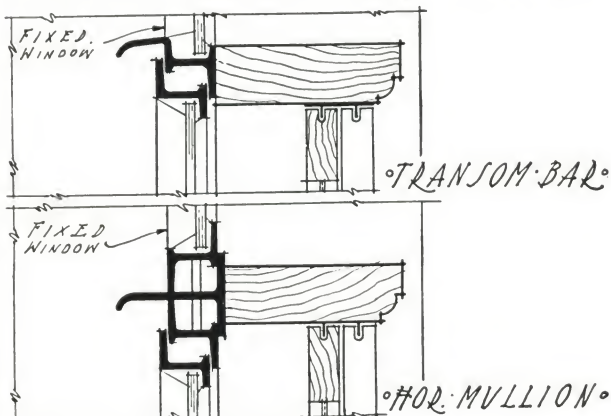
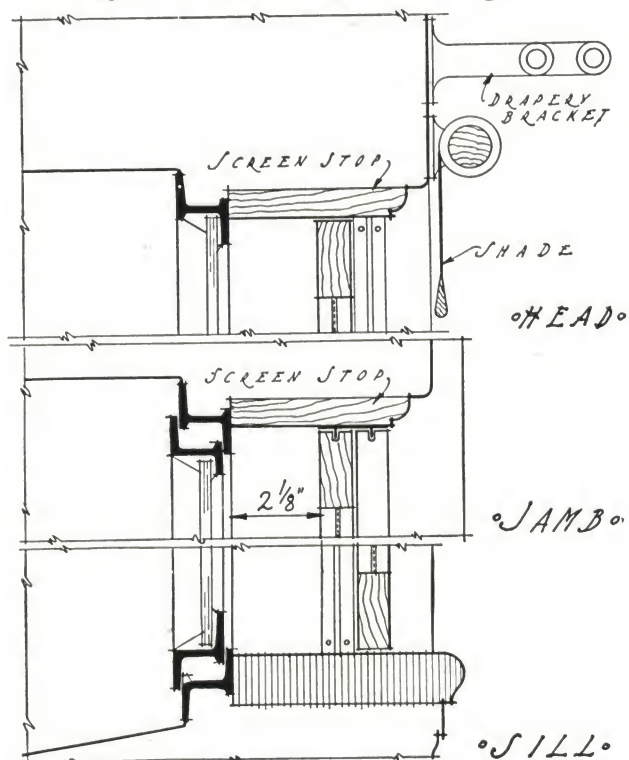
Steel Casement Windows
Drip, Fins and Anchors

Plate No
A-107

•HOR. SLIDING SCREEN•



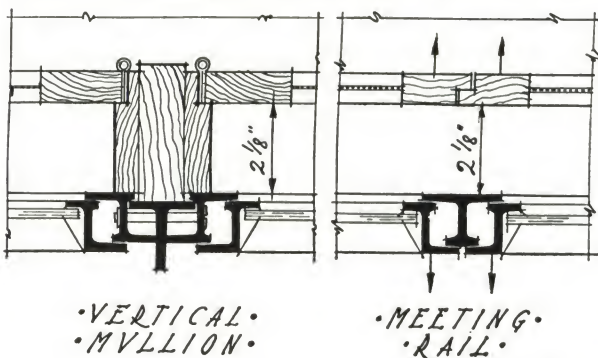
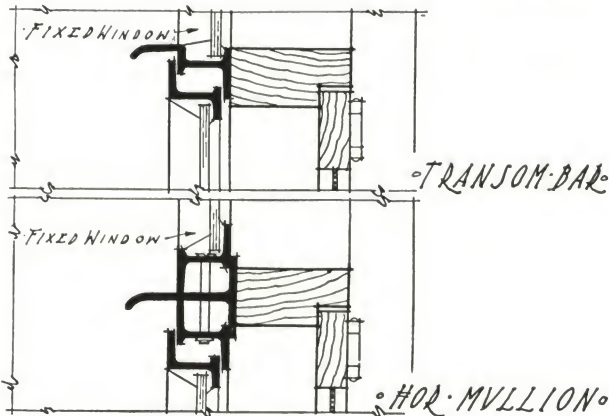
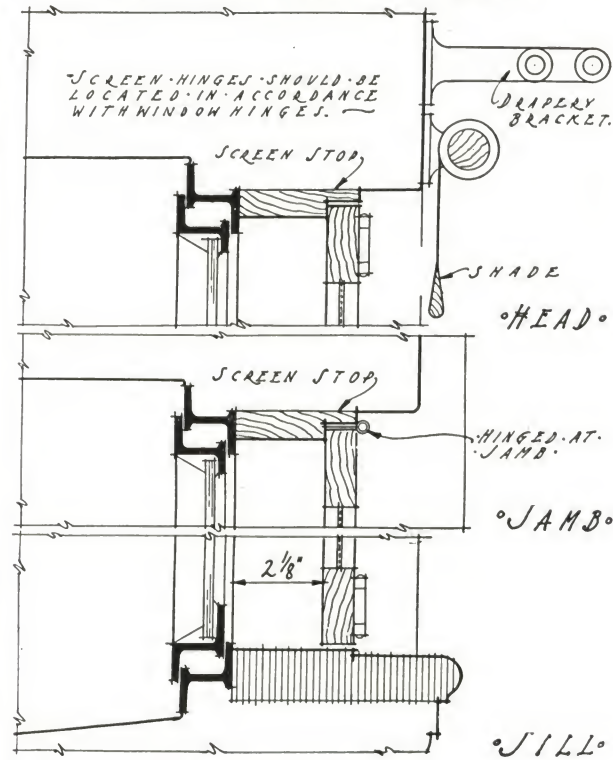
•VERT. SLIDING SCREEN•

•VERTICAL
•MULLION••MEETING
•RAIL••T-BAR MULLION• •WOOD MULLION•
•VERTICAL MULLIONS•

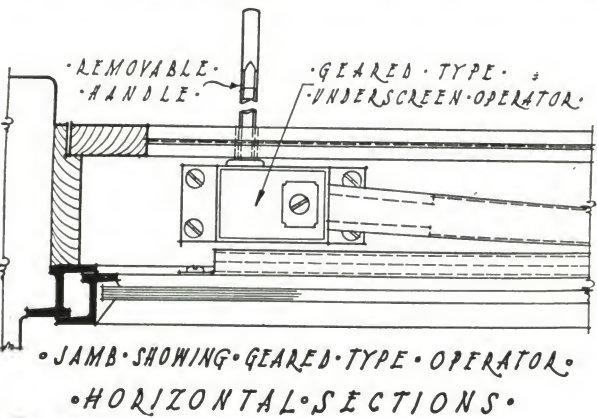
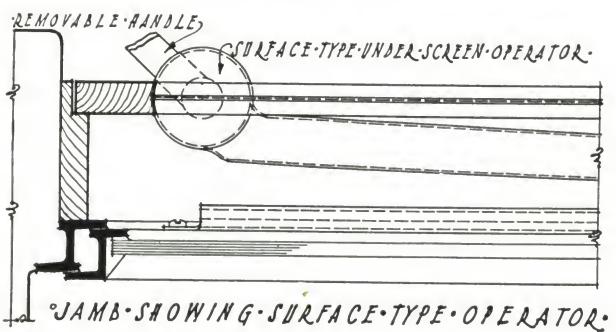
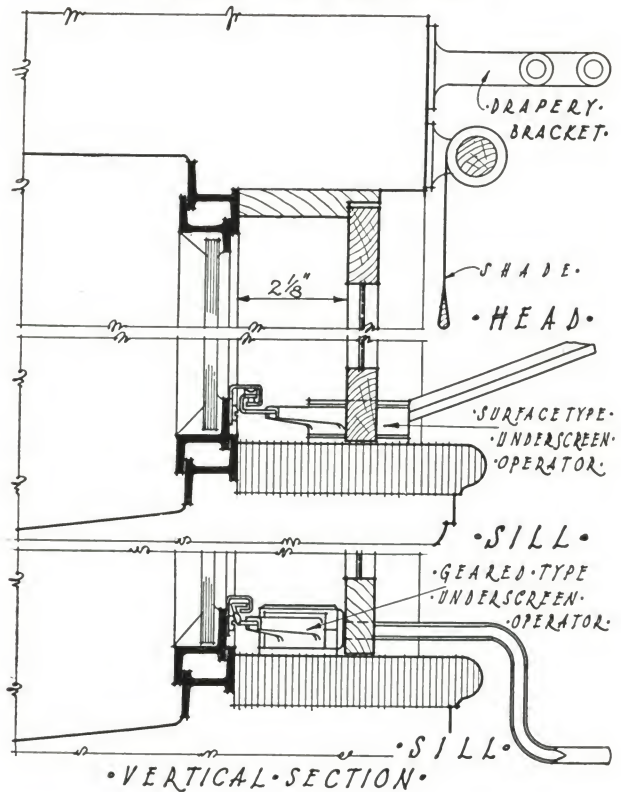
•SCALE: 3" = 1'-0"•

Fenestra
August 1927**Steel Casement Windows**
Screening and Shading Details**Plate No**
A-108

•SIDE •HINGED •SCREEN•



•FIXED •SCREEN•

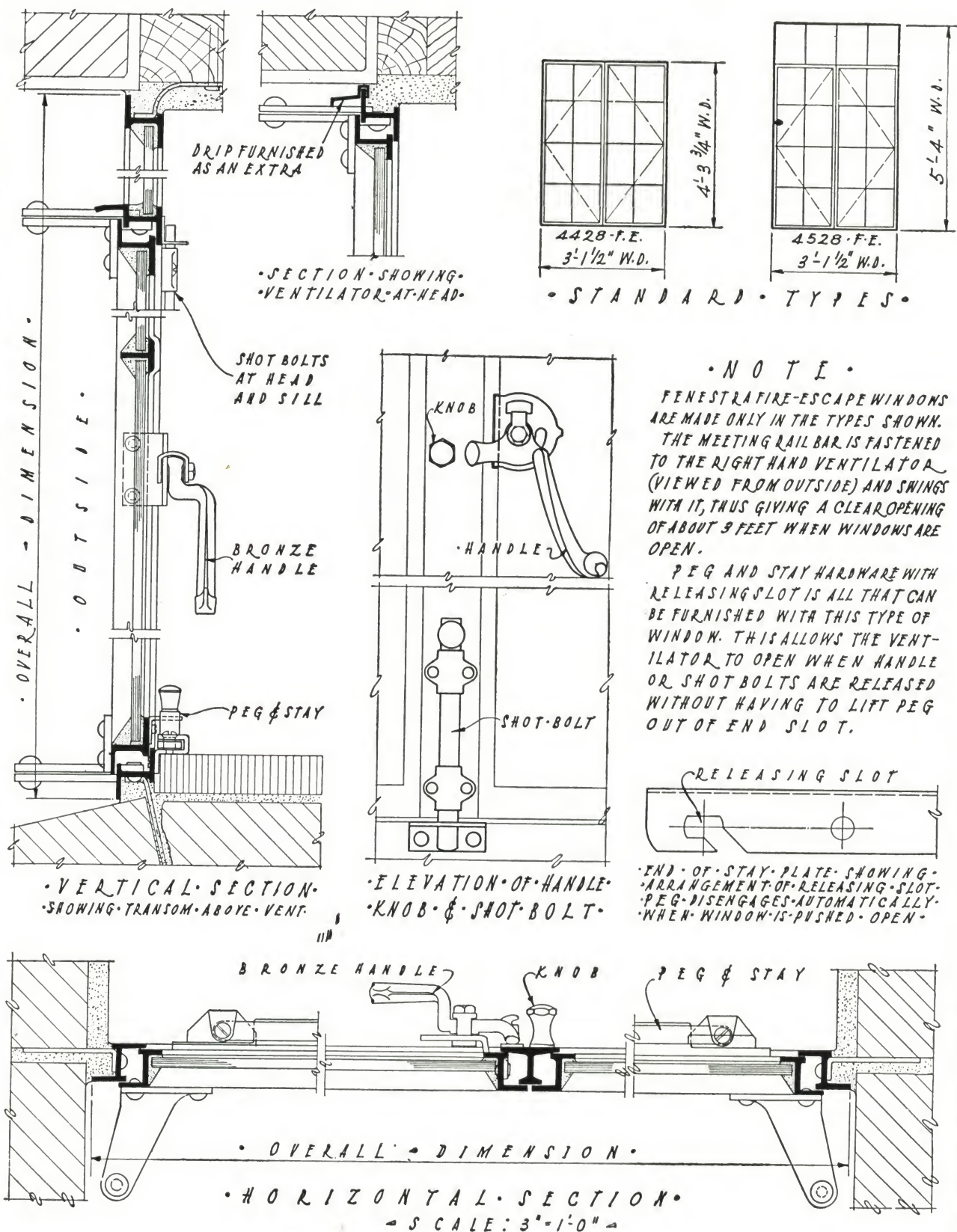


• SCALE : 3" = 1'-0" •

Fenestra
August 1927

Steel Casement Windows
Screening and Shading Details

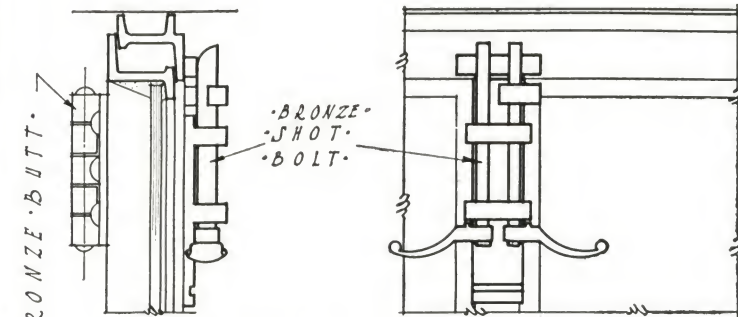
Plate No
A-109



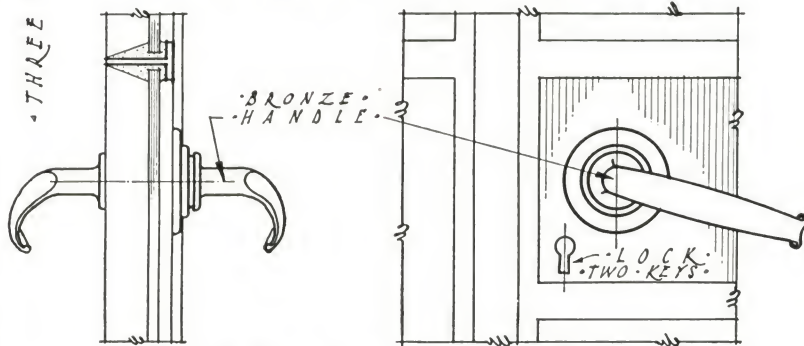
Fenestra
August 1927

Steel Casement Windows
Fire Escape Details

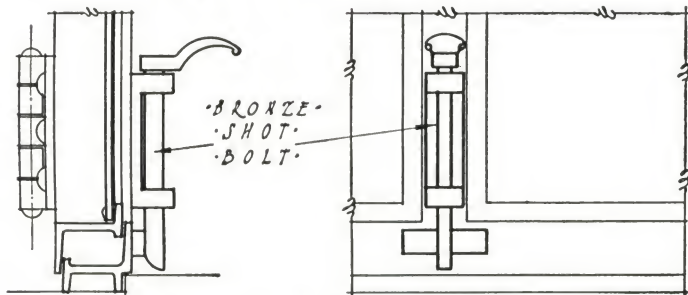
Plate No
A-110



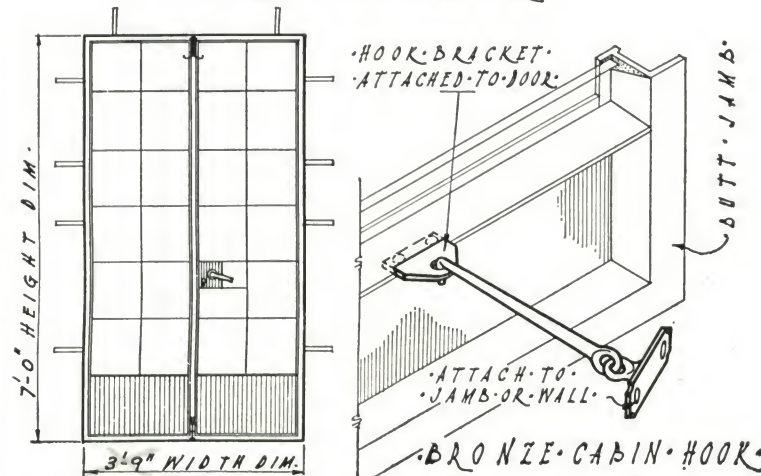
• HEAD OF DOOR •



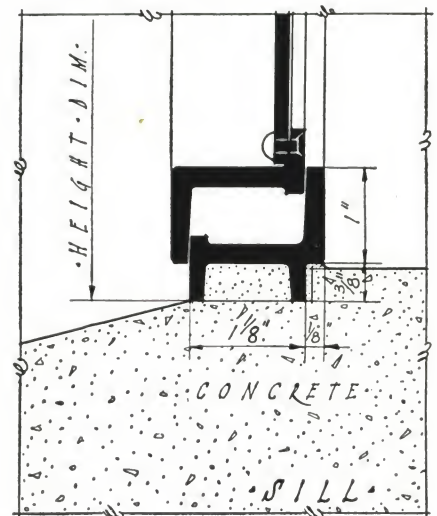
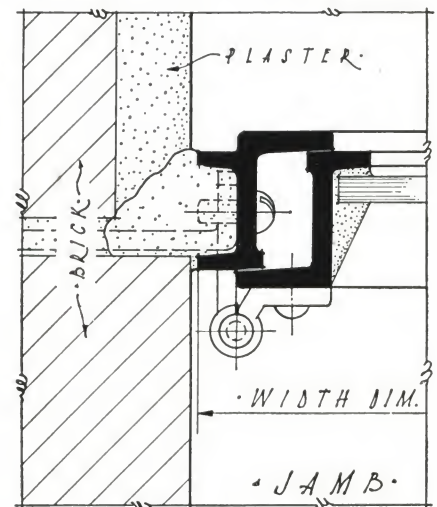
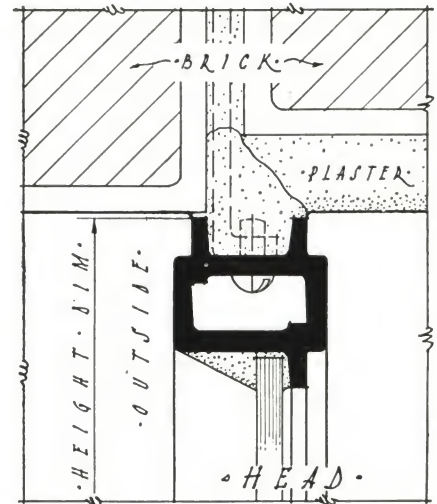
• HANDLE & LOCK •



• SILL OF DOOR •



• INSIDE ELEVATION • • HARDWARE SCALE: 3"=1'-0" •



• DETAILS SCALE: HALF-FULL SIZE •

Fenestra
August 1927

Steel Casement Doors
Elevations and Details

Plate No
B-101

(D) STEEL BASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: These windows are sold exclusively through dealers. See Paragraph 12 Fenestra Page 2.

(D-1) Work Included

Note: List and locate. (See Paragraph 13 Fenestra Page 2.)

(D-2) General

Basement Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(D-3) Materials

All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles. All frame and sash members shall be rolled with $\frac{1}{8}$ " baffles. Sash bottom rails shall be rolled with special projecting drip. Provide steel fins for jamb anchorage and weathering. Muntins shall be T bars. Provide two holes in each frame jamb for screen attachment.

Note: Sections (except sash bottom rails) are similar to Casement Window Sections (see Fenestra Page 4) arranged for inside glazing.

(D-4) Construction

Sills and jambs of frame shall be continuous of one piece mitered and turned at corners. Joints at head of frame and all joints of sash shall be mortise and tenon, air hammer riveted. Fins shall be spot welded to frame jambs. Provide continuous, two-point, flat contact weathering between sash and frame.

(D-5) Hardware

All hardware shall be of steel and shall be attached at the factory. Hinges shall be of "pinless" hook design riveted to the frame, so constructed, in conjunction with formed slots in the sash top rail, that the sash may be removed for glazing. Locks shall be self-centering and shall consist of a bevel lipped,

slotted angle, riveted to sill and a wedge pin attached by ring and heavy chain to the bottom rail of sash to act as the support for the sash when open.

(D-6) Erection

Basement windows shall be set plumb and true securely anchored to the building construction. Adjust all sash to properly operate.

(D-7) Painting

All Basement Windows shall be given one dip-coat of grey, lead and oil paint by the Manufacturer before shipment.

Note: The following should be provided for in the painting specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(D-8) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10 Fenestra Page 2.

(D-8a) Glass—Glass shall be double strength.

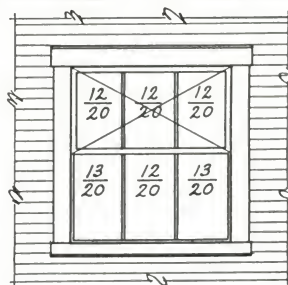
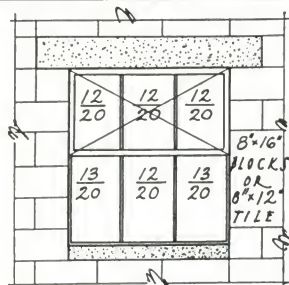
Note: Single strength glass is not recommended.

(D-8b) Putty—Putty shall be a high grade Steel Window Putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11 Fenestra Page 2.

(D-8c) Glazing—All windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Window Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See Paragraph (D-7).



ELEVATION OF WINDOWS INSTALLED IN CONCRETE BLOCK AND FRAME CONSTRUCTION.

NOTE

THE FENESTRA UTILITY WINDOW IS DESIGNED FOR SMALL BUILDINGS SUCH AS GARAGES FILLING STATIONS, SHOPS, STORES AND BASEMENTS HIGH ABOVE THE GRADE LINE.

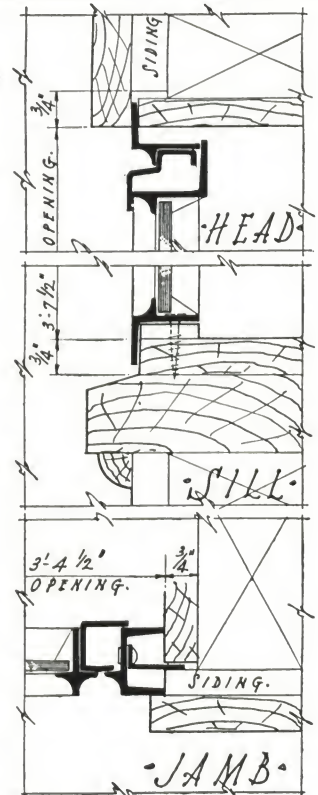
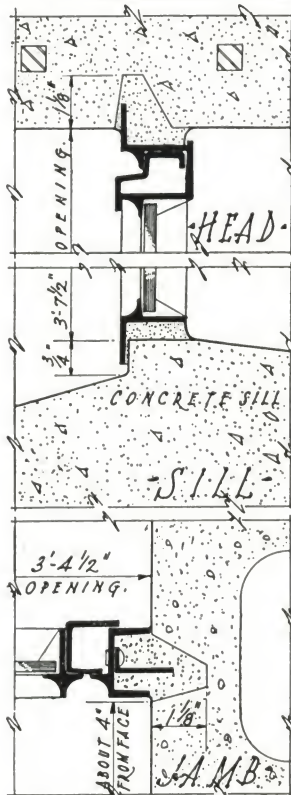
IT IS ALSO DESIRABLE IN AREA-WAYS WHERE MORE LIGHT IS NEEDED THAN IS SUPPLIED THRU FENESTRA BASEMENT WINDOWS, AS IN LAUNDRY ROOMS.

IT IS MADE IN ONE SIZE, ONLY, 3'-4 1/2" x 3'-7 1/2".

VENTILATOR IS ONE LIGHT HIGH, PIVOTED 2" ABOVE CENTER TO PREVENT UNDUE PROJECTION EITHER INSIDE OR OUTSIDE.

SECTIONS AND FITTINGS ARE THE SAME AS FOR HORIZONTALLY PIVOTED WINDOWS.

OPERATING HARDWARE CONSISTS OF IRON CAM HANDLE AND NOTCHED STAY-BAR AS IN HORIZONTALLY PIVOTED WINDOWS.



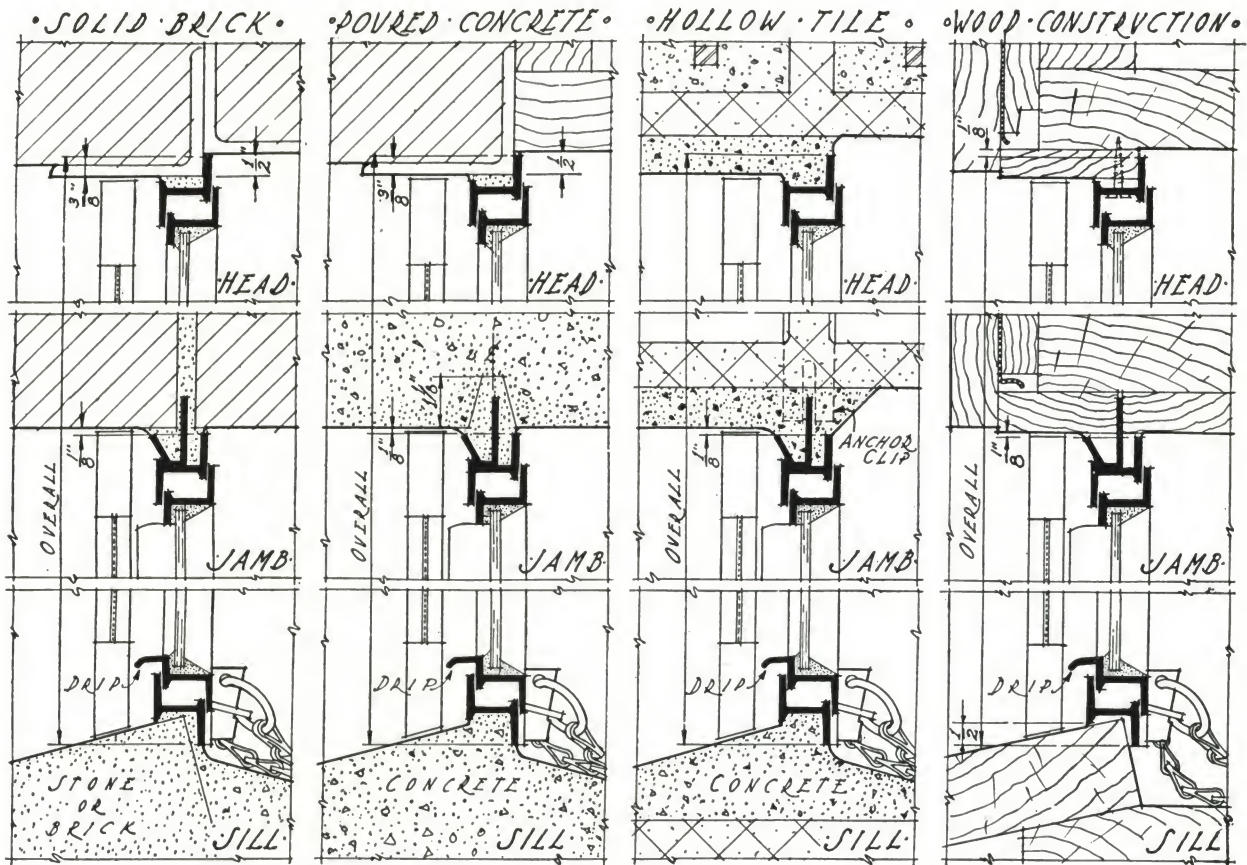
INSTALLATION DETAILS

SCALE: 3" = 1'-0"

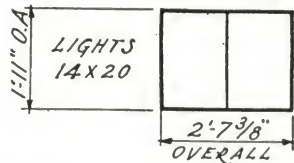
Fenestra
August 1927

Steel Utility Windows
Types, Sizes and Details

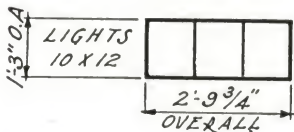
Plate No
C-101



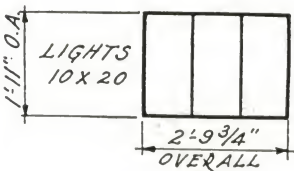
• TYPES • AND • SIZES •



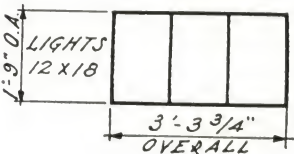
IN CONCRETE BLOCK CONSTRUCTION, FITS OPENING TWO BLOCKS WIDE BY THREE BLOCKS HIGH WITH A TROWELED SILL.



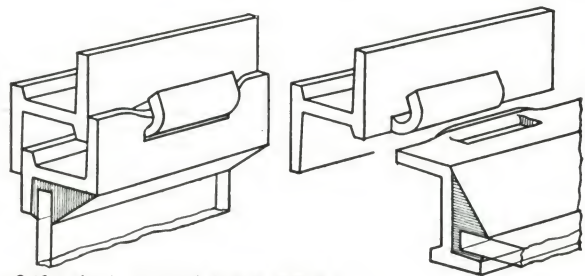
FOR HOUSES WITH LOW GRADE LINES - WORKS OUT EXCEPTIONALLY WELL IN BRICK CONSTRUCTION.



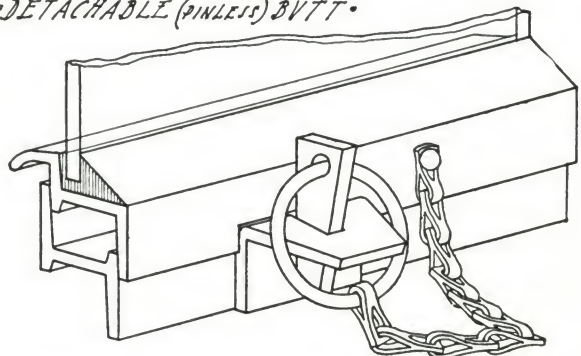
FOR HOUSES WITH A HIGHER GRADE LINE. WORKS OUT WELL IN BRICK OR CONCRETE BLOCKS



WORKS OUT WELL WITH EITHER BRICK OR CONCRETE BLOCK, AND IS THE WINDOW MOST USED IN THE AVERAGE TYPE OF CONSTRUCTION.



**DETAIL OF FENESTRA.
• DETACHABLE (PINLESS) BVT.**



**• DETAIL OF SELF-CENTERING KEEPER.
• SCALE: 3" = 1'-0" •**

Fenestra
August 1927

Steel Basement Windows
Types, Sizes and Details

Plate No
D-101

(G) ARCHITECTURAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(G-1) Work Included

Note: List and locate. (See Paragraph 13 Fenestra Page 2).

(G-2) General

Architectural Projected Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(G-3) Materials

(G-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in re-entrant angles.

(G-3b) Frame Members—All frame members shall be unequal leg channel sections, outside leg 1½", inside leg ¾".

(G-3c) Muntins—Muntins shall be 1½" deep.

(G-3d) Vertical Mullions—Vertical Mullions shall be standard *Fenestra*, hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(G-3e) Horizontal Mullions—Horizontal mullions shall be standard *Fenestra* (hot rolled, solid steel Z bars and angles) (structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(G-3f) Mullion Covers—(Vertical) (Horizontal) Mullion covers shall be of pressed steel designed to neatly cover mullion recesses.

(G-4) Construction

(G-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous two point, flat-contact weathering between ventilators and frames.

(G-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at the intersections. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 44. An exclusive Fenestra feature.

(G-4c) Glazing (Angles) (Beads)—All glass shall be secured with glazing (angles) (beads) neatly mitered at corners. (Angles) (Beads) shall be secured to head, jamb and sill frame and ventilator members with brass tap screws and to muntins with brass barrel screws.

Note: Specify choice of angles or beads. Glazing Beads as detailed on Fenestra Page 21 are furnished at slightly added cost over the cost of angles.

(G-4d) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(G-4e) Horizontal Mullions—Where two or more windows are placed one above another in the same opening, provide horizontal mullions with bolts for frame attachment.

(G-4f) Mullion Covers—Provide (vertical) (horizontal) steel mullion covers with the necessary clips and bolts for attachment.

(G-4g) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(G-5) Attached Hardware

Note: Attached at Factory.

(G-5a) Ventilator Operating Hardware—Ventilators shall (swing-out from the bottom while sliding down from the top) (or) (swing-in from the top while sliding up from the bottom) as indicated. The *open-out* ventilators shall be so constructed that by tilting them slightly beyond the horizontal they may be conveniently washed from inside the building. (The *open-in* ventilators shall tilt to 90°.)

Note: Specify swing-out, swing-in or both as required.

Each ventilator shall be accurately balanced on two supporting arms of solid spring steel attached to the ventilator with bronze shoulder pivots, equipped with bronze washers. Connections between supporting arms and window frame shall be made by malleable iron brackets rigidly supported on the horizontal frame members or muntins and double riveted to the vertical frame members or muntins with arms attached by bronze shoulder pivots.

Each ventilator shall be equipped with two bronze friction shoes sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Friction shoes shall be channel shaped

(to insure ease of operation) and mounted on bronze shouldered studs, so constructed that through galvanized compression springs (covered by weather protecting bronze tubes) uniform tension is secured. Shoes shall be accurately gauged and located and solidly riveted in place to assure proper, constant pressure at the jambs.

(G-5b) Alignment Springs—Each *open-out* ventilator shall be equipped with two shouldered, alignment-control bronze springs riveted to the channel jambs.

Note: The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle or reverse for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic. See Fenestra Page 19.

Note: Include if open-out ventilators are used.

(G-5c) Alignment Stops—Each *open-in* ventilator shall be equipped with a solid steel stop which prevents its opening farther than 90°.

Note: Include if open-in ventilators are used.

(G-5d) Cam Handle Brackets—Where required, provide special design malleable iron brackets, triple riveted to ventilators, for attachment of cam handles.

(G-6) Detached Hardware

Note: See Fenestra Page 19.

(G-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(G-6b) All hardware for Architectural Projected Windows shall be of bronze, light coinage finish.

(G-6c) Locking and Operating Devices

Note: Select as required.

Note: Where ventilators are screened, special flat-type bronze handles may be secured which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Bronze cam handle, Part 114, attached to malleable iron bracket by bronze screw-head bolt through steel spring friction clevis. Bronze strike plate carrying a 6" bronze hook stay, Part 122, riveted to window at ventilator sill.

(2) *For open-out ventilators beyond reach from floor*—Riveted bronze pole ring, Part 151, at head of ventilator. Bronze cam handle, Part 150, with hole for pole hook, attached to malleable iron brackets by bronze, screw-head, steel, spring, friction clevis. Riveted bronze strike plate.

(3) *For open-in ventilators within reach from floor*—Riveted bronze spring latch with ornamental handle, Part 212, at head of ventilator. Riveted bronze lipped strike.

(4) *For open-in ventilators beyond reach from floor*—(Riveted bronze spring latch with pole hook ring handle, Part 147, at head of ventilator; riveted steel strike). (Riveted bronze spring latch with endless chain, Part 146, at head of ventilator. Riveted steel strike. Riveted bronze chain guide, Part 149, at sill).

Note: Select type desired.

(G-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. (See Paragraph 9, Fenestra Page 1.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(G-7a) All Architectural Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See paragraph 5 Fenestra Page 1.

(G-7b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing. Standard *Fenestra* sill anchors shall be used under the following conditions:

- (1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.
 - (2) In all cases where the window is over 5' 0" wide, regardless of the location of the ventilators.
 - (3) In all multiple unit openings where mullions are not anchored into the sills.
- All ventilators shall be properly adjusted before glazing.

(G-7c) Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting has been completed.

(G-8) Painting

All Windows shall be given one dip-coat of red mineral paint by the Manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.

(G-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10 Fenestra Page 2.

(G-9a) **Glass**—Glass shall be (1/4" thick plate) (1/4" wire of type desired) (double strength).

Note: 1/4" thick glass is recommended. Single strength glass is not recommended.

(G-9b) **Putty**—Putty shall be a high grade steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(G-9c) **Glazing**—All Architectural Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured with glazing (angles) (beads) set against face putty neatly and smoothly applied.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (G-8).

(G-10) Provision for Screens

Note: Fenestra Page 26 gives suggestions for screening provisions. Include in the Carpentry Specifications the necessary clauses covering wood trim required in conjunction with screens. Space between inside screen and window must be not less than 2" to clear standard hardware. If special "Flat Type" handles are specified. (See note, paragraph [G-6c] 1" clearance only is required.) On account of the roller, rolling screens require a 2 1/2" clearance.

(G-11) Screens

Note: On open-out ventilators, metal side hinged or vertical sliding screens may be used as desired. Rolling screens up to 6' 0" wide may be used where entire window is covered. On open-in ventilators, metal, removable, fixed, outside screens may be used. Screens are not included by the Window Manufacturer and should, therefore, be provided for under another division of the specification.

(G-12) Shading

Note: All shades must be located at least 2" from the inside face of the window for hardware clearance. Clearance for screens depends upon the type selected.

Note: Shade bracket clips designed to attach by drilling and tapping two small holes at the top of each jamb section are supplied at slight added cost (see Fenestra Page 25). These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. Shade clips cannot be used satisfactorily with rolling screens but shade brackets may be attached to the underside of screen box. Brackets of various projections may be used to clear any type of screening except where whole opening is screened. If shade bracket clips are required, so specify.



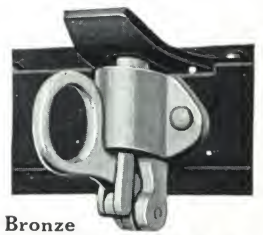
Fig. 1



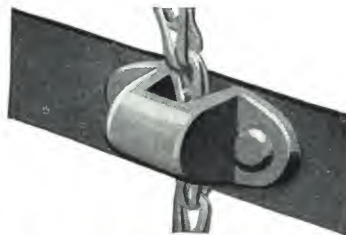
Figs. 1 and 2 show views of the alignment stop. Fig. 1, ventilator against the stop. Fig. 2, ventilator below the stop.



Bronze Pole Ring, Part 151



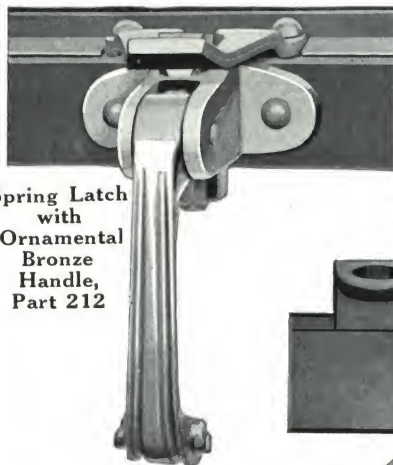
Bronze Spring Latch with Ring, Part 147



Bronze Chain Guide, Part 149



Bronze Sliding Friction Shoe



Spring Latch with Ornamental Bronze Handle, Part 212



Bronze Cam Handle, Part 150 and Strike



Fig. 2

Ornamental Bronze Cam Handle, Part 114, Strike and Stay, Part 122

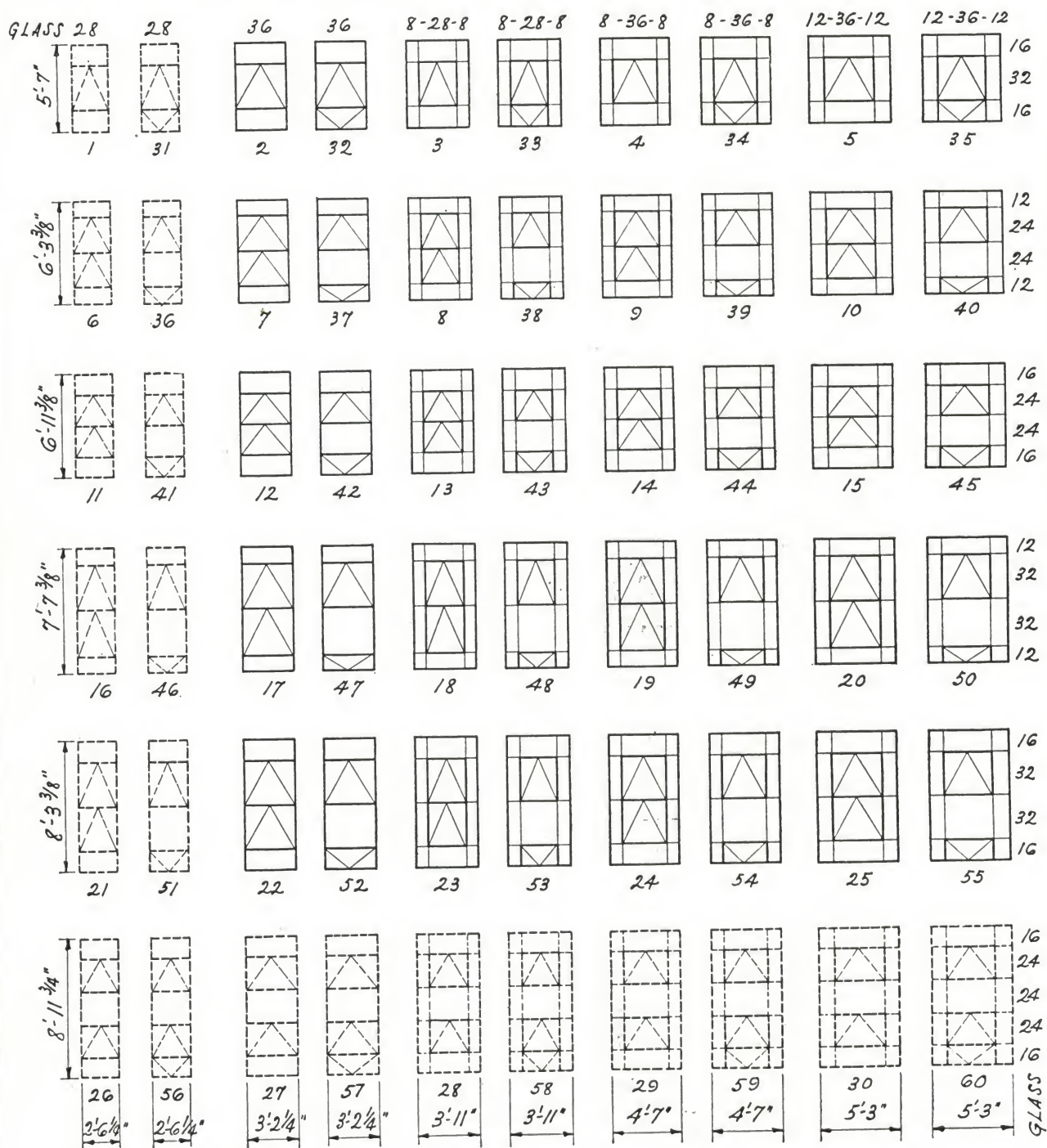


Supporting Arm and Bracket

Architectural Projected Window Hardware

T Y P E S • A N D • S I Z E S •
FULL LINES INDICATE STANDARD TYPES - DOTTED LINES LISTED SPECIALS •

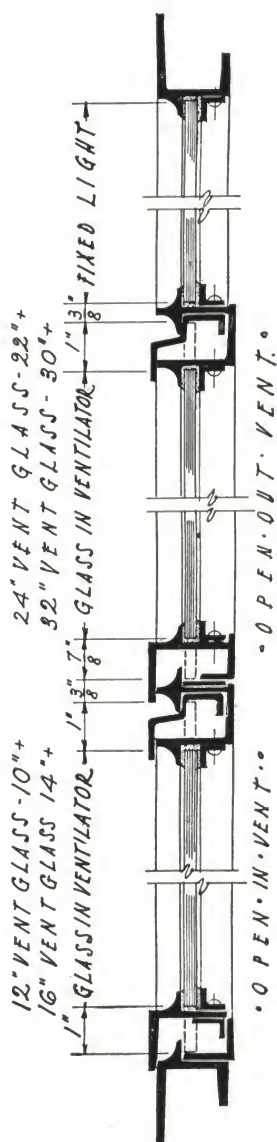
• GLASS SIZES GIVEN ARE FOR FIXED LIGHTS •
 • GLASS IN VENTILATORS IS 2' LESS IN BOTH WIDTH AND HEIGHT •



Fenestra
 August 1927

Architectural Projected Windows
Types and Sizes

Plate No
 G-101

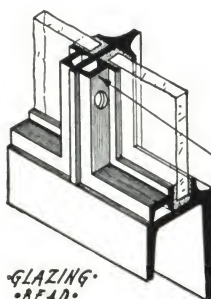


• VERTICAL •
• SECTION •

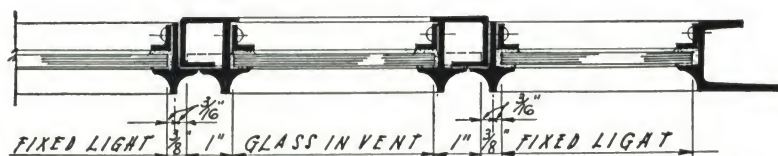
Symmetrical Combined Widths

Widths	Units Wide	Lights Wide	Kind of Units Width of Lights
5' 2 1/2"	2	2	28/28
6' 6 1/2"	2	2	36/36
7' 10 3/4"	3	3	28/28/28
8' 0"	2	6	8-28-8/8-28-8
8' 6 3/4"	3	3	28/36/28
9' 2 3/4"	3	3	36/28/36
9' 3 1/2"	3	5	28/8-28-8/28
9' 4"	2	6	8-36-8/8-36-8
9' 10 3/4"	3	3	36/36/36
9' 11 1/2"	3	5	28/8-36-8/28
10' 7"	4	4	28/28/28/28
10' 7 1/2"	3	5	28/12-36-12/28
10' 7 1/2"	3	5	36/8-28-8/36
10' 8"	2	6	12-36-12/12-36-12
10' 8 1/4"	3	7	8-28-8/28/8-28-8
11' 3 1/2"	3	5	36/8-36-8/36
11' 4 1/4"	3	7	8-28-8/36/8-28-8
11' 11"	4	4	28/36/36/28
11' 11 1/2"	3	5	36/12-36-12/36
12' 0 1/4"	3	7	8-36-8/28/8-36-8
12' 1"	3	9	8-28-8/8-28-8/8-28-8
12' 8 1/4"	3	7	8-36-8/36/8-36-8
12' 9"	3	9	8-28-8/8-36-8/8-28-8
13' 3"	4	4	36/36/36/36
13' 4 1/4"	3	7	12-36-12/28/12-36-12
13' 4 1/2"	4	8	28/8-28-8/8-28-8/28
13' 5"	3	9	8-28-8/12-36-12/8-28-8
13' 5"	3	9	8-36-8/8-28-8/8-36-8
14' 0 1/4"	3	7	12-36-12/36/12-36-12
14' 1"	3	9	8-36-8/8-36-8/8-36-8
14' 8 1/2"	4	8	36/8-28-8/8-28-8/36
14' 8 1/2"	4	8	28/8-36-8/8-36-8/28
14' 9"	3	9	8-36-8/12-36-12/8-36-8
14' 9"	3	9	12-36-12/8-28-8/12-36-12
15' 5"	3	9	12-36-12/8-36-8/12-36-12

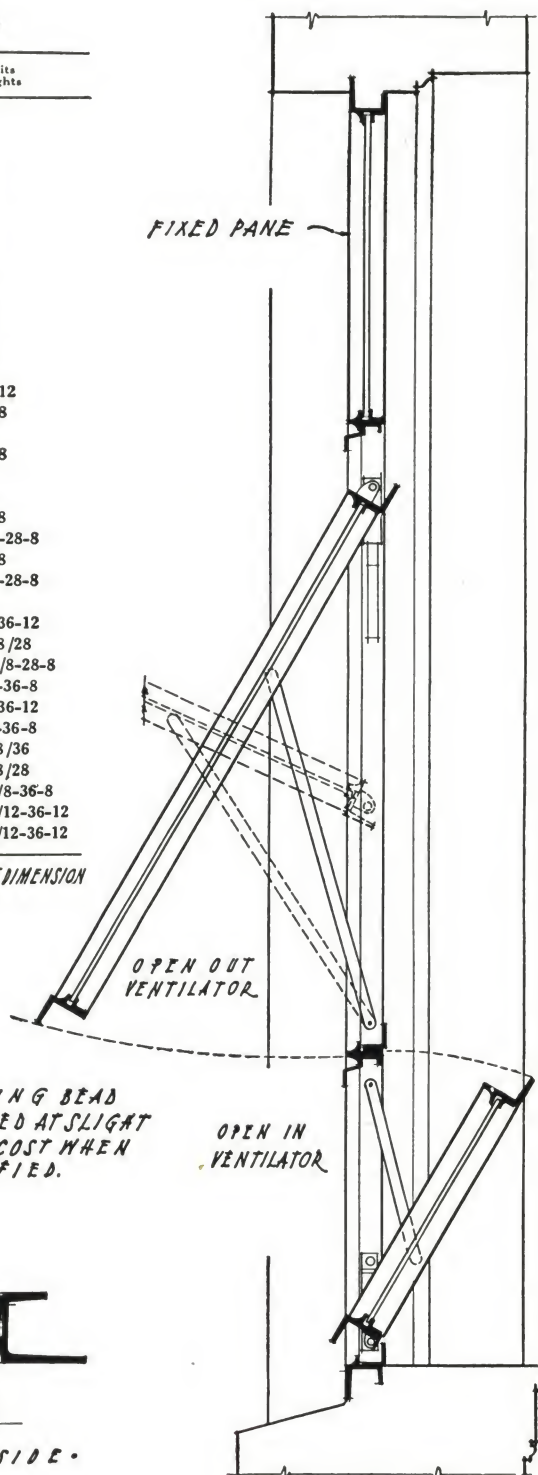
USE THESE WIDTH DIMENSIONS WITH ANY HEIGHT DIMENSION



GLAZING BEAD
SUPPLIED AT SLIGHT
ADDED COST WHEN
SPECIFIED.

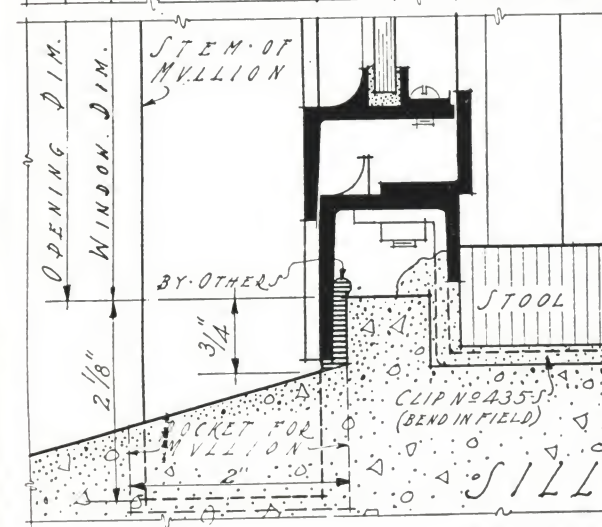
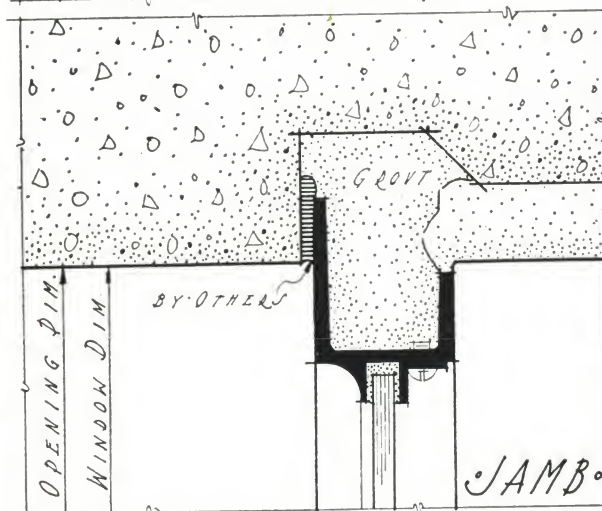
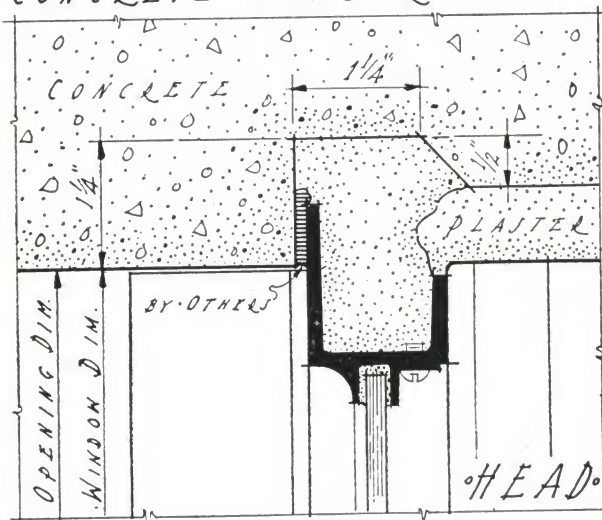


• HORIZONTAL • SECTION •
• GLASS • SIZES • FOR • VENTILATORS •
• SCALE : 5" = 1'-0" •

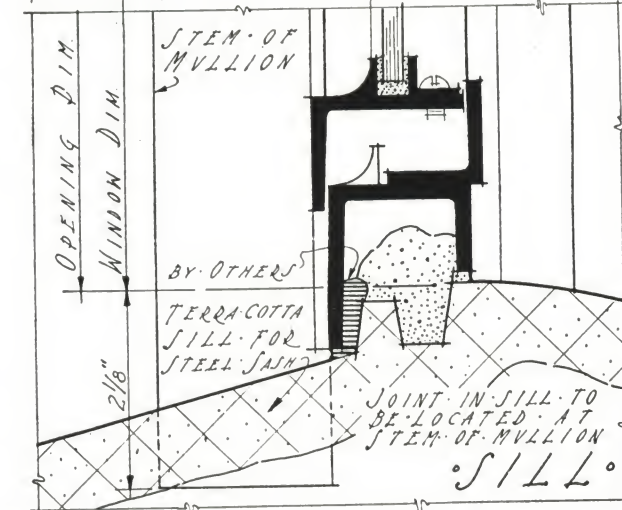
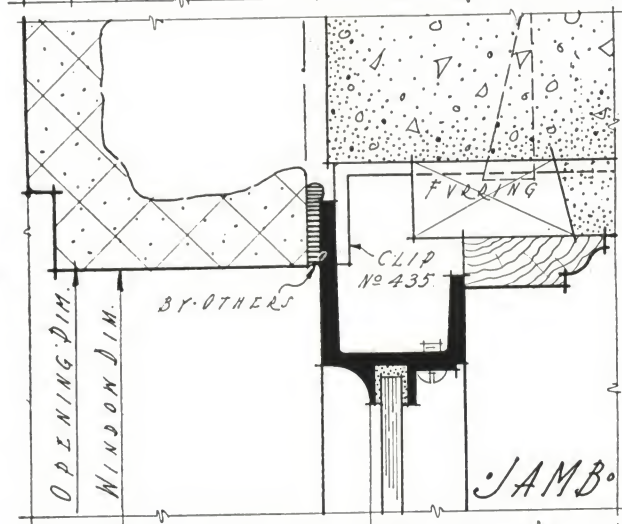
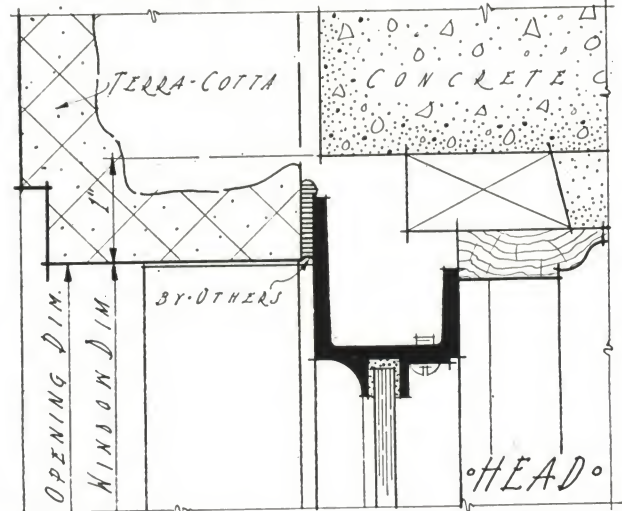


• SECTION • SHOWING •
• OPERATION • OF • VENTS •

CONCRETE CONSTRUCTION.



TERRA-COTTA.

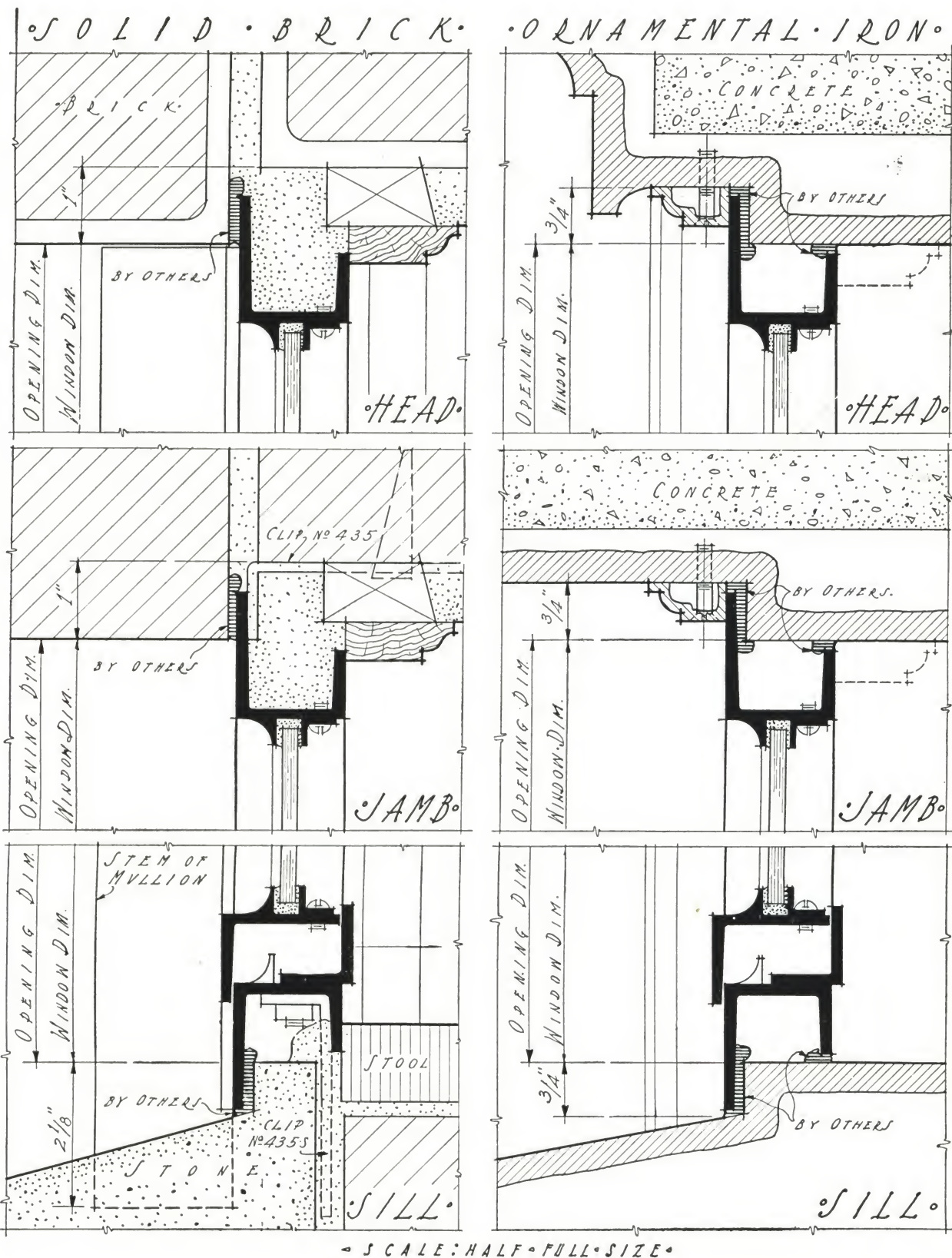


- SCALE: HALF-FULL-SIZE -

Fenestra
August 1927

Architectural Projected Windows
Installation Details

Plate No
G-103

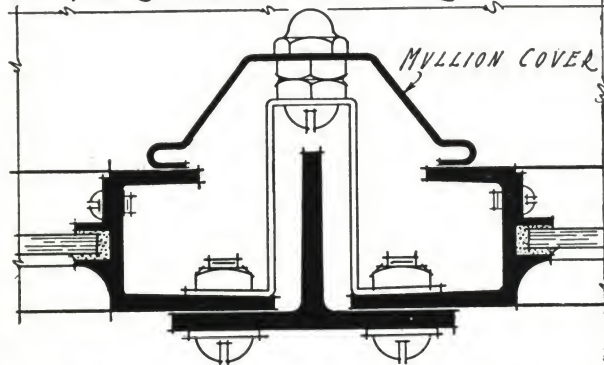


Fenestra
August 1927

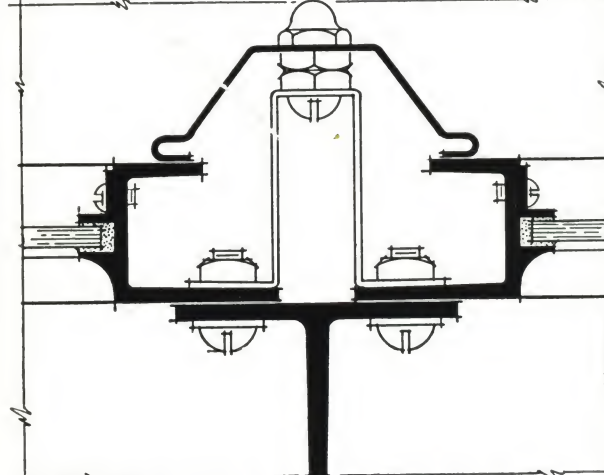
Architectural Projected Windows
Installation Details

Plate No
G-104

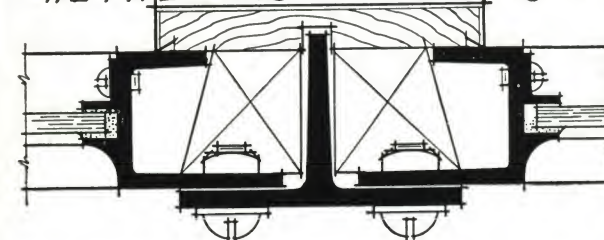
"T" BAR MULLION-TURNED-IN.



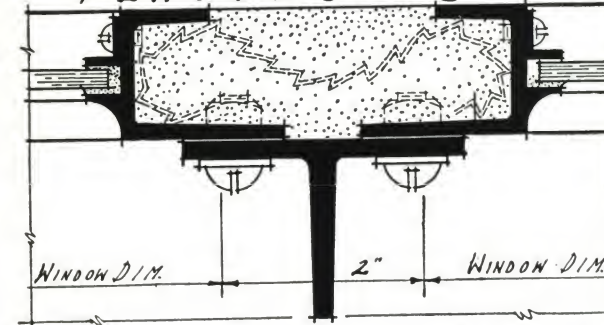
"T" BAR MULLION-TURNED-OUT.



METAL OR WOOD TRIM.

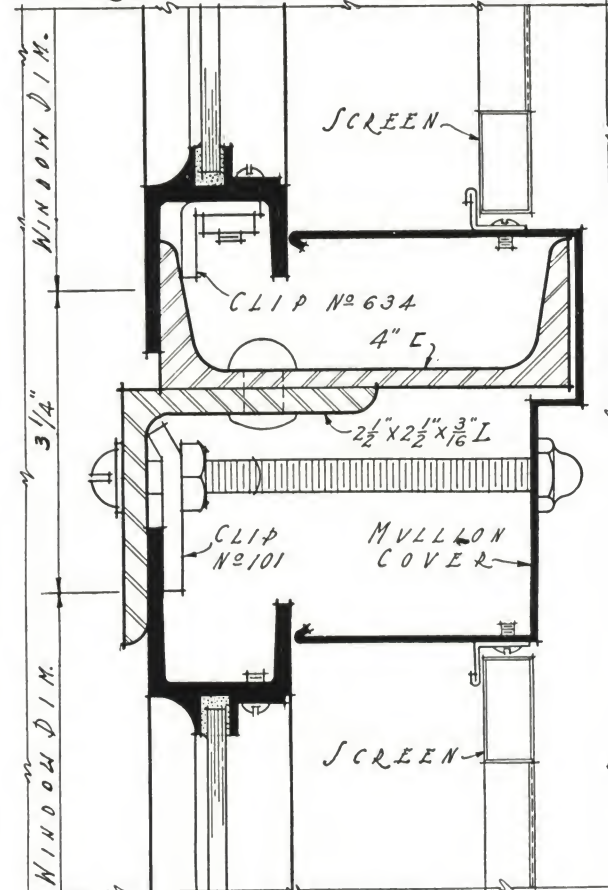


PLASTER TRIM.

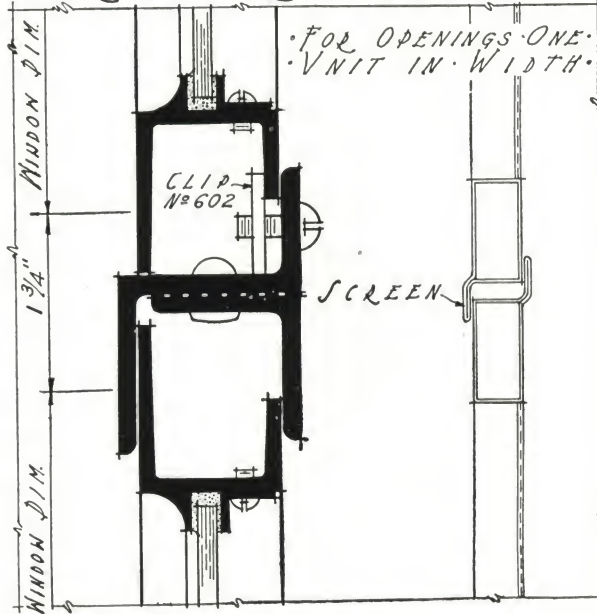


SCALE: HALF-FULL-SIZE

STRUCTURAL MULLION.



HOR. "Z" BAR MULLION.

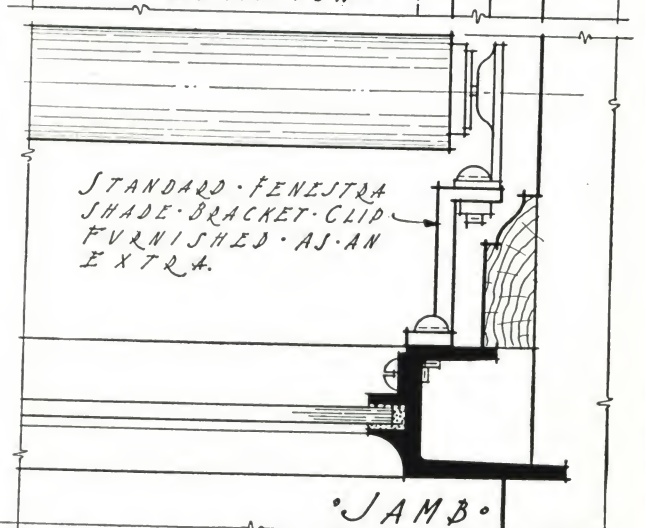
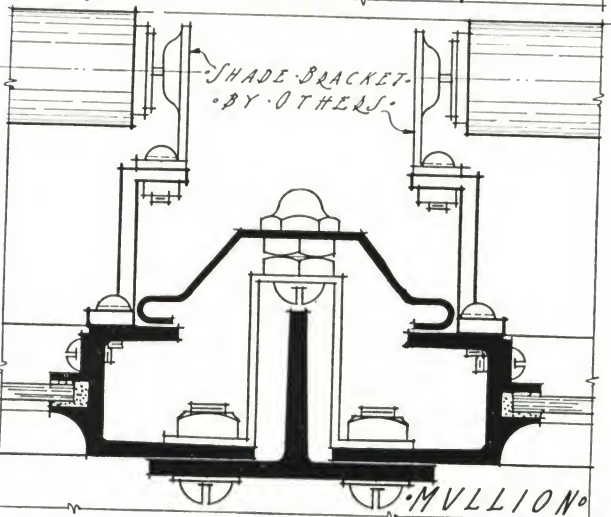
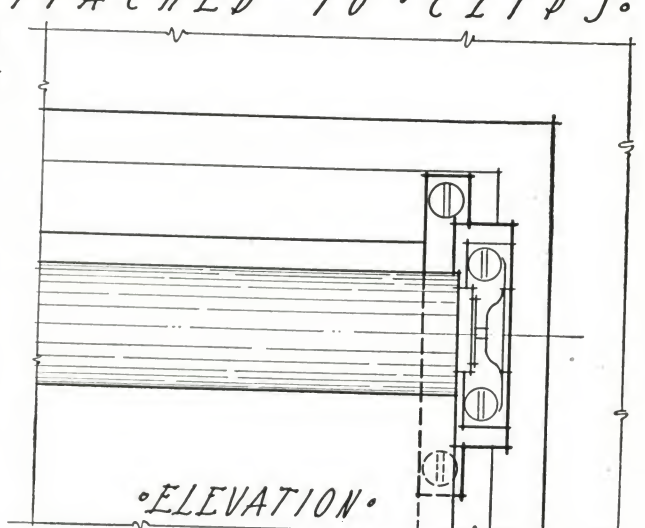
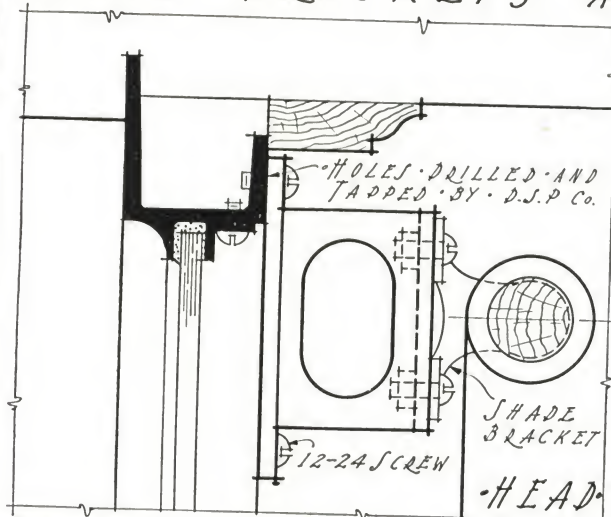


Fenestra
August 1927

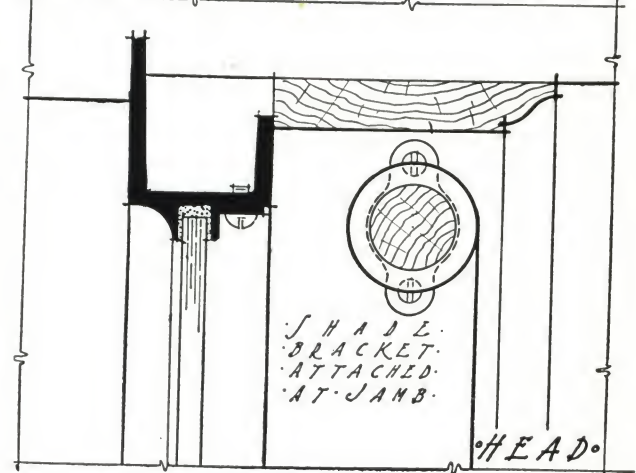
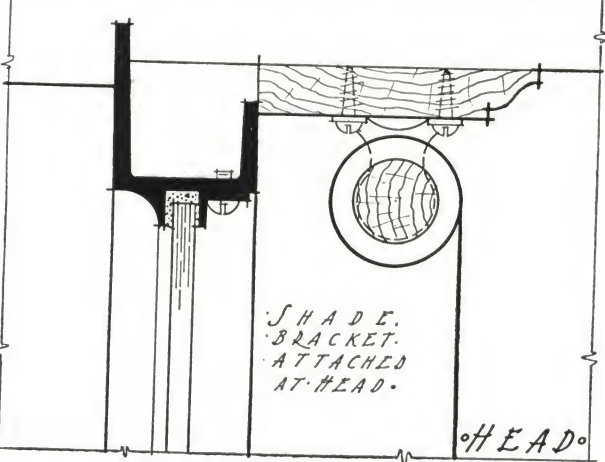
Architectural Projected Windows
Mullion Details

Plate No
G-105

SHADE BRACKETS ATTACHED TO CLIPS



SHADE BRACKETS ATTACHED TO TRIM



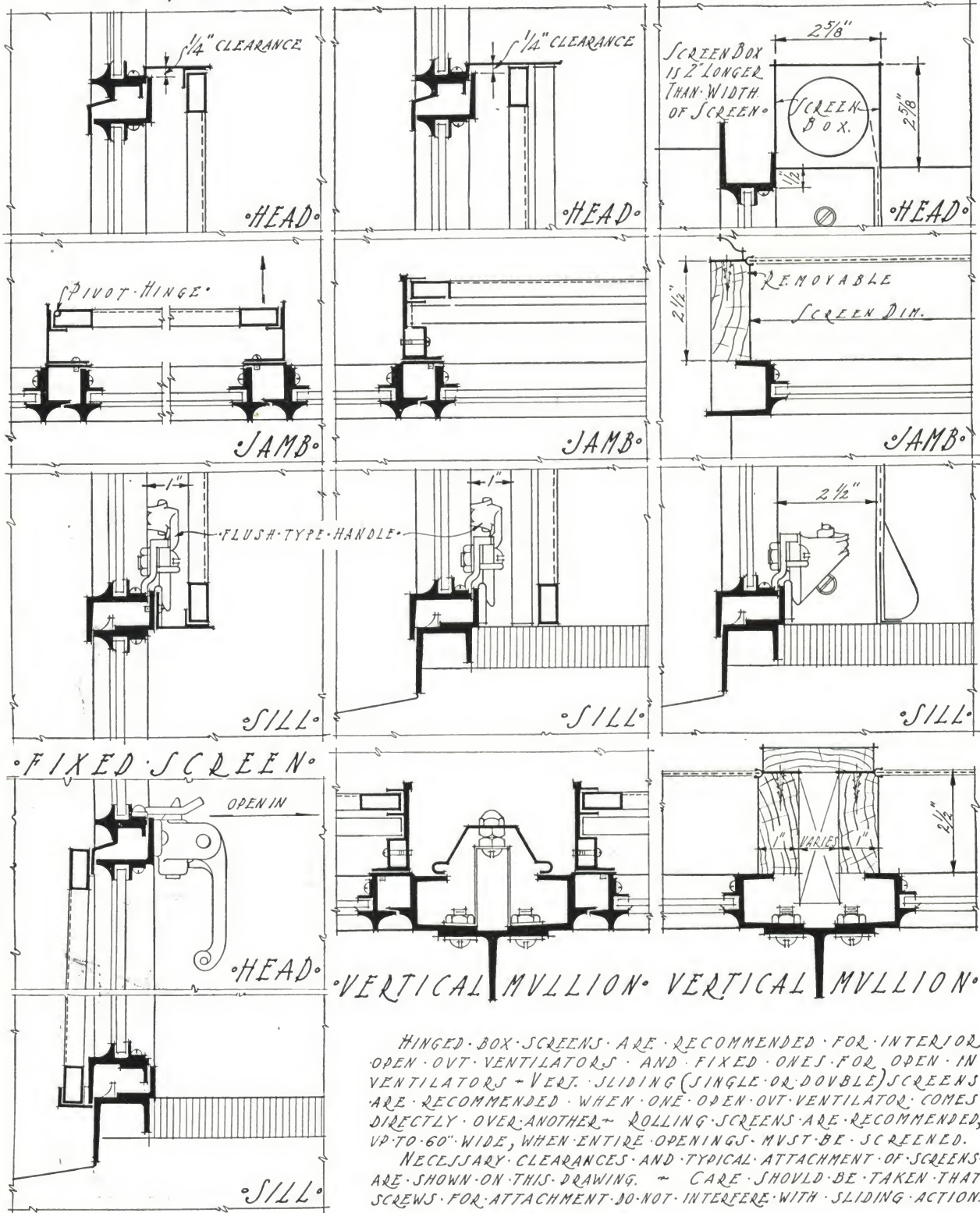
SCALE: HALF-FULL-SIZE

Fenestra
August 1927

Architectural Projected Windows
Shading Details

Plate No
G-106

HINGED SLIDING ROLLING



HINGED BOX SCREENS ARE RECOMMENDED FOR INTERIOR OPEN OUT VENTILATORS AND FIXED ONES FOR OPEN IN VENTILATORS. VERT. SLIDING (SINGLE OR DOUBLE) SCREENS ARE RECOMMENDED WHEN ONE OPEN OUT VENTILATOR COMES DIRECTLY OVER ANOTHER. ROLLING SCREENS ARE RECOMMENDED UP TO 60" WIDE, WHEN ENTIRE OPENINGS MUST BE SCREENED.

NECESSARY CLEARANCES AND TYPICAL ATTACHMENT OF SCREENS ARE SHOWN ON THIS DRAWING. CARE SHOULD BE TAKEN THAT SCREWS FOR ATTACHMENT DO NOT INTERFERE WITH SLIDING ACTION.

SCALE: - 3" = 1'-0" -

Fenestra
August 1927

Architectural Projected Windows
Screening Details

Plate No
G-107

(GC) COMMERCIAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: Commercial Projected Windows are in general design and operation similar to Architectural Projected Windows. They are made to meet the demand for a less expensive window of this type. The chief differences between the two are (1) the section of the frame member; (2) the addition of muntins dividing the window into small panes; (3) inside putty instead of glazing angles or beads; (4) use of malleable iron instead of bronze hardware.

Note: Commercial Projected Windows with "open-in" ventilators are particularly adapted to Food Products Plants since these windows may be screened economically. See Paragraphs (GC-10) and (GC-11).

Note: To avoid repetition where the specification is the same as that for the Architectural Projected Windows, this is so noted. Where not identical, use the clauses here given. For Specification for Architectural Projected Window referred to, see Fenestra Page 18.

accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. See Paragraph 9, Fenestra Page 1.

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GC-1) Work Included

Same as (G-1).

(GC-2) General

Commercial Projected Windows shall be Fenestra as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(GC-3) Materials

(GC-3a) Window Sections—Same as (G-3a).

(GC-3b)—Frame Members—All frame members shall be (special angle sections with protruding leg 1" deep) (special unequal leg channel sections).

Note: Select as required unequal leg channel at added cost over angle section.

(GC-3c) Muntins—Same as (G-3c).

(GC-3d) Vertical Mullions—Same as (G-3d).

(GC-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled solid steel T bars) (Structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GC-3f) Mullion Covers—Same as (G-3f).

(GC-4) Construction

(GC-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted at all corners. Ventilators shall, in addition to riveting, be electrically welded at corners, with exposed faces ground to a smooth finish.

(GC-4b) Muntins—Same as (G-4b).

(GC-4c) Vertical Mullions—Same as (G-4d).

(GC-4d) Horizontal Mullions—Same as (G-4e).

(GC-4e) Mullion Covers—Same as (G-4f).

(GC-4f) Sill and Jamb Anchor Clips—Same as (G-4g).

(GC-5) Attached Hardware

Note: Attached at factory.

(GC-5a) Ventilator Operating Hardware—Same as (G-5b) (G-5c).

(GC-5d) Cam Handle Brackets—Where required, provide solid rolled steel Z bar brackets, triple riveted to the ventilators, for the attachment of cam handles.

(GC-6) Detached Hardware

(GC-6a) Same as G-6a).

(GC-6b) All hardware for Commercial Projected Windows shall be (malleable iron with one coat of red mineral paint) (bronze, light coinage finish).

Note: Select as required. Bronze at added cost over iron.

(GC-6d) Locking and Operating Devices—

Note: Select as required.

Note: Where ventilators are screened, special flat type handles may be secured at added cost which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) For open-out ventilators within reach from floor—Malleable iron cam handle attached to Z bar bracket by bolt and nut, Part 150.

(2) For open-out ventilators beyond reach from floor—Riveted malleable iron pole hook ring at head of ventilator, Part 151, malleable iron cam handle, Part 150, with hole for pole hook, attached to Z bar bracket by bolt and nut.

(3) For open-in ventilators within reach from floor—Riveted malleable iron spring latch with finger ring handle at head of ventilator, Part 147.

(4) For open-in ventilators beyond reach from floor—(Riveted malleable iron spring latch with endless chain, Part 146, at head of ventilator. Riveted iron chain guide, Part 149, at sill) (or) (Riveted malleable iron spring latch with pole hook ring handle, Part 147, at head).

(GC-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in

(GC-7a) All Commercial Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(GC-7b) Same as (G-7b).

(GC-7c) Same as (G-7c).

(GC-8) Painting

Same as (G-8).

(GC-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(GC-9a) Glass—Same as (G-9a).

(GC-9b) Putty—Same as (G-9b).

(GC-9c) Glazing—All Commercial Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring, glazing clips furnished by the window manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Glazing angles are obtainable at slight added cost.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (G-8).

(GC-10) Provision for Screens

(GC-10a) For Open-out Ventilators—Same as (G-10).

(GC-10b) For Open-in Ventilators—For open-in ventilators provide permanent brackets for removable screen support.

Note: See Fenestra Page 31.

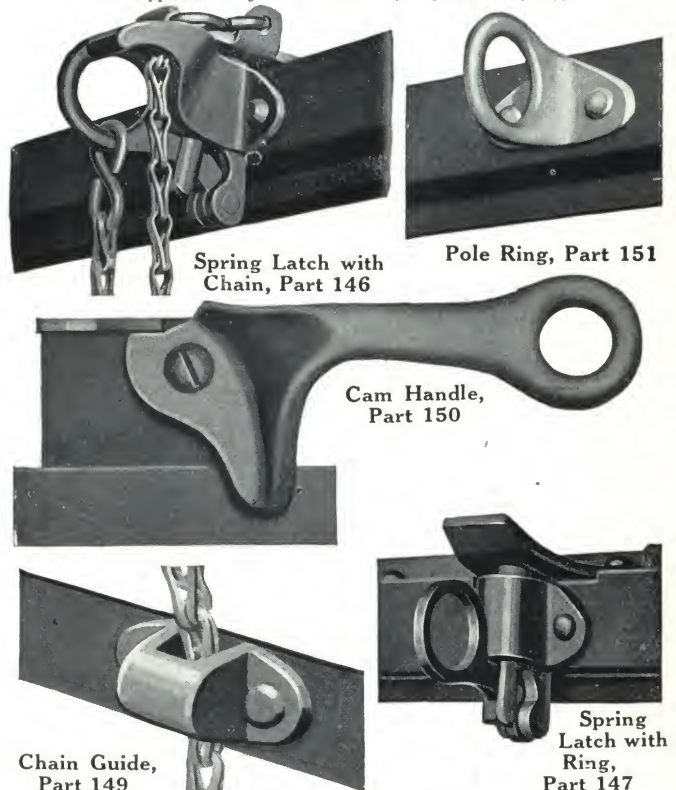
(GC-11) Screens

Same as (G-11).

Note: Where desired for open-in ventilators, the Window Manufacturer will furnish, at reasonable added cost, removable, tubular, steel frame, removable screens (baked enameled finish) with No. 16 mesh bronze screen cloth. These screens are well constructed and furnished completely adapted to and fitting the ventilator opening. (See Fenestra Page 31.) If required so specify.

(GC-12) Shading

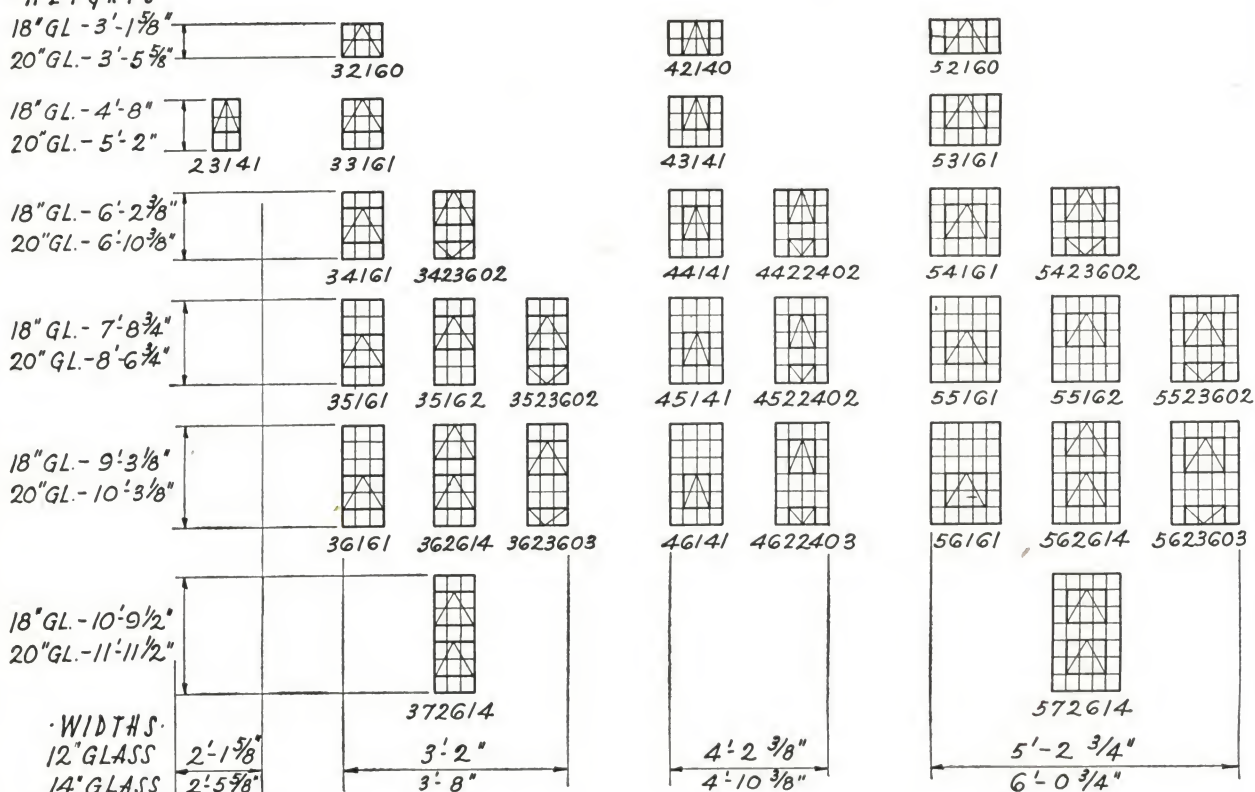
Note: Where ventilators are "open out" shade bracket clips, slotted to accommodate standard shade brackets, may be attached by drilling and tapping two small holes at the top of each jamb section of the frame. Clips are supplied at slight added cost. If required so specify.



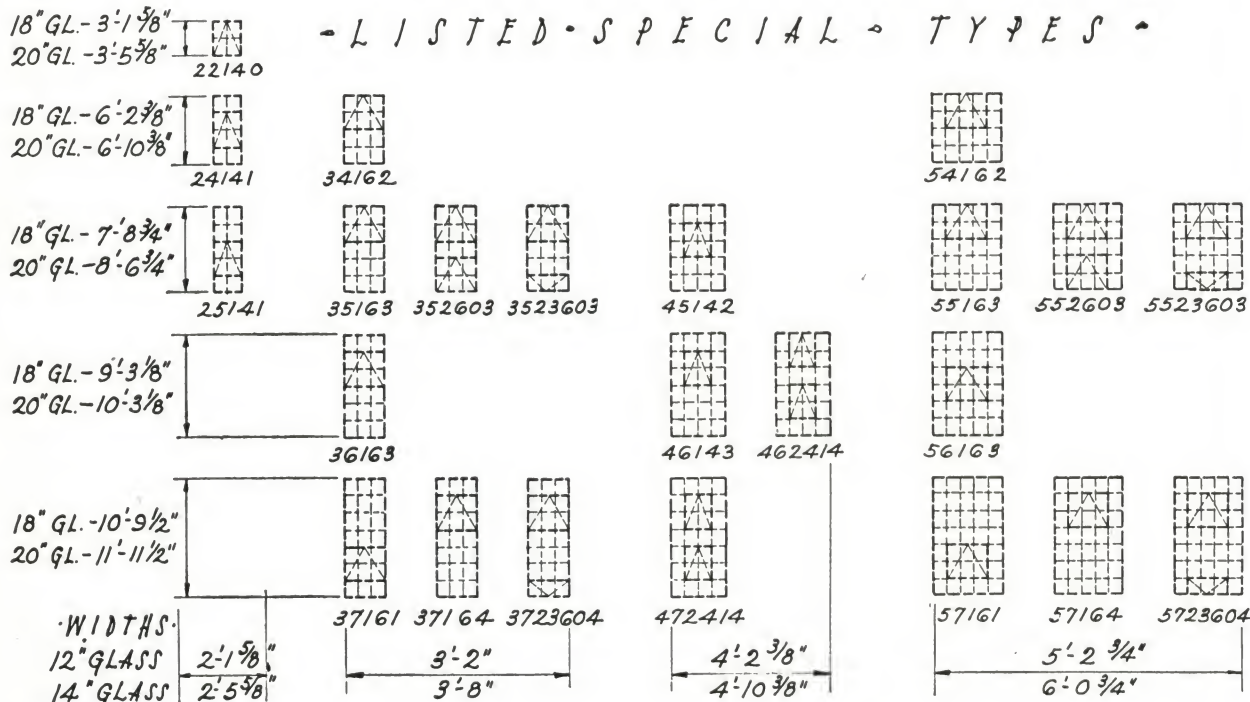
Commercial Projected Window Hardware

STANDARD TYPES

HEIGHTS



LISTED SPECIAL TYPES



Fenestra
August 1927

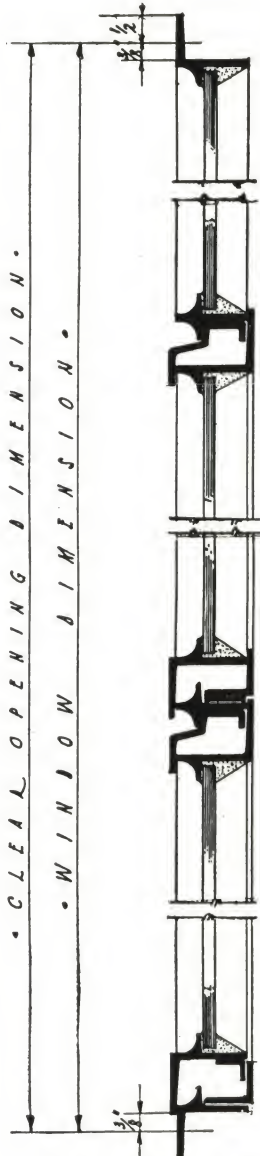
Commercial Projected Windows
Types and Sizes

Plate No
G-201

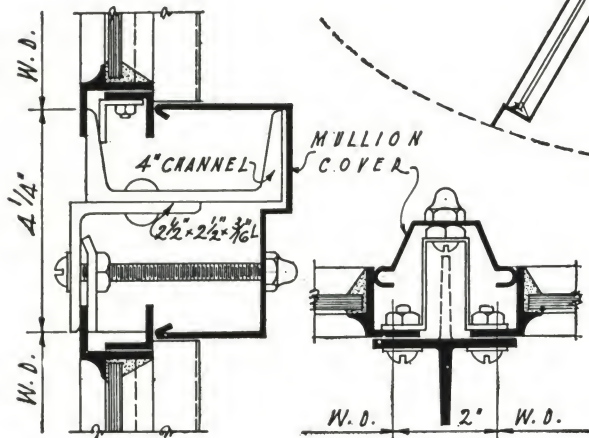
Symmetrical Combined Widths

12" x 18" Glass	14" x 20" Glass	Units Wide	Lights Wide	No. of Units and Lights Per Unit
2' 1 1/8"	2' 5 5/8"	1	2	2
3' 2"	3' 8"	1	3	3
4' 2 3/8"	4' 10 3/8"	1	4	4
4' 5 1/4"	5' 1 1/4"	2	4	2, 2
5' 2 3/4"	6' 0 3/4"	1	5	5
6' 6"	7' 6"	2	6	3, 3
8' 6 3/4"	9' 10 3/4"	2	8	4, 4
9' 10"	11' 4"	3	9	3, 3, 3
10' 7 1/2"	12' 3 1/2"	2	10	5, 5
10' 10 3/8"	12' 6 3/8"	3	10	3, 4, 3
11' 10 3/4"	13' 8 3/4"	3	11	3, 5, 3
12' 11 1/8"	14' 11 1/8"	3	12	4, 4, 4
13' 11 1/2"	16' 1 1/2"	3	13	4, 5, 4
13' 11 1/2"	16' 1 1/2"	3	13	5, 3, 5
14' 11 7/8"	17' 3 7/8"	3	14	5, 4, 5
15' 2 3/4"	17' 6 3/4"	4	14	3, 4, 4, 3
16' 0 1/4"	18' 6 1/4"	3	15	5, 5, 5
17' 3 1/2"	19' 11 1/2"	4	16	4, 4, 4, 4
19' 4 1/4"	22' 4 1/4"	4	18	4, 5, 5, 4
20' 7 1/2"	23' 9 1/2"	5	19	5, 3, 3, 3, 5
21' 5"	24' 9"	4	20	5, 5, 5, 5

COMBINE WIDTH DIMENSIONS IN COL. 1 WITH 12" x 18" GLASS HEIGHTS ONLY.
COMBINE WIDTH DIMENSIONS IN COL. 2 WITH 14" x 20" GLASS HEIGHTS ONLY.

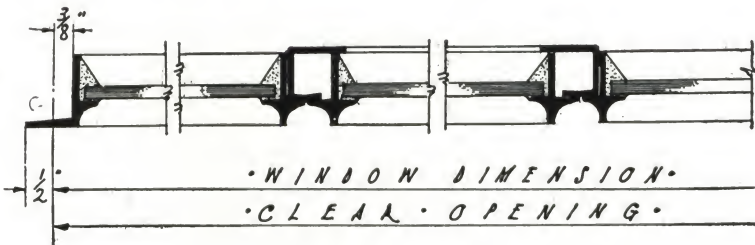


• VERTICAL SECTION •

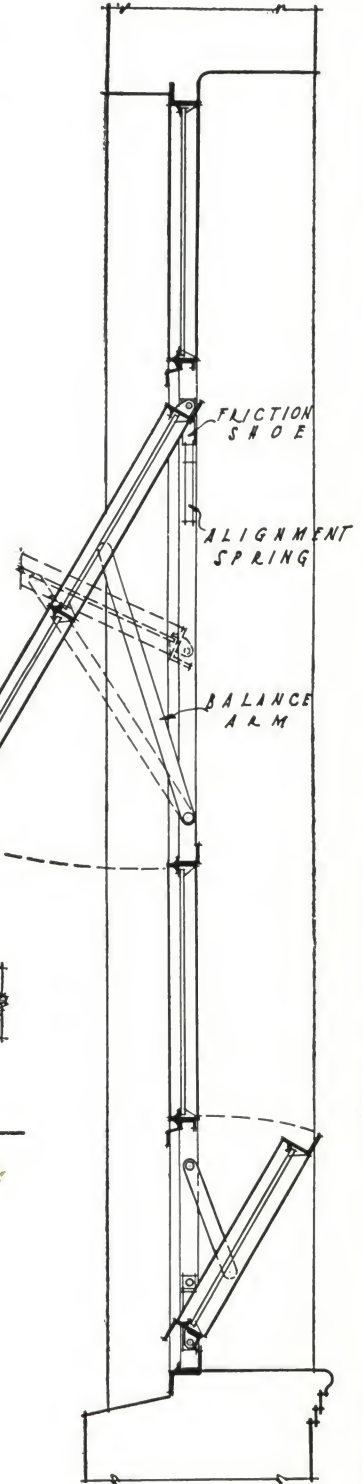


• HORIZONTAL •
• MULLION •

• VERTICAL •
• MULLION •



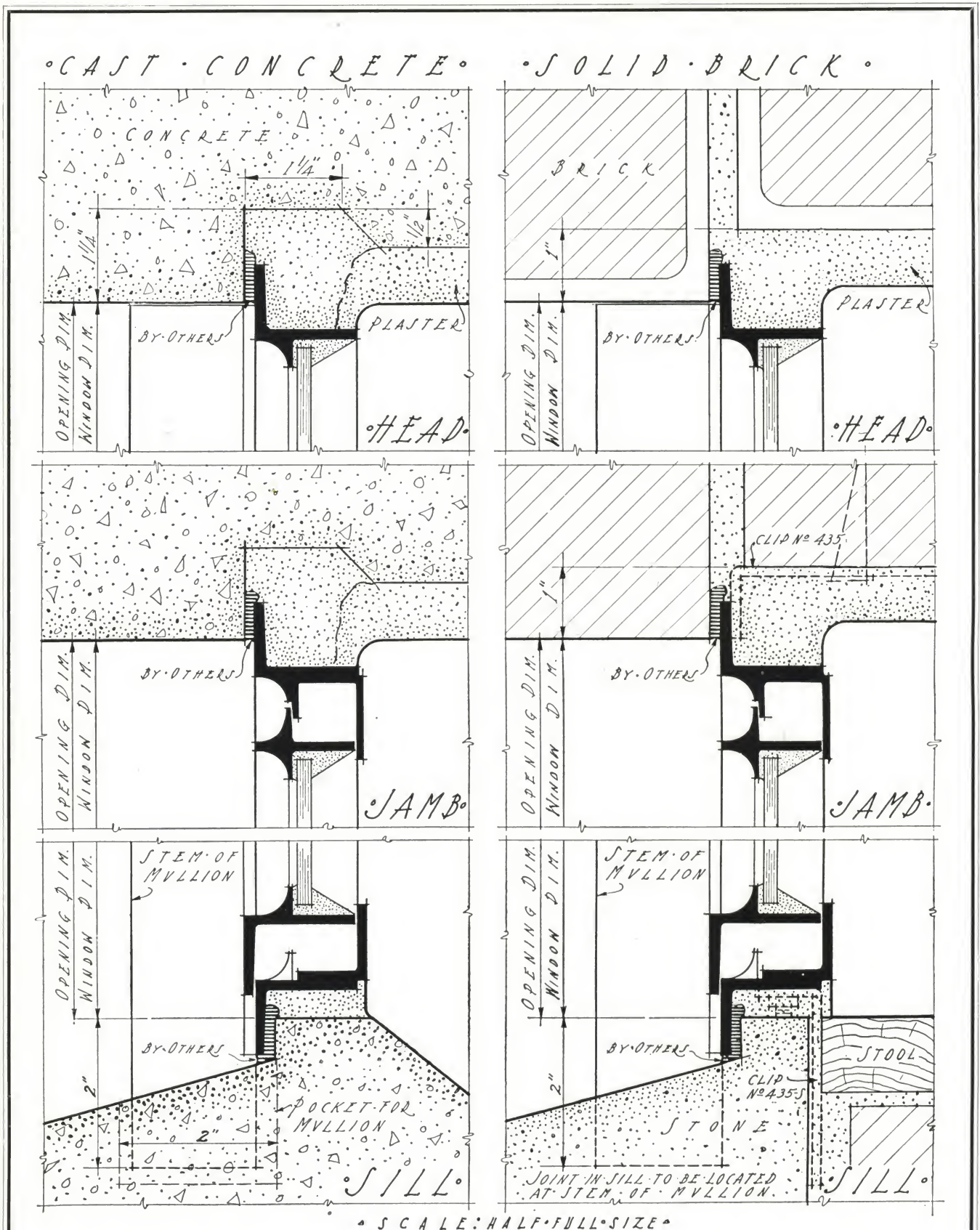
• OUTSIDE •
• HORIZONTAL SECTION •
• SCALE: 3" = 1'-0" •



Fenestra
August 1927

Commercial Projected Windows
Details and Combinations

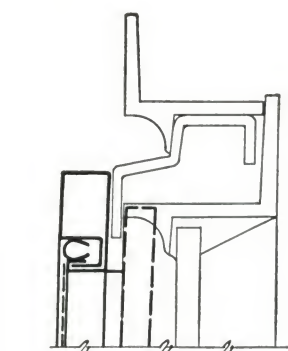
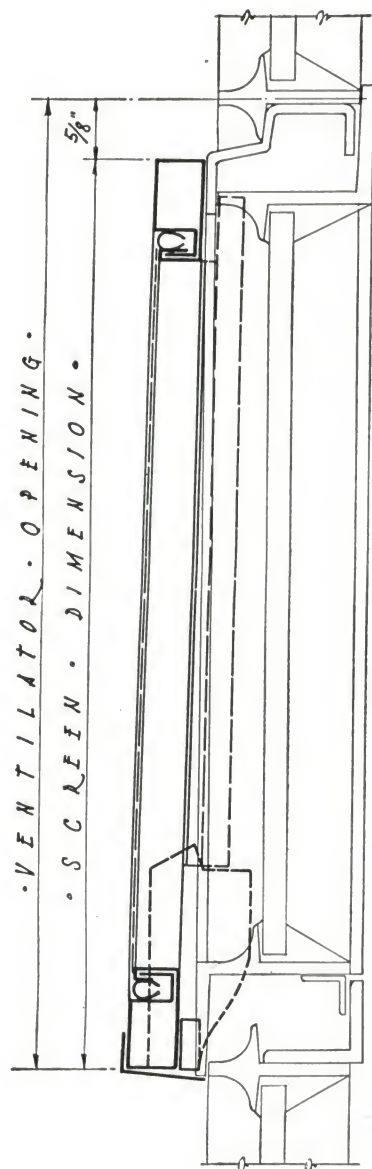
Plate No
G-202



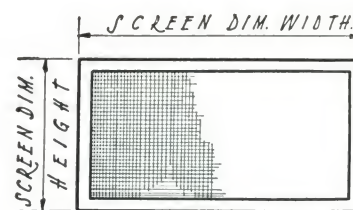
Fenestra
August 1927

Commercial Projected Windows
Installation Details

Plate No
G-203



• DETAIL WHEN VENT.
• COMES TO HEAD •



SIZE OF VENT	SIZE OF SCREEN	
	WIDTH	HEIGHT
4 PANE 12x18	23 7/8"	36 1/8"
6 PANE 12x18	36 1/4"	36 1/8"
8 PANE 12x18	48 5/8"	36 1/8"
4 PANE 14x20	27 1/8"	40 1/8"
6 PANE 14x20	42 1/4"	40 1/8"
8 PANE 14x20	56 5/8"	40 1/8"

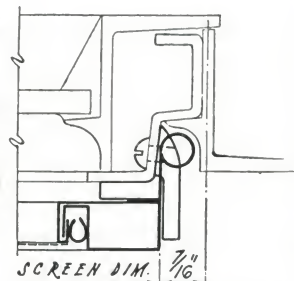
SIZES SHOWN ABOVE ARE STANDARD. ANY SIZE NOT SHOWN IS SPECIAL. SCREEN WIDTH AND HEIGHT CAN BE DETERMINED BY SUBTRACTING DIMENSIONS SHOWN ON SECTIONS FROM THE VENTILATOR OPENING.

SCREEN FRAMES ARE MADE OF OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL. CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE.

WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

IF SCREENING IS NOT SPECIFIED AND LATER IS DESIRED, IT WILL BE NECESSARY TO DRILL HOLES FOR CLIPS IN FIELD.

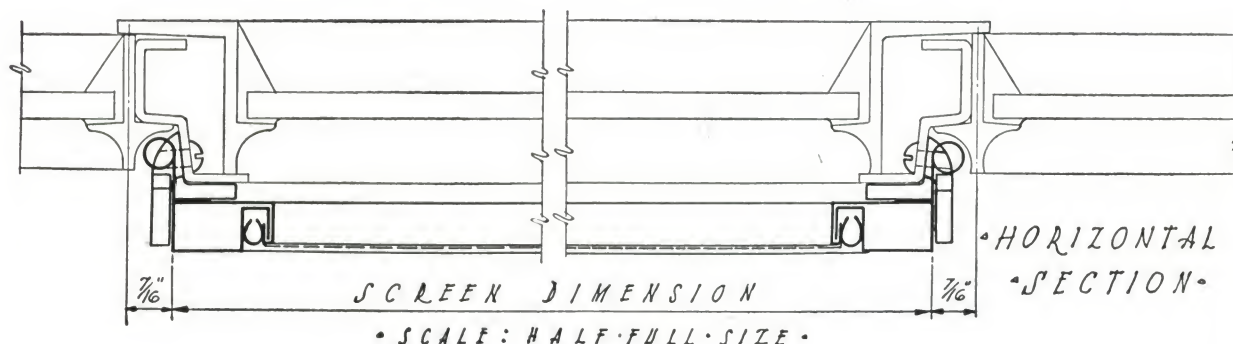
FIRST-OPEN VENTILATOR
SLIDE END OF BAFFLE
UNDER WEATHERING.
SECOND-PUSH SCREEN UP
AS FAR AS IT WILL GO.
THIRD-BRING BOTTOM OF
SCREEN FRAME IN TIGHT
AGAINST OUTSIDE OF WINDOW
FOURTH-PUSH SCREEN DOWN
FORCING BAFFLE BACK OF
LUG ON BRACKET.



• VERTICAL SECTION •

• METHOD OF ATTACHING
• SCREEN TO WINDOW •

• DETAIL WHEN SCREEN
• COMES TO JAMBS •



Fenestra
August 1927

Commercial Projected Windows
Screening Details

Plate No
G-204

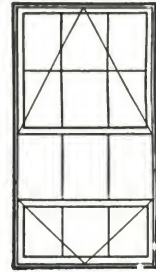
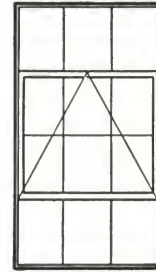
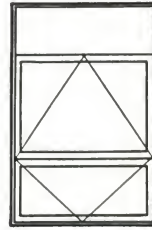
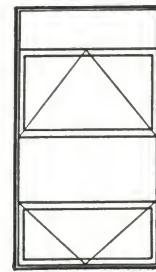
SHADE ADJUSTER

• TYPICAL • ELEVATIONS •

SHADE GUIDE

SHADE

SHADE CORD

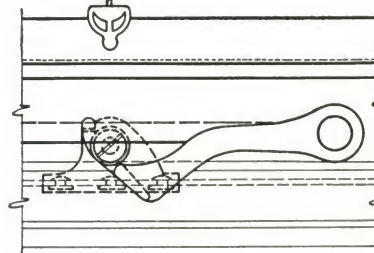


NOTE:—THIS SHADING DETAIL IS FURNISHED ONLY FOR WINDOWS WITH VENTILATORS COMING TO THE JAMB, AS NARROW SIDE-LIGHTS MAKE IT IMPOSSIBLE TO GET ENOUGH SPRING ACTION IN THE SHADE ROLLER TO HANDLE THE LONG NARROW SHADES.

PUNCHING IN WINDOWS AND NECESSARY FITTINGS WILL BE FURNISHED BY US AT A SLIGHT ADDITIONAL COST.

SHADE, CORD AND RING PULL MUST BE FURNISHED BY THE SHADE MANUFACTURER.

• ELEVATION OF HANDLE •



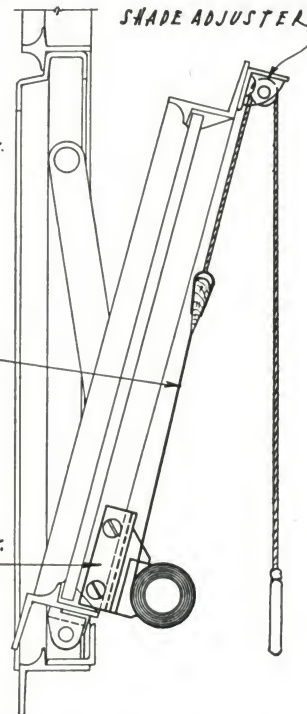
OPEN OUT VENTILATORS

LIGHT BAFFLE SILL OF OPEN OUT VENTS, SERVES ALSO AS A GLAZING ANGLE.

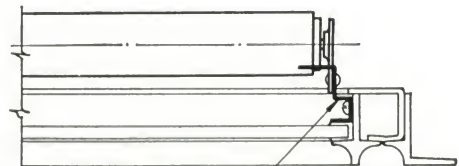
NOTE:—

SHADE GUIDE SECTION IS USED ONLY AT JAMBS OF OPEN OUT VENTS. FIXED PANES AND OPEN IN VENTS ARE EQUIPPED WITH SHADE BRACKET CLIPS ONLY AS SHOWN ON SECTIONS.

SHADE BRKT. CLIP.

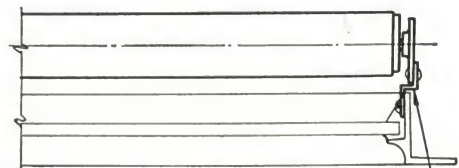


SHADE BRKT. CLIP

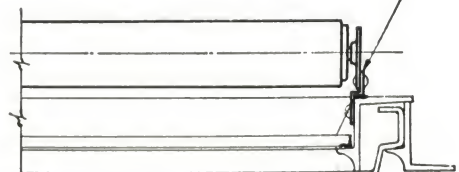


SHADE GUIDE SECTION. NOTE HOW IT SERVES ALSO AS LIGHT BAFFLE AND GLAZING ANGLE.

• OPEN • OUT • JAMB •



SHADE BRACKET CLIP
• FIXED • JAMB •



• FIXED • PANE • • OPEN • IN • VENTILATOR •

• OPEN • IN • JAMB •

• VERTICAL • SECTIONS •

• HORIZONTAL • SECTIONS •

• SCALE: 3" = 1'-0" •

Fenestra
August 1927

Commercial Projected Windows
Shading Details

Plate No
G-205

(H) COUNTERBALANCED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(H-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(H-2) General

Counterbalanced Steel Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(H-3) Material

(H-3a) General—All sections, unless otherwise specially mentioned, shall be specially designed, hot rolled, solid steel sections with heavy fillets in all re-entrant angles.

(H-3b) Frames—Jambs or mullions shall be 4" I-beam sections with flaring channel parting beads. Heads and Sills shall be heavy pressed steel sections.

Note: Jamb members serve also as mullions. No extra mullions needed.

Note: Flaring channel parting beads provide continuous "line" contacts for efficient weathering, eliminating friction produced by flat surfaces.

Note: Brass flaring channel jamb weathering may be provided at added cost to increase weathering and reduce friction. If required, so specify.

(H-3c) Sash—Stiles of sash shall be equal leg channels. Head and sill rails shall be unequal leg channels. Meeting rails shall be special channels with one leg rolled to provide a beveled, interlocking, flat contact weathering. Muntins shall be 1 3/8" deep.

Note: Muntins may be omitted for single light sash. If required, so specify.

(H-3d) Fittings—Provide malleable iron, adjustable, sill clips and meeting rail parting bead closures.

Note: Pulley housings form adjustable head clips.

(H-4) Construction

(H-4a) Frames—Parting beads shall be riveted to jambs.

Note: Brass weathering, if specified, is riveted to jambs in sash runs. If required, so specify.

Frame members shall be shipped "knocked down."

(H-4b) Sash—Stiles and rails shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces of welds shall be ground to a smooth finish. Muntins shall be mortise and tenon, air hammer riveted, at joints with sash rails.

(H-5) Hardware

Note: Hardware is shipped carefully packed to prevent damage until applied for use.

(H-5a) Pulleys and Chains—Each window shall be equipped with two roller bearings, steel pulleys mounted in a malleable iron housings.

Note: Pulley housing forms a clip for securing jambs to head and is accessible for oiling and easy removal.

Provide tension, malleable iron chain cleats cored to snugly receive three links of chain. The lower sash meeting rail cleat shall be tension adjusting. Chains shall be flat link, galvanized steel, tested to 400 pound load.

(H-5b) Locks—Meeting rail locks shall be cam action malleable iron.

(H-5c) Lifts—Lifts shall be of malleable iron attached to lower sash bottom rail with bolts and lock nuts.

Note: Bronze lifts, furnished at added cost. If required, so specify.

Note: A hole is provided in upper sash top rail for pole hook.

(H-6) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed.

Note: Include in the Masonry Specifications that all mortar grouting, painting, etc., shall be done by the Mason Contractor after windows have been erected.

(H-6a) All Counterbalanced Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(H-6b) Frames shall be accurately assembled in accordance with the manufacturer's directions. All windows shall be set plumb and true, properly aligned and securely anchored before glazing. All sash shall be properly adjusted before glazing.

(H-7) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.

(H-8) Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

Glass—Glass shall be (1/4" thick plate) (1 1/4" wire of type desired) (double strength).

Note: 1/4" thick glass is recommended. Single strength glass is not recommended.

Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

Glazing—All Counterbalanced Windows shall be glazed from the inside. All glass shall be set in a bed of putty secured by copper-plated, steel, spring glazing clips furnished by the window manufacturer and face puttied in a neat and smooth manner.

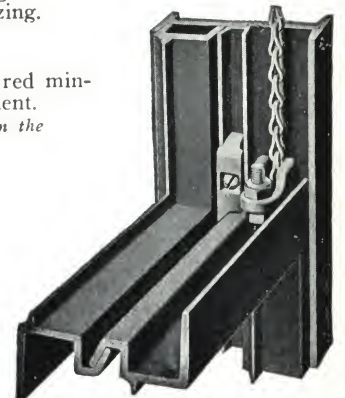
Note: Do not paint until putty has thoroughly hardened. See note Paragraph (H-7).

Note: Where single light sash are used, glass shall be secured with glazing angles. If required, so specify.

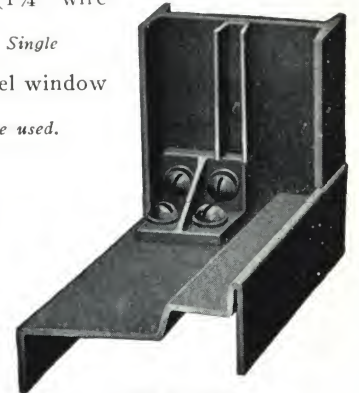
Counterbalanced Window Fittings and Hardware



Head Section



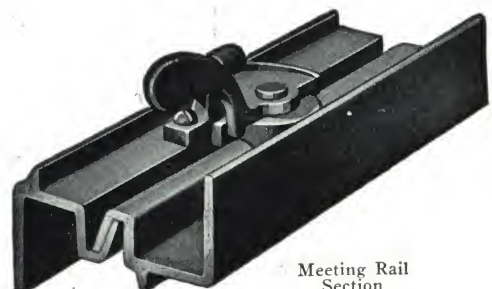
Jamb Section



Sill Section




































































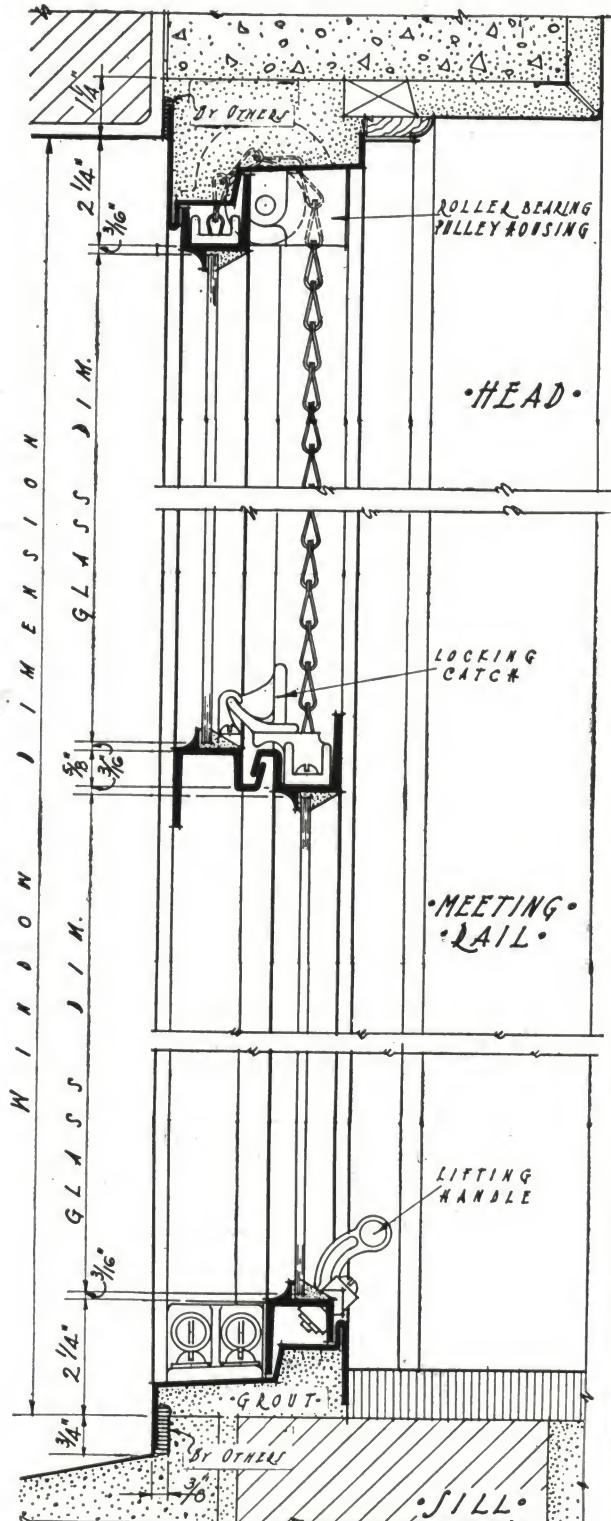
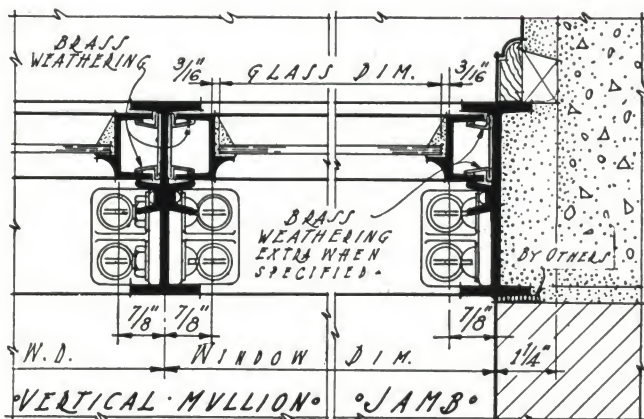
Sill Hardware



Meeting Rail Section

STANDARD TYPES

4'-6"					
	3046	3646	4046	4646	5046
5'-6"					
	3056	3656	4056	4656	5056
6'-0"					
	3060	3660	4060	4660	5060
6'-6"					
	3066	3666	4066	4666	5066
7'-0"					
	3070	3670	4070	4670	5070
7'-6"					
	3076	3676	4076	4676	5076
8'-0"					
	3080	3680	4080	4680	5080
9'-0"					
	3090	3690	4090	4690	5090
3'-0"					
	3090	3690	4090	4690	5090
3'-6"					
	3090	3690	4090	4690	5090
4'-0"					
	3090	3690	4090	4690	5090
4'-6"					
	3090	3690	4090	4690	5090
5'-0"					
	3090	3690	4090	4690	5090



HORIZONTAL SECTION VERTICAL SECTION
SCALE: 3" = 1'-0"

Fenestra
August 1927

Counterbalanced Windows
Types, Sizes and Details

Plate No
H-101

(I) INTERIOR CORRIDOR WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Corridor Windows are designed primarily for office buildings as a means of daylighting and ventilating corridors and inside offices.

Note: See "Open In" Architectural Projected Windows, Paragraph (G-5a), Fenestra Page 18.

(I-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(I-2) General

Corridor Windows shall be Fenestra as manufactured by the DETROIT STEEL PRODUCTS COMPANY.

(I-3) Materials

(I-3a) Frame Sections—All frame sections shall be specially designed, hot rolled, solid steel, equal leg channel with heavy fillets in all re-entrant angles.

(I-3b) Muntins—Muntins shall be 1½" deep.

(I-4) Construction

(I-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish.

(I-4b) Muntins—Muntins shall be mortise and tenon, air hammer riveted.

(I-4c) Jamb Anchor Clips—Furnish steel jamb anchor clips with bolts to attach to frame as required.

(I-5) Attached Hardware

(I-5a) Ventilator Operating Hardware—All ventilators shall swing in from the top while sliding up from the bottom and shall be equipped with standard Fenestra supporting arms and friction shoes as used in Fenestra Projected Windows.

(I-6) Detached Hardware

Each ventilator shall have one riveted, malleable iron spring latch with pole hook ring handle, part 147, and riveted steel strike. See Fenestra Page 27.

Note: Bronze hardware may be had at slight added cost.

(I-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be constructed in accordance with standard Fenestra installation details and that the Mason Contractor shall do all pointing, mortar grouting, etc., after windows have been erected.

(I-7a) All corridor windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY under separate contract.

(I-7b) All corridor windows shall be set plumb and true, properly aligned and securely anchored before glazing.

(I-8) Painting

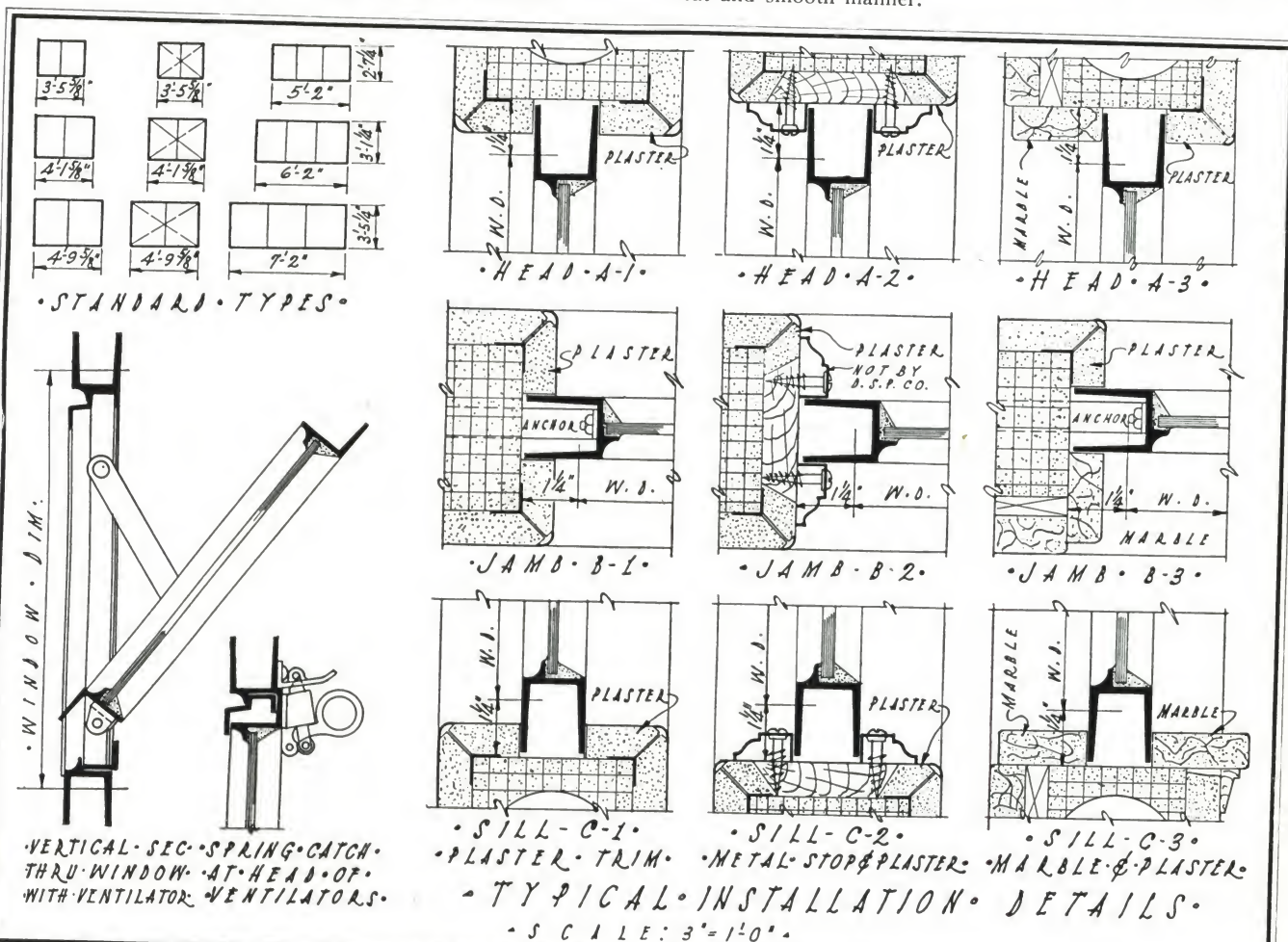
All corridor windows shall be given one dip coat of red mineral paint by the manufacturer before shipment.

Note: See Paragraph (G-8), Fenestra Page 19.

(I-9) Glass and Glazing

Note: See Paragraph (G-9a) and (G-9b), Fenestra Page 19.

(I-9a) Glazing—All glass shall be set in a bed of high grade steel window putty, held by copper plated spring glazing clips furnished by the window manufacturer and face puttied in a neat and smooth manner.



Fenestra
August 1927

Interior Corridor Windows
Types, Sizes and Details

Plate No
I-101

(L) HORIZONTALLY PIVOTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

(L-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(L-2) General

Horizontally Pivoted Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(L-3) Materials

(L-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(L-3b) Frame Members—All frame members shall be special angle sections.

(L-3c) Muntins—Muntins shall be 1½" deep.

(L-3d) Vertical Mullions—Vertical mullions shall be standard *Fenestra* hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(L-3e) Horizontal Mullions

Note: Horizontal structural mullions are not furnished by the window manufacturer. Include structural steel horizontal mullions in Structural Steel Specifications.

(L-4) Construction

(L-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted, at all corners. Provide continuous two point, flat-contact weathering between ventilators and frames.

(L-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase their strength at the point of intersection. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 44. An exclusive Fenestra feature.

(L-4c) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(L-4d) Structural Steel Clips—Furnish in types adapted to conditions, all necessary clips and bolts for attaching windows to structural steel.

Note: All structural steel is furnished by others. Include in steel specifications all punching to accommodate clips. Where masonry work will interfere with installation of clips at time windows are erected, provide that clip bolts be included and attached by the steel contractor.

(L-4e) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to be attached in the field.

(L-5) Attached Hardware

Note: Attached at factory.

(L-5a) Ventilator Pivots—All ventilators shall be horizontally pivoted and supported by external, adjustable, special, solid rolled, steel butts double machine riveted through window bars and weathering.

Note: Butts are set 2" above center unless otherwise specified. Butts may be set 4" below ventilator top where windows are required to be relatively rain protecting when open or where center pivoting would throw the upper half of the sash in conflict with piping, sway bracing or other interior obstructions. If required, so specify.

All butts shall have ⅝" solid steel bolts equipped with washers and nuts; each pin shouldered to insure constant, free and easy ventilator operation.

(L-5b) Operator Provisions—All ventilators shall be provided with solid rolled steel Z bar brackets, triple machine riveted to ventilator sill for attachment of operating hardware.

(L-6) Detached Hardware

Note: See Fenestra Page 44.

(L-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

Note: Select type desired.

(L-6b) Provide malleable iron cam latches and rolled steel stay bars.

(L-6c) Provide malleable iron cam latches, chain, chain catches and pulley brackets.

(L-7) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 55 to 59.

(L-8) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows can be erected in prepared opening. (See Fenestra Page 37.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(L-8a) All Horizontally Pivoted Windows shall be erected in preparing openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(L-8b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing. Standard *Fenestra* sill anchors shall be used under the following conditions: (Use 2 clips for windows up to 6'-6" wide and 4 clips for windows over 6'-6").

(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.

(2) In all cases where the window is over 5'-0" wide, regardless of the location of the ventilators.

(3) In all multiple unit openings where mullions are not anchored into the sills.

All ventilators shall be properly adjusted before glazing.

(L-8c) Apply all hardware in accordance with the manufacturer's directions.

(L-9) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at a reasonable added cost, will do field painting after erection. If required, so specify here, including specification for paint and its application.

(L-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(L-10a) Glass—Glass shall be (¼" rough wire) (¼" factory ribbed) (⅛" factory ribbed) (double strength).

Note: ¼" thick glass is recommended. Single strength glass is not recommended.

(L-10b) Putty—Putty shall be a high grade of steel window putty.

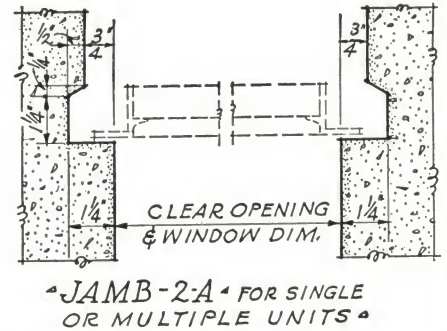
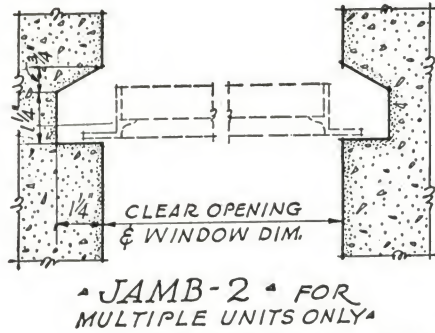
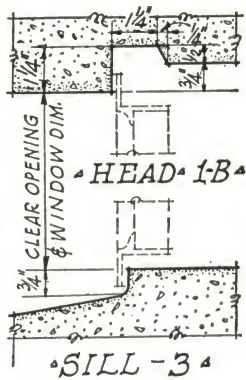
Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(L-10c) Glazing—All Horizontally Pivoted Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel spring, glazing clips furnished by the window manufacturer. (4 clips for each fixed light and 6 for each ventilator light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

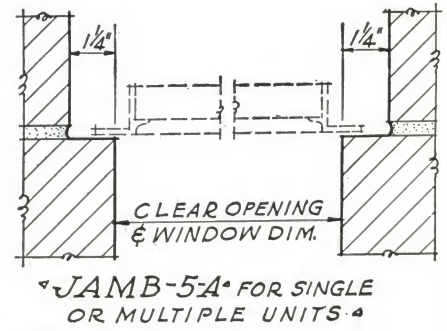
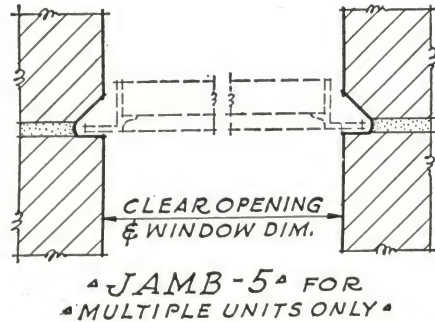
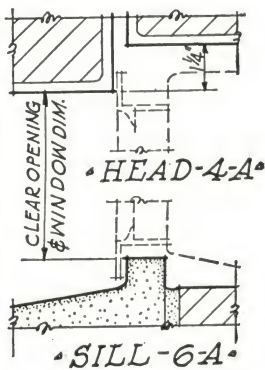
Note: Do not paint until putty has thoroughly hardened. See note paragraph (L-9).

(L-11) Screens

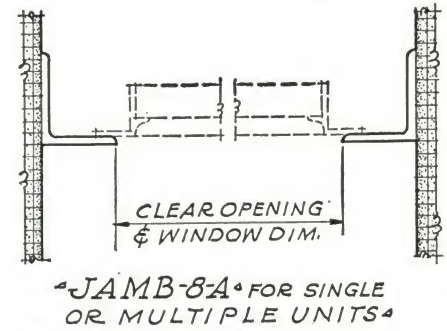
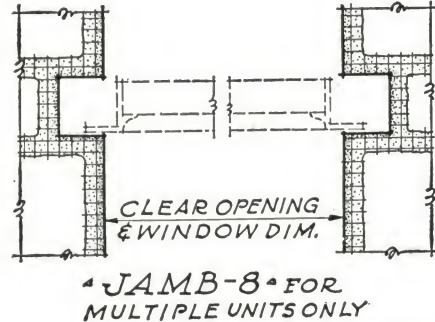
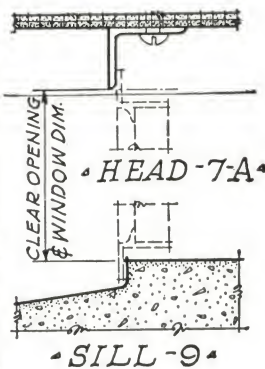
Note: Special metal pivoted ventilator screens may be used. These lie close to the ventilator, the upper half outside, the lower half inside, with insect-proof closures at ventilator pivot line. For suggested screening details, see Fenestra Page 45. Screens are not ordinarily included by the window manufacturer and should, therefore, be provided for under another division of the specification.



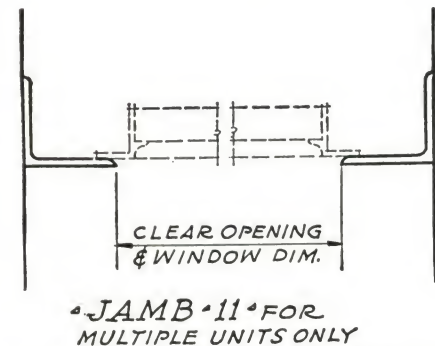
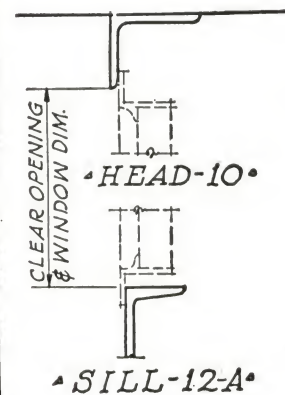
INSTALLATION IN CONCRETE



INSTALLATION IN BRICK



INSTALLATION IN TILE



INSTALLATION IN STEEL

NOTE:-

WE STRONGLY RECOMMEND THE INSTALLATION OF FENESTRA SIDEWALL WINDOWS AFTER THE WALLS OF BUILDING ARE PRACTICALLY COMPLETED.

IN EVERY CASE, REGARDLESS OF WHETHER SINGLE UNITS OR COMBINATIONS OF UNITS ARE TO BE USED, THE OPENING SHOULD BE PREPARED IN ACCORDANCE WITH THE DIMENSIONS SHOWN IN THE INSTALLATION DETAILS ON PLATES L-104 & L-105. REBATES AND ANGLES SHOWN HAVE BEEN ACCEPTED BY BUILDERS AND CONTRACTORS AS THE BEST PRACTICE AND THESE SHOULD BE CLOSELY FOLLOWED.

Fenestra
August 1927

Horizontally Pivoted Windows
Prepared Openings

Plate No
L-101

• STANDARD • AND • STOCK • TYPES •
• STOCK • TYPES • SHOWN • WITH • SHADED • BACKGROUND •

HEIGHTS

18" GL 3'-1 5/8"
20" GL 3'-5 3/8"



18" GL 4'-8"
20" GL 5'-2"



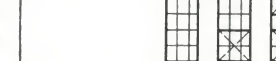
18" GL 6'-2 3/8"
20" GL 6'-10 3/8"



18" GL 7'-8 3/4"
20" GL 8'-6 3/4"



18" GL 9'-3 1/8"
20" GL 10'-3 1/8"



18" GL 10'-9 1/2"
20" GL 11'-11 1/2"



WIDTHS

12" GLASS 2'-1 5/8"
14" GLASS 2'-5 3/8"

3'-2"
3'-8"

4'-2 3/8"
4'-10 3/8"

5'-2 3/4"
6'-0 3/4"

6'-3 1/8"
7'-3 1/8"

HEIGHTS

18" GL 1'-7 1/4"
20" GL 1'-9 1/4"



18" GL 3'-1 5/8"
20" GL 3'-5 3/8"



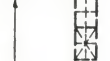
18" GL 4'-8"
20" GL 5'-2"



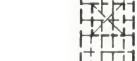
18" GL 6'-2 3/8"
20" GL 6'-10 3/8"



18" GL 7'-8 3/4"
20" GL 8'-6 3/4"



18" GL 9'-3 1/8"
20" GL 10'-3 1/8"



18" GL 10'-9 1/2"
20" GL 11'-11 1/2"



WIDTHS

12" GLASS 2'-1 5/8"
14" GLASS 2'-5 3/8"

3'-2"
3'-8"

4'-2 3/8"
4'-10 3/8"

5'-2 3/4"
6'-0 3/4"

6'-3 1/8"
7'-3 1/8"

• GLASS • COMBINATIONS • ARE • 12" • X • 18" • AND • 14" • X • 20" •

Fenestra
August 1927

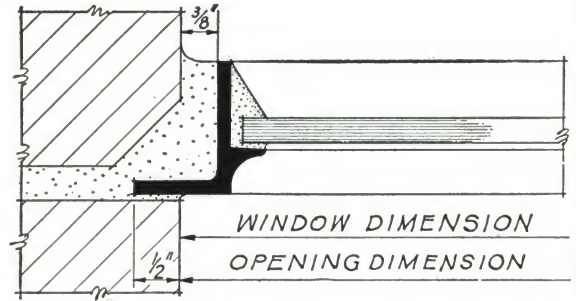
Horizontally Pivoted Windows
Types and Sizes

Plate No
L-102

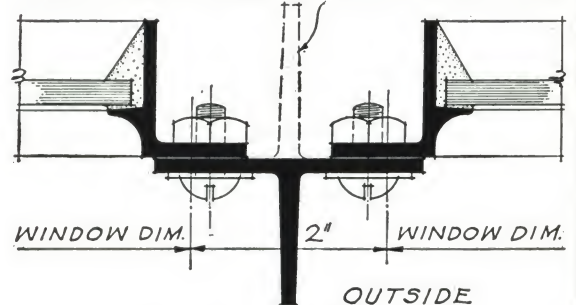
SYMMETRICAL • COMBINATIONS •

OPENING • DIMENSIONS				NO. UNITS IN OPENING	NO. LIGHTS IN OPENING	-ARRANGEMENT- OF UNITS IN OPENING • FIGURES INDICATE THE NUMBER OF LIGHTS IN WIDTH OF EACH UNIT.
18" HEIGHTS		20" HEIGHTS				
PANES	DIM.	PANES	DIM.			
2	3'-1 ⁷ / ₈ "	2	3'-5 ⁵ / ₈ "			
3	4'-8"	3	5'-2"			
4	6'-2 ³ / ₈ "	4	6'-10 ³ / ₈ "			
5	7'-8 ¹ / ₂ "	5	8'-6 ³ / ₄ "			
6	9'-3 ¹ / ₈ "	6	10'-3 ¹ / ₈ "			
7	10'-9 ¹ / ₂ "	7	11'-11 ¹ / ₂ "			
12" WIDTHS		14" WIDTHS				
* 2'-1 ⁵ / ₈ "	* 2'-5 ⁵ / ₈ "	1	2	2		
3'-2"	3'-8"	1	3	3		
4'-2 ³ / ₈ "	4'-10 ³ / ₈ "	1	4	4		
4'-5 ¹ / ₄ "	5'-1 ¹ / ₄ "	2	4	2,2		
5'-2 ³ / ₄ "	6'-0 ³ / ₄ "	1	5	5		
6'-3 ¹ / ₈ "	7'-3 ¹ / ₈ "	1	6	6		
6'-6"	7'-6"	2	6	3,3		
8'-6 ³ / ₄ "	9'-10 ³ / ₄ "	2	8	4,4		
9'-10"	11'-4"	3	9	3,3,3		
10'-7 ¹ / ₂ "	12'-3 ¹ / ₂ "	2	10	5,5		
10'-10 ³ / ₈ "	12'-6 ³ / ₈ "	3	10	3,4,3		
11'-10 ³ / ₄ "	13'-8 ³ / ₄ "	3	11	3,5,3		
11'-10 ³ / ₄ "	13'-8 ³ / ₄ "	3	11	4,3,4		
12'-8 ¹ / ₄ "	14'-8 ¹ / ₄ "	2	12	6,6		
12'-11 ¹ / ₈ "	14'-11 ¹ / ₈ "	3	12	4,4,4		
13'-2"	15'-2"	4	12	3,3,3,3		
13'-11 ¹ / ₂ "	16'-1 ¹ / ₂ "	3	13	4,5,4		
13'-11 ¹ / ₂ "	16'-1 ¹ / ₂ "	3	13	5,3,5		
14'-11 ⁷ / ₈ "	17'-3 ⁷ / ₈ "	3	14	4,6,4		
14'-11 ⁷ / ₈ "	17'-3 ⁷ / ₈ "	3	14	5,4,5		
15'-2 ³ / ₄ "	17'-6 ³ / ₄ "	4	14	3,4,4,3		
16'-0 ¹ / ₄ "	18'-6 ¹ / ₄ "	3	15	5,5,5		
16'-0 ¹ / ₄ "	18'-6 ¹ / ₄ "	3	15	6,3,6		
16'-6"	19'-0"	5	15	3,3,3,3,3		
17'-0 ⁵ / ₈ "	19'-8 ⁵ / ₈ "	3	16	5,6,5		
17'-0 ⁵ / ₈ "	19'-8 ⁵ / ₈ "	3	16	6,4,6		
17'-3 ¹ / ₂ "	19'-11 ¹ / ₂ "	4	16	4,4,4,4		
17'-3 ¹ / ₂ "	19'-11 ¹ / ₂ "	4	16	3,5,5,3		
17'-6 ³ / ₈ "	20'-2 ³ / ₈ "	5	16	3,3,4,3,3		
18'-1"	20'-11"	3	17	6,5,6		
18'-6 ³ / ₄ "	21'-4 ³ / ₄ "	5	17	3,4,3,4,3		
19'-1 ³ / ₈ "	22'-1 ³ / ₈ "	3	18	6,6,6		
19'-4 ¹ / ₄ "	22'-4 ¹ / ₄ "	4	18	3,6,6,3		
19'-4 ¹ / ₄ "	22'-4 ¹ / ₄ "	4	18	4,5,5,4		
19'-7 ¹ / ₈ "	22'-7 ¹ / ₈ "	5	18	3,4,4,4,3		
20'-7 ¹ / ₂ "	23'-9 ¹ / ₂ "	5	19	3,5,3,5,3		
21'-5"	24'-9"	4	20	5,5,5,5		
21'-5"	24'-9"	4	20	4,6,6,4		
21'-7 ¹ / ₈ "	24'-11 ⁷ / ₈ "	5	20	4,4,4,4,4		
21'-10 ³ / ₄ "	25'-2 ³ / ₄ "	6	20	3,3,4,4,3,3		

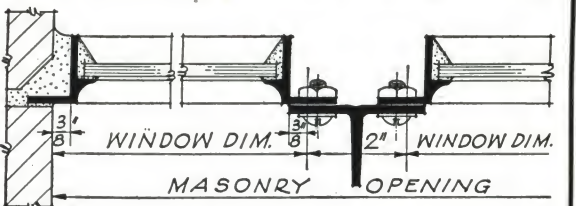
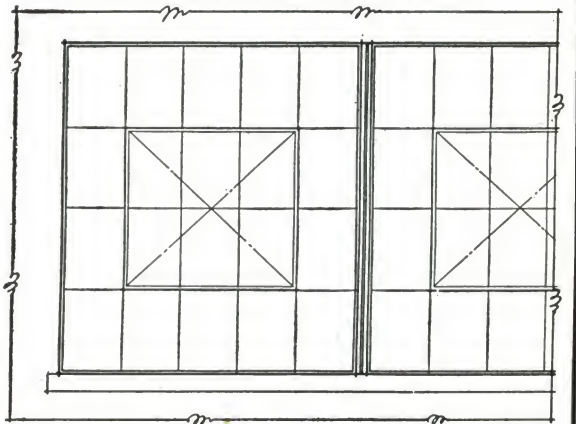
* TWO LIGHT WIDE UNITS ARE FURNISHED IN THREE LIGHT HEIGHTS ONLY • •



WHEN DESIRED STEM OF MULLION CAN BE TURNED IN AS SHOWN BY DOTTED LINES



• SCALE: HALF • FULL • SIZE •



• TYPICAL • COMBINATION •

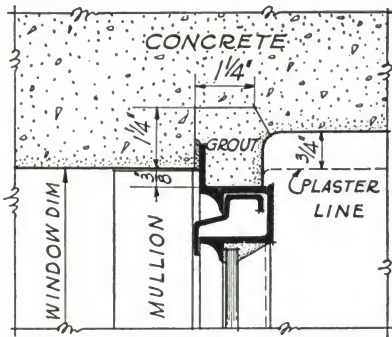
• SCALE: 3" = 1'-0" •

NOTE: IN FIGURING OPENING SIZES FOR COMBINED UNITS, ADD TOGETHER THE WINDOW DIMENSIONS PLUS 2" FOR EACH VERTICAL MULLION. STANDARD COMBINATIONS ARE GIVEN IN THE TABLE. WHEN USING TABLE ALWAYS COMBINE 18" HEIGHTS WITH 12" WIDTHS AND 20" HEIGHTS WITH 14" WIDTHS.

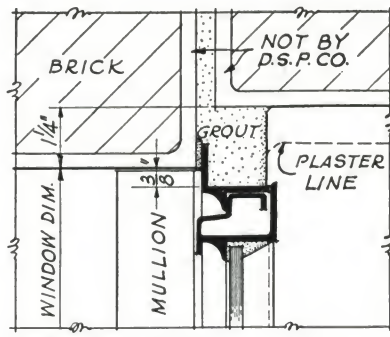
Fenestra
August 1927

Horizontally Pivoted Windows
Standard Combinations

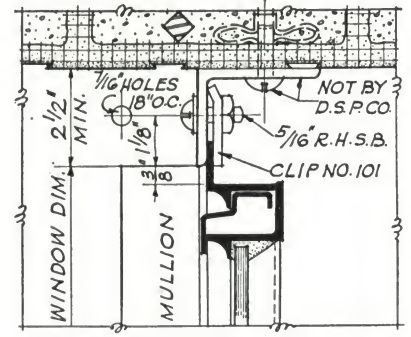
Plate No
L-103



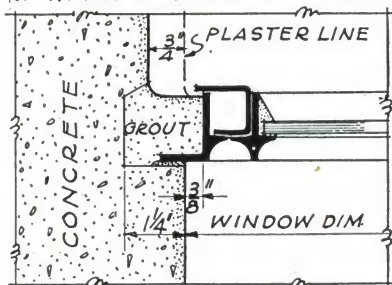
•HEAD-1-B• REBATE IN THE SOFFIT PERMITS INSTALLATION OF WINDOWS AFTER WALL IS BUILT.



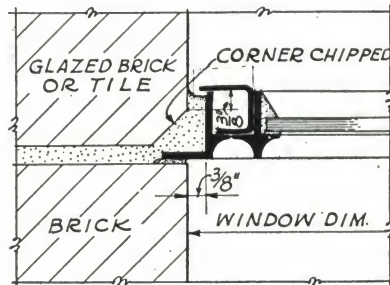
•HEAD-4-A• ANGLE SHOULD ALWAYS BE OFFSET AS SHOWN



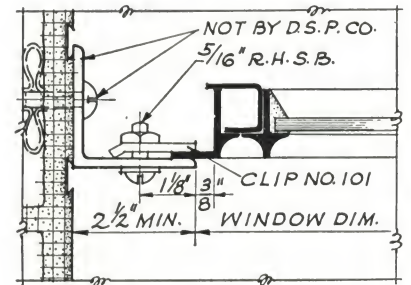
•HEAD-7-A• STEEL ANGLE FRAME IN TILE OPENINGS.



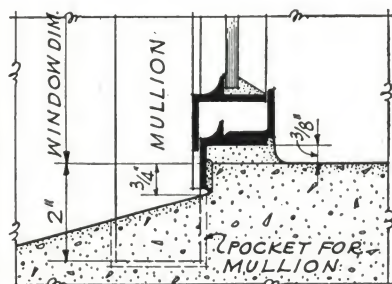
•JAMB-2-A• FOR SINGLE OR MULTIPLE UNIT OPENINGS



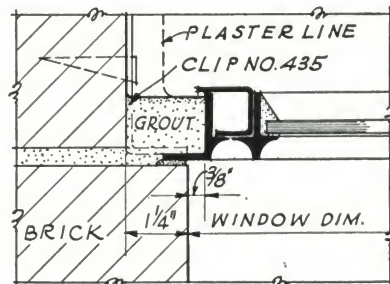
•JAMB-5• FOR MULTIPLE UNIT OPENINGS ONLY.



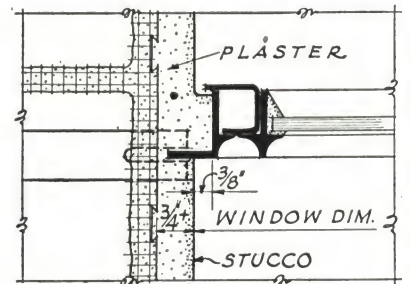
•JAMB-8-A• STEEL ANGLE FRAME IN TILE OPENINGS.



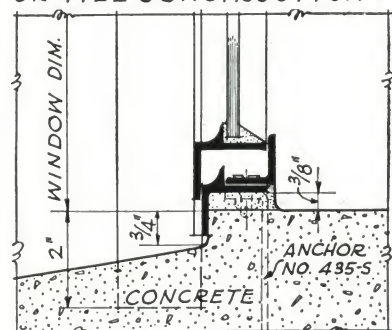
•SILL-3• PRECAST CONCRETE MAY ALSO BE USED FOR BRICK OR TILE CONSTRUCTION



•JAMB-5-A• FOR SINGLE OR MULTIPLE UNIT OPENINGS.

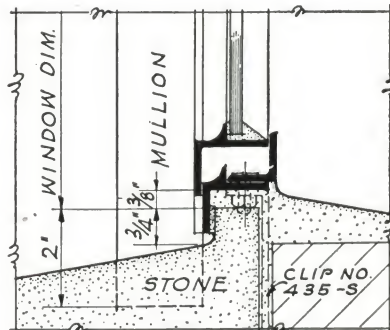


•JAMB-8-B• WITH SPLIT CLIP FURNISHED BY D.S.P.CO.



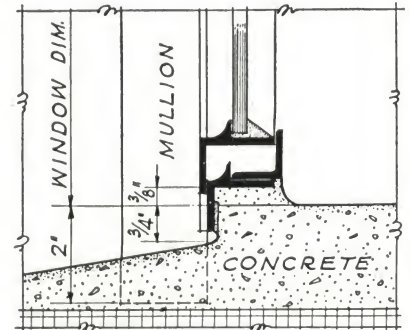
•SILL-3-A• POURED CONCRETE ANCHOR CLIP FURNISHED BY D.S.P.CO.

•CONCRETE•



•SILL-6-A• CUT STONE. AS ALTERNATES USE DETAILS 3 OR 3A.

•BRICK•



•SILL-9• CONCRETE SILL. POURED AFTER WINDOW IS SET

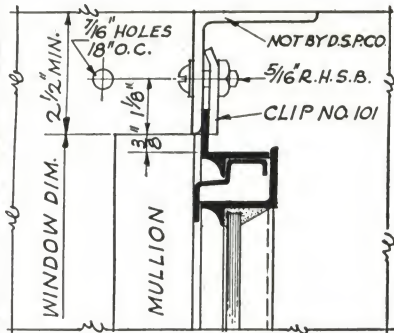
•TILE•

•SCALE: 3" = 1'-0"•

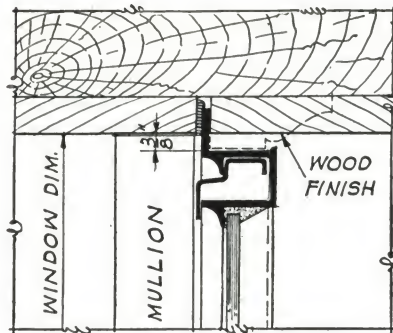
Fenestra
August 1927

Horizontally Pivoted Windows
Installation Details

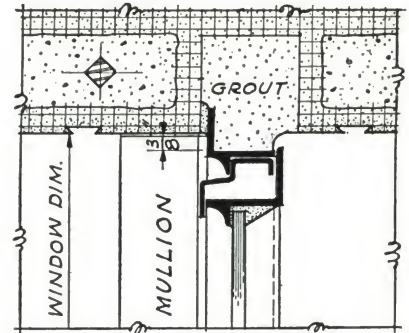
Plate No
L-104



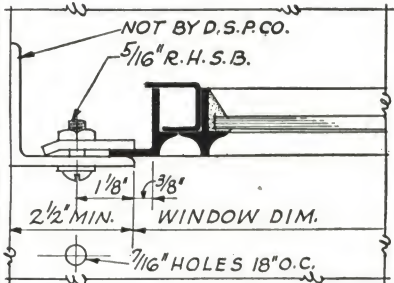
HEAD-10 STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



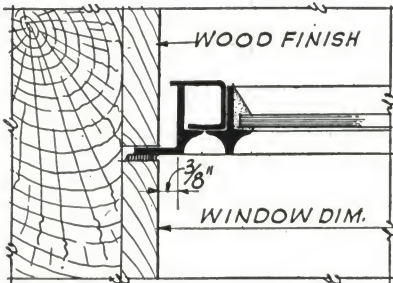
HEAD-13 DOTTED LINES
SHOW ALTERNATE FINISH.



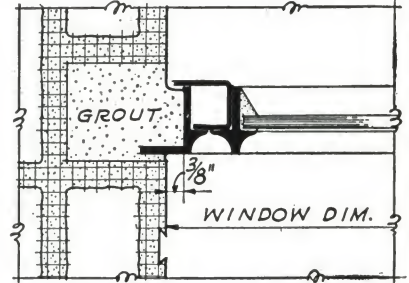
HEAD-7 FOR TILE LINTEL
WITH STEEL WINDOW RAGGLE AS SHOWN



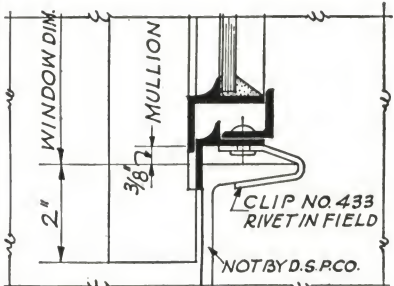
JAMB-11 STEEL ANGLE
CLIP & BOLT FURNISHED BY D.S.P.CO.



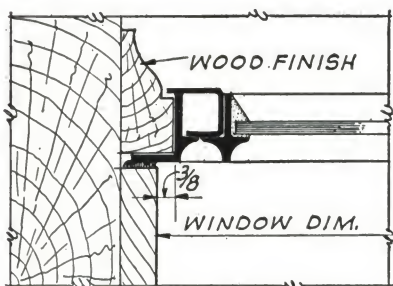
JAMB-14 PLAIN TRIM.



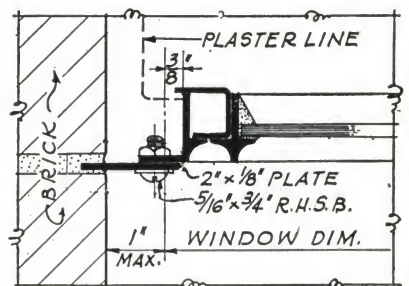
JAMB-8 FOR TILE WITH
STEEL WINDOW RAGGLE AS SHOWN.



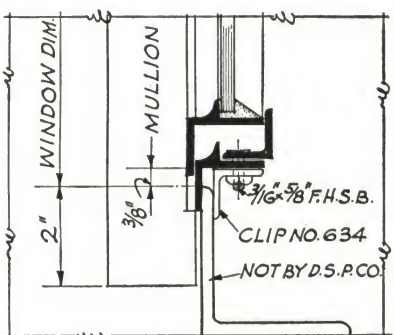
SILL-12-A STEEL CHANNEL
CLIP & RIVET FURNISHED BY D.S.P.CO.



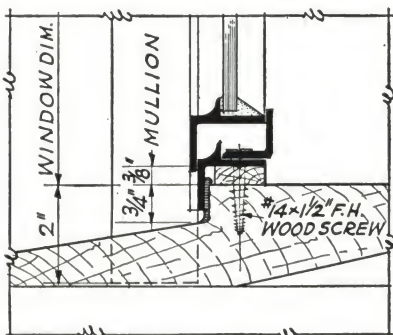
JAMB-14-A MOLDING
FINISH ALTERNATE FOR JAMB-14



JAMB-5-B DETAIL
USING JAMB PLATE



SILL-12-B STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



SILL-15 WOOD APRON & SILL.

STEEL

WOOD

SCALE: 3" = 1'-0"

MISCELLANEOUS

THE MULLIONS SHOWN WITH THESE DETAILS HAVE THE STEM TURNED OUT. IT IS ADVISABLE TO DO THIS AS GREATER STIFFNESS IS SECURED.

WITH STEEL WORK THIS IS ESSENTIAL IN ORDER TO AVOID NOTCHING OF THE STEEL OR A SPECIAL CUT-OFF OF MULLIONS.

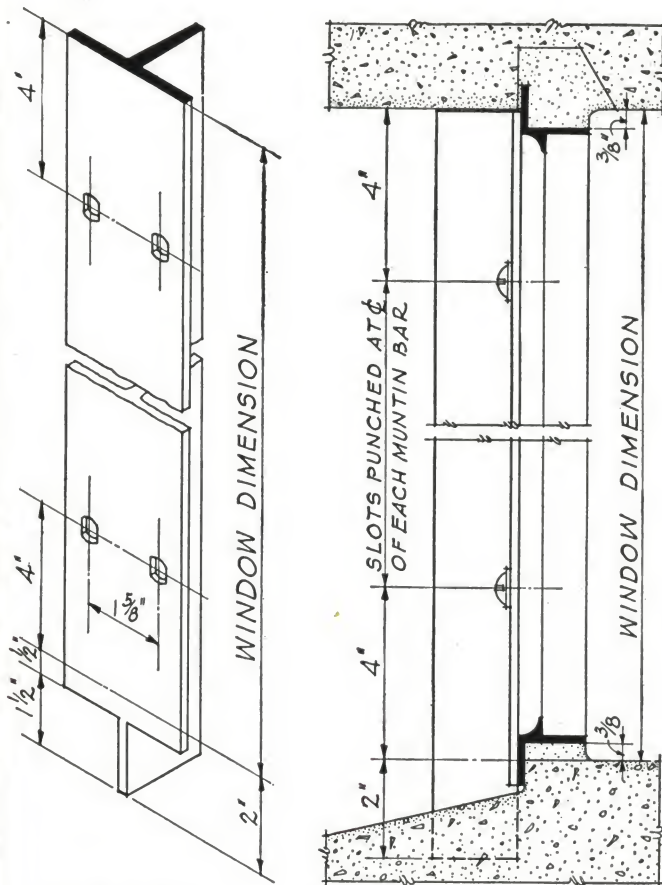
ANCHORING MULLIONS AT SILL AS SHOWN IS RECOMMENDED.

SCALE: 3" = 1'-0"

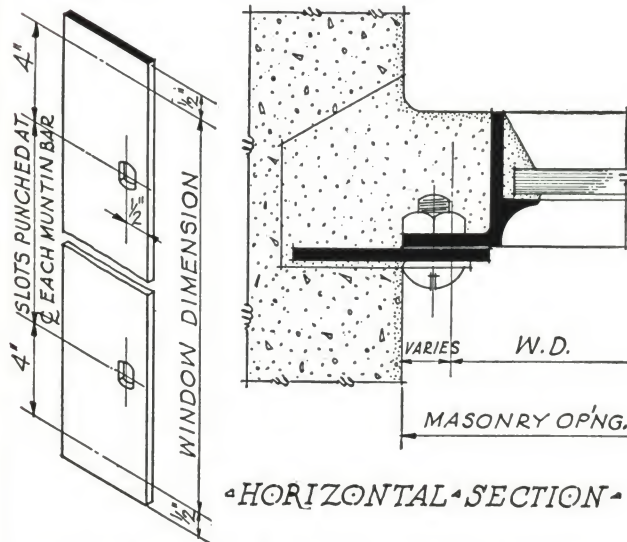
Fenestra
August 1927

Horizontally Pivoted Windows
Installation Details

Plate No
L-105

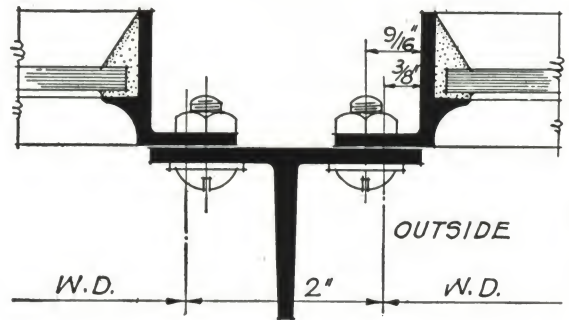


• SKETCH •
• VERTICAL SECTION •
• VERTICAL MULLION DETAILS •



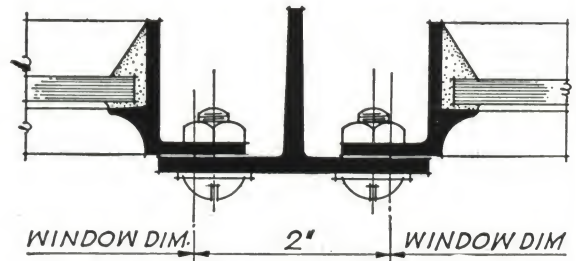
• HORIZONTAL SECTION •
• JAMB PLATE DETAILS •

• SCALE: HALF-FULL-SIZE •

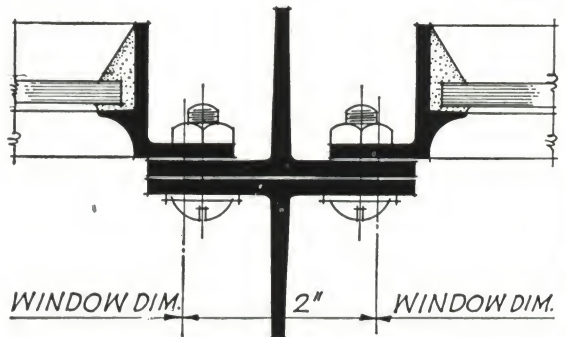


• STEM • TURNED • OUT •

RECOMMENDED DETAIL. THE OUTSTANDING LEG PROVIDES ADDITIONAL RIGIDITY. CAN BE USED FOR SASH UP TO 7 LIGHTS HIGH, 20" GLASS. MULLIONS MAY BE USED WITH STEM TURNED IN AS SHOWN BELOW IF DESIRED. • • • •



• STEM • TURNED • IN •



• DOUBLE • MULLION •

SHOULD BE USED ON SASH HIGHER THAN 7 LIGHTS 20" GLASS, OR WHERE EXTRA WIDE OPENINGS ARE TO BE FILLED AND WHERE THE EXPOSURE IS SEVERE.

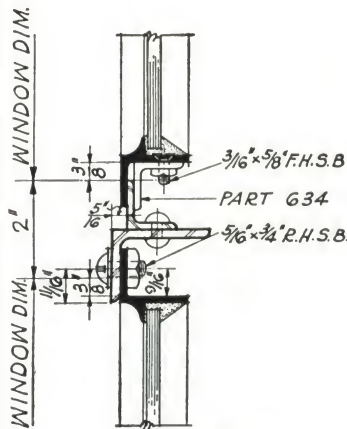
NOTE: PROVISION SHOULD ALWAYS BE MADE FOR ANCHORING MULLIONS IN THE SILL. SEE VERTICAL SECTION ABOVE.

BOLTHOLES ARE PUNCHED TO MATCH THE JAMB BARS OF SASH, 4" FROM WINDOW DIMENSION POINT AT TOP AND BOTTOM AND OPPOSITE EACH MUNTIN BAR.

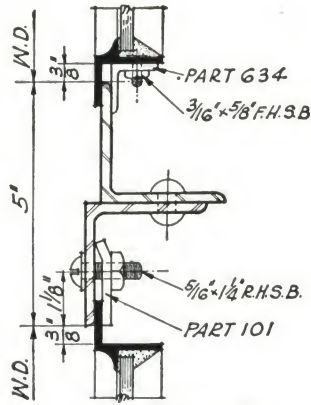
Fenestra
August 1927

Horizontally Pivoted Windows
Vertical Mullion Details

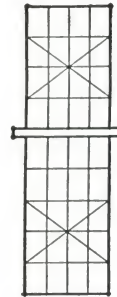
Plate No
L-106



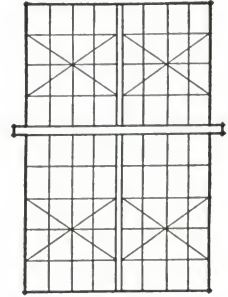
•TYPE-1•



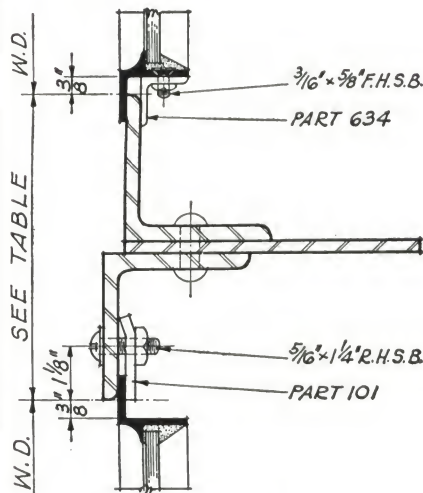
•TYPE-2•



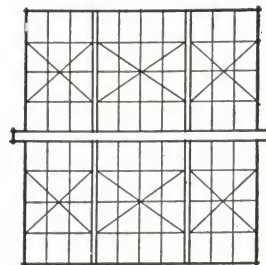
•TYPICAL OPENING•
•TYPE NO. 1•



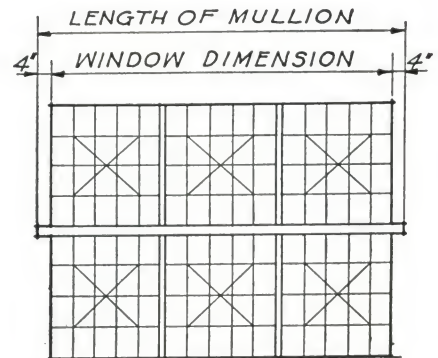
•TYPICAL OPENING•
•TYPE NO. 2•



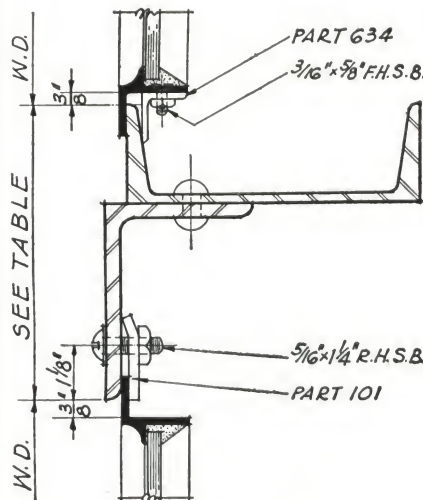
•TYPE-3•



•TYPICAL OPENING•
•TYPES NO. 3 & 4•



•TYPICAL OPENING•
•TYPES NO. 3 & 4•



•TYPE-4•

•DETAILS SCALE: 3\"/>

•TABLE OF HORIZONTAL•
•MULLION SIZES•

LIGHTS WIDE	MULL TYPE NO.	•ANGLES• REQD. •SIZE•	PLATE OR CHANNEL	ESTIMATED WEIGHT OF MULL PER FT.	BETWEEN WINDOW DIMENS.
SINGLE UNIT OPENINGS	1	1 1" x 1" x 1/8"	NONE	3.0 LBS.	2"
	1	2" x 1 1/2" x 3/16"			
• 12" x 18" SIZE GLASS •					
3 TO 9	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS.	5"
10 TO 13	3	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT.	11.5 LBS.	5 1/4"
10 TO 13	4	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
14 TO 18	3	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
14 TO 18	4	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS.	6 1/8"
• 14" x 20" SIZE GLASS •					
3 TO 8	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS.	5"
9 TO 11	3	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT.	11.5 LBS.	5 1/4"
9 TO 11	4	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
12 TO 16	3	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
12 TO 16	4	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS.	6 1/8"

Fenestra
August 1927

Horizontally Pivoted Windows
Horizontal Mullion Details

Plate No
L-107

HORIZONTALLY PIVOTED WINDOW FITTINGS AND HARDWARE



Fig. 1



Fig. 2



Fig. 3



Fig. 4

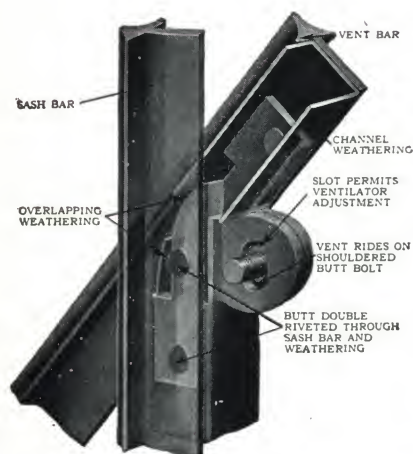


Fig. 5

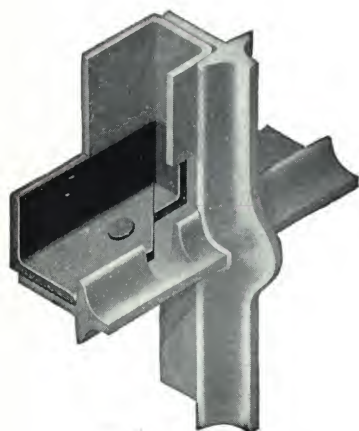


Fig. 6

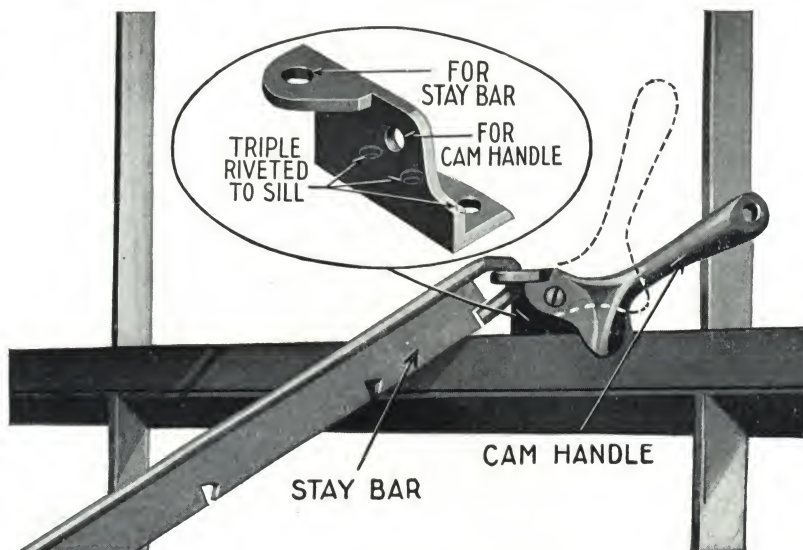


Fig. 7

Figs. 1, 2, 3 and 4 show four views of the patented Fenestra joint by means of which vertical and horizontal bars are interlocked with increased strength at the point of intersection. Fig. 1 shows the horizontal bar with nick cut out. Fig. 2 shows the vertical bar with slot. Fig. 3 shows vertical bar expanded to receive horizontal bar. Fig. 4 shows the completed Fenestra joint.

Fig. 5 shows the Fenestra butt. Fig. 6 shows the weathering member at ventilator sill, mitered to guide water out of the building. Fig. 7 shows the cam handle, stay bar and riveted Z-bar bracket. Fig. 8 shows the spring latch, chain and pulley at the head of ventilator. Fig. 9 shows the cam handle at the sill with endless chain passing over pulley at the head. Fig. 10 shows the spring latch at the sill with chain passing over pulley at head; also chain cleats attached either to the muntins or the building construction.



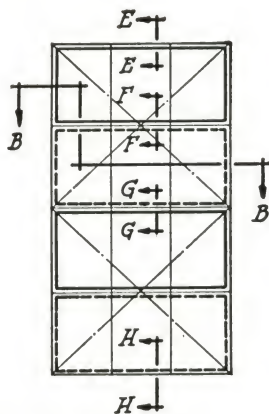
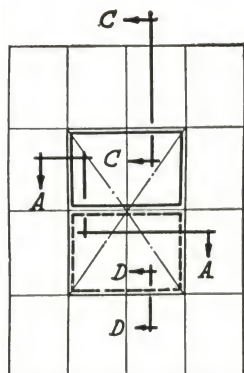
Fig. 8



Fig. 9



Fig. 10



• OUTSIDE ELEVATIONS •

• N O T E •

STANDARD SCREENS ARE MADE FOR 4, 6 OR 8 PANE VENTILATORS IN BOTH 12" X 18" AND 14" X 20" GLASS.

SCREEN FRAMES ARE OF ELECTRICALLY WELDED CONSTRUCTION FROM OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL. TURN BUTTONS, HINGE LUGS AND WING NUTS ARE BRASS. BOLTS ARE STEEL GALVANIZED AND CLAMPS ARE OF STEEL GALVANIZED WITH TIPS OF MONEL METAL (A NON-RUSTING AND NON-CORRODING MATERIAL).

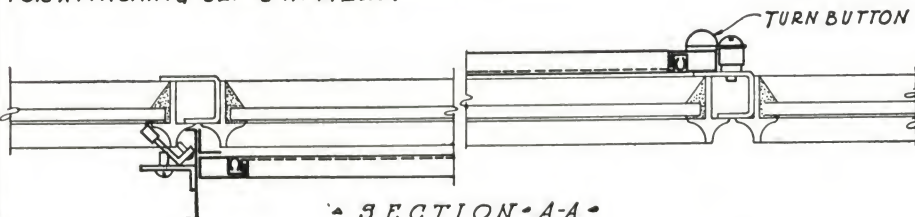
CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE.

SCREENS ARE MADE TO ALLOW 45° OPENING AND LIMIT RING MUST BE PLACED IN CHAIN TO REGULATE THIS.

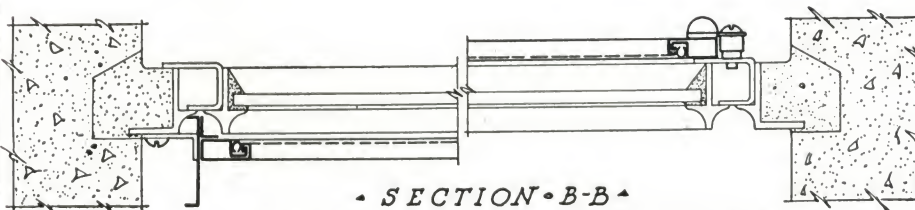
WHEN VENTILATOR COMES TO THE HEAD OF AN OPENING OR DIRECTLY BELOW ANOTHER VENTILATOR, A LOWER OUTSIDE SCREEN AND FILLER PIECE IS USED. SEE DETAILS E-E AND G-G.

WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS, WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

IF SCREENING IS NOT SPECIFIED BUT LATER IS DESIRED IT WILL BE NECESSARY TO DRILL HOLES FOR ATTACHING CLIPS IN FIELD.



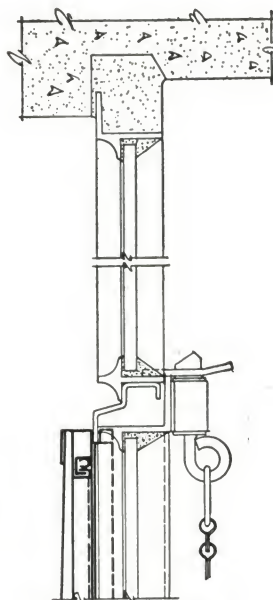
• SECTION A-A •



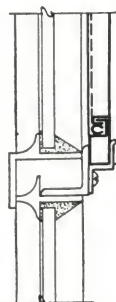
• SECTION B-B •

• HORIZONTAL SECTION •

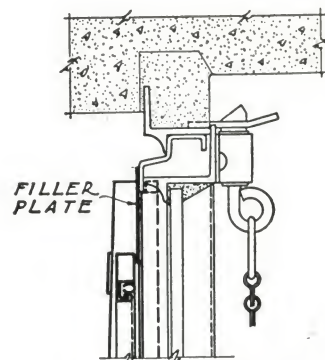
• SCALE : 3" = 1'-0" •



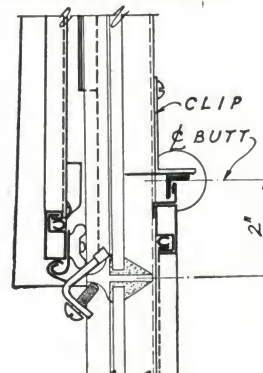
• SECTION C-C •
WITH FIXED PANE
ABOVE VENTILATOR



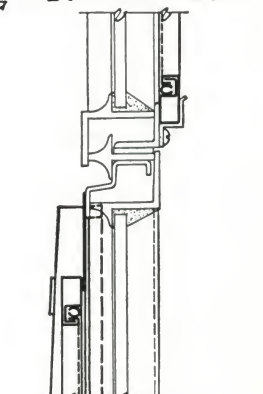
• SECTION D-D •



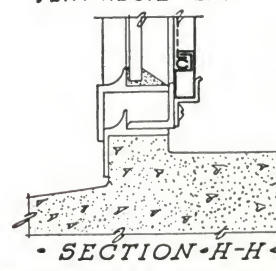
• SECTION E-E •
WHEN VENT COMES
TO HEAD OF WINDOW



• SECTION F-F •



• SECTION G-G •
VENT ABOVE VENT



• SECTION H-H •

• VERTICAL SECTION •

Fenestra
August 1927

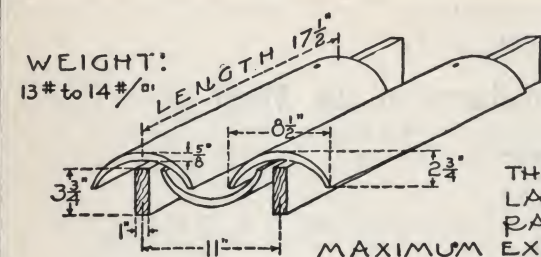
Horizontally Pivoted Windows
Screening Details

Plate No
L-108

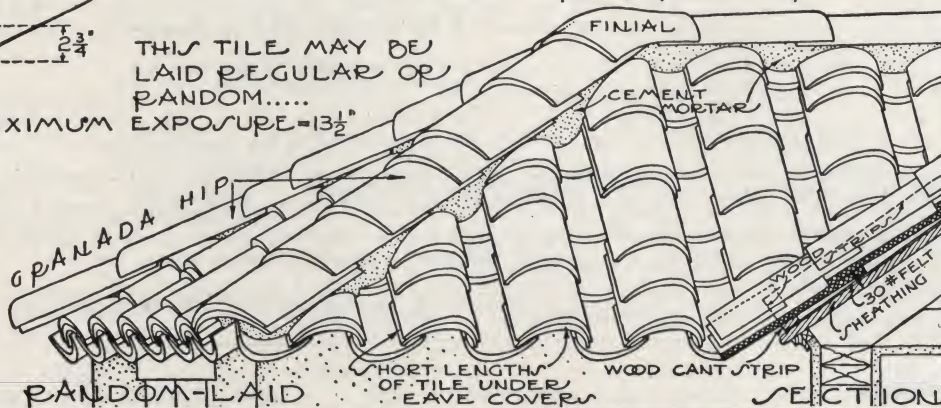
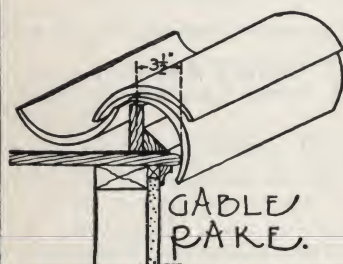
GRANADA TILE

PLAIN OR VARICOLOR

WEIGHT:
13# to 14# / sq ft

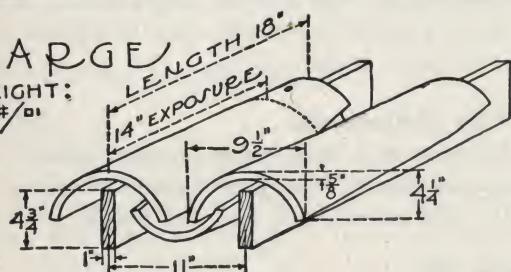


THIS TILE MAY BE
LAID REGULAR OR
RANDOM.....
MAXIMUM EXPOSURE=13 1/2"

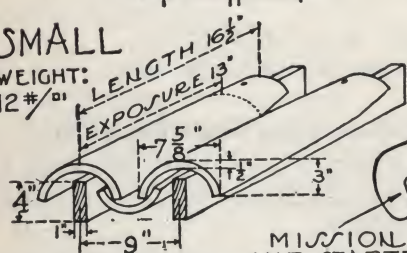


MISSION TILE

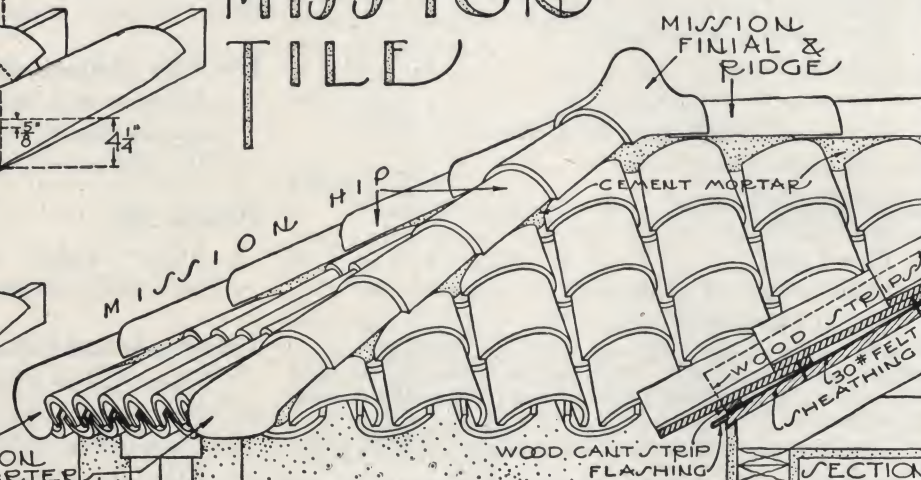
LARGE
WEIGHT:
15# / sq ft



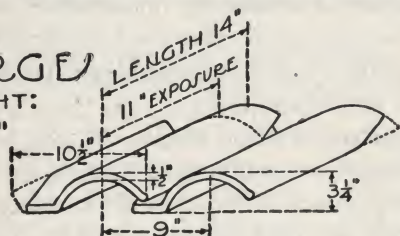
SMALL
WEIGHT:
12# / sq ft



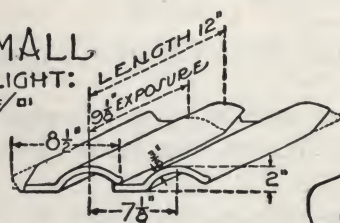
MISSION
HIP STARTER



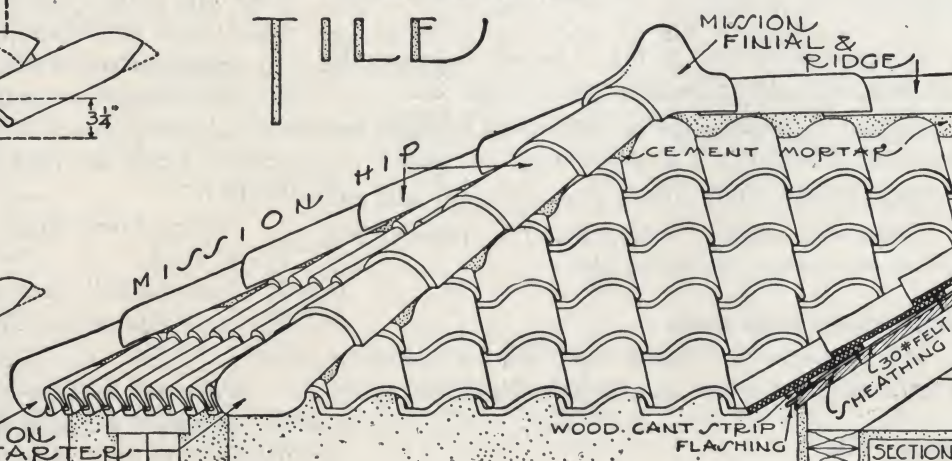
LARGE
WEIGHT:
9# / sq ft



SMALL
WEIGHT:
8# / sq ft



MISSION
HIP STARTER

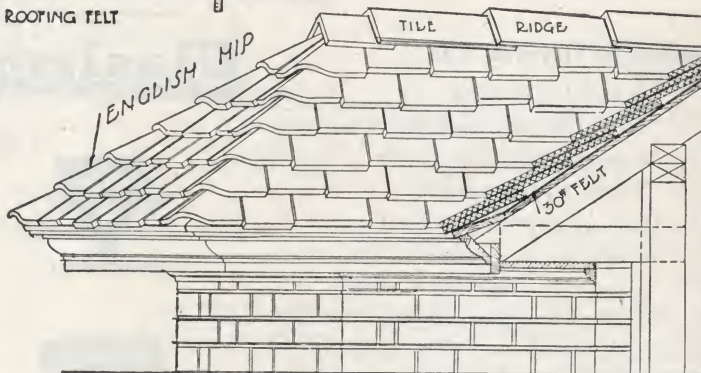
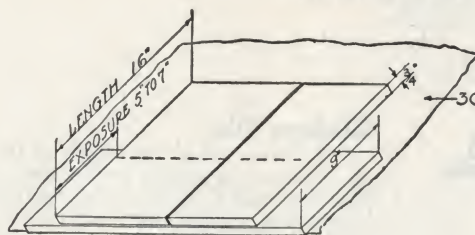


LOS ANGELES
PRESSED BRICK
COMPANY

STANDARD SHAPES OF ROOFING TILE

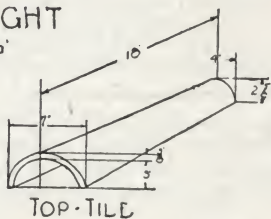
NOT DRAWN TO
SCALE
1

HEAVY "ENGLISH" SHINGLE TILE LAID RANDOM

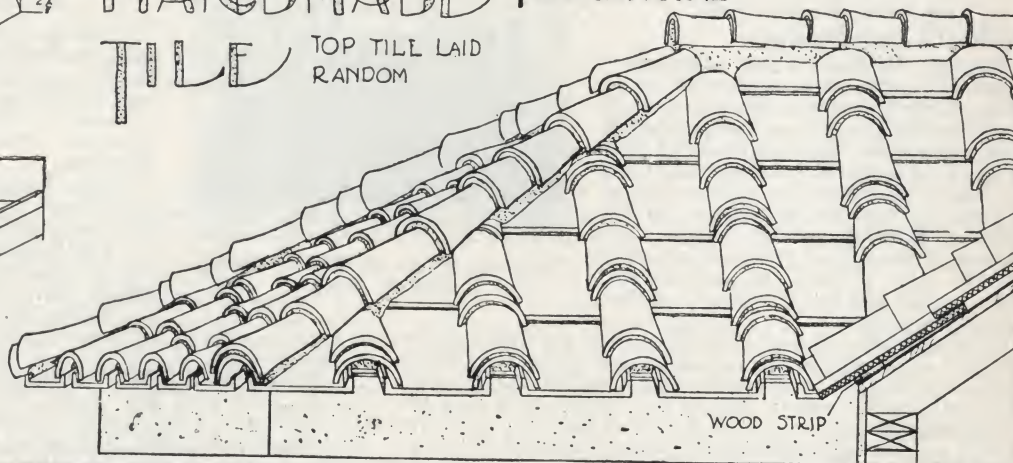
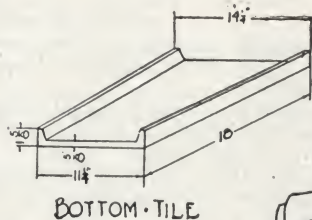


WEIGHT
1850 LBS PER SQUARE
NOTE - 1 SQUARE = 90-7x16" SHINGLES
90-8x16" "
90-10x16" "

WEIGHT
15 #/sq



HANDMADE "FLORENTINE" TILE TOP TILE LAID RANDOM



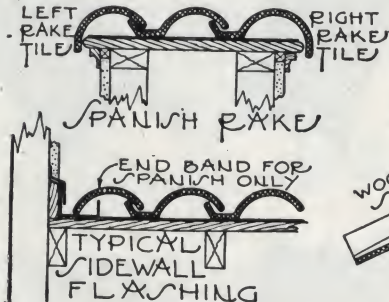
VARIOUS DETAILS



RIGHT OR LEFT
RAKE
TILE



TYPICAL
RAKE
ITALIAN
GRANADA
MISSION
SPANISH



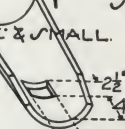
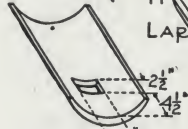
LEFT
RAKE
TILE
SPANISH RAKE
END BAND FOR
SPANISH ONLY
TYPICAL
SIDEWALL
FLASHING

GRANADA

MISSION

SPANISH

ITALIAN

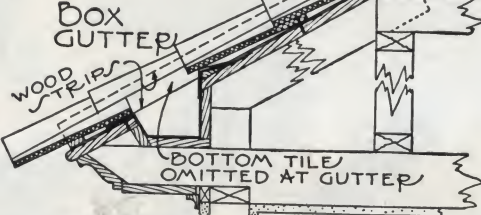


... SHOWING SIZE & LOCATION OF OUTLET HOLES ...

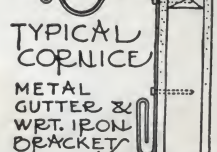
GUTTER
DETAIL



COPING OR
RIDGE
DECK
CURB



BOX
GUTTER
WOOD
STRIP
BOTTOM TILE
OMITTED AT GUTTER



TYPICAL
CORNICHE
METAL
GUTTER &
WRT. IRON
BRACKET

LOS ANGELES
PRESSED BRICK
COMPANY

STANDARD SHAPES AND DETAILS OF ROOFING TILE

NOT DRAWN
TO
SCALE
2

GLASIRON PRODUCTS COMPANY

Manufacturers of Glasiron Roofing Tile

TELEPHONE
LAFAYETTE 6278

Scotten Avenue at Michigan
DETROIT, MICH.

Advantages of Glasiron Tile

- (1) Unusual durability.
- (2) No yearly maintenance.
- (3) Non-fading colors.
- (4) Unlimited color choice.
- (5) Easy and quick application.
- (6) Adaptable any construction.
- (7) One-sixth weight of clay tile.
- (8) Low understructure cost.
- (9) Cool summer—warm winter.
- (10) Waterproof and noiseless.
- (11) Architectural beauty.
- (12) Adaptable over old roofing.
- (13) Fireproof—lower insurance.

Architect's Specifications

Special Service Upon Request—Manufacturer shall make all cuts according to blue prints for hips, dormers and all other irregular sections of roof including closed valley pieces, tile to be enameled after cutting. Roof must be constructed strictly according to all dimensions on blue prints in order for cuts made at factory to be correct.

Roof Boarding—Roof boarding or sheathing shall be $\frac{7}{8}$ in. thick and not more than 8 in. wide, tongued and grooved, surfaced one side, and free from wanes, shakes, loose or large knots.

Roofing Felt—All roof boarding shall be covered with "asphalt felt" weighing not less than 30 lb. per 100 sq. ft., and laid in horizontal layers with joints lapped towards the eaves, interlapped with the tile courses having two layers under each tile.

Cutting—If tile are cut on job with shears or torch, all openings and cut edges shall be thoroughly cemented.

Flashings—Galvanized ingot iron or copper drip shall be used over the edge at the eaves and overlapped with the roofing felt. A base and cap flashing course of galvanized ingot iron or copper shall be laid against all chimneys, parapet and party walls, roof posts and porch roofs where they connect with the walls. Roofing felt shall be laid 5 in. or more up the side underneath the metal flashing.

Glasiron
ROOFING TILE



Glasiron Home on Balfour Road,
Detroit, Mich.

Glasiron Tile

A new roofing tile which is the result of years of scientific development in two great industries. The roofing qualities of a combination of glass and iron fused together at 1600° F. are apparent. It cannot burn, fade, rust or decay. It is exceptionally durable and will remain in perfect condition during the life of the building. Each tile is 1 $\frac{1}{8}$ in. high in the center of its crown, casts 1-in. shadow lines and has a covering space of 10 in. square to the weather. It weighs only 245 lb. to the square. Glasiron is a most distinctive roof—a gold bond investment which will not depreciate in value.

Colors—Endless color tones can be matched in addition to having 50 tones as standard. Glasiron colors can be made according to your own ideas. Two tones blended in each tile or solid colors are available in three finishes—glazed, dull, sand.

Tiling—The main and porch roofs, the roofs and sides of dormer windows and all other surfaces, so indicated on the drawings, shall be covered with Glasiron Tile of ... color, ... finish as manufactured by the GLASIRON PRODUCTS COMPANY, Detroit, Michigan.

Side Spacing—Beginning at the center of the roof at the eaves, space the bottom first row complete.

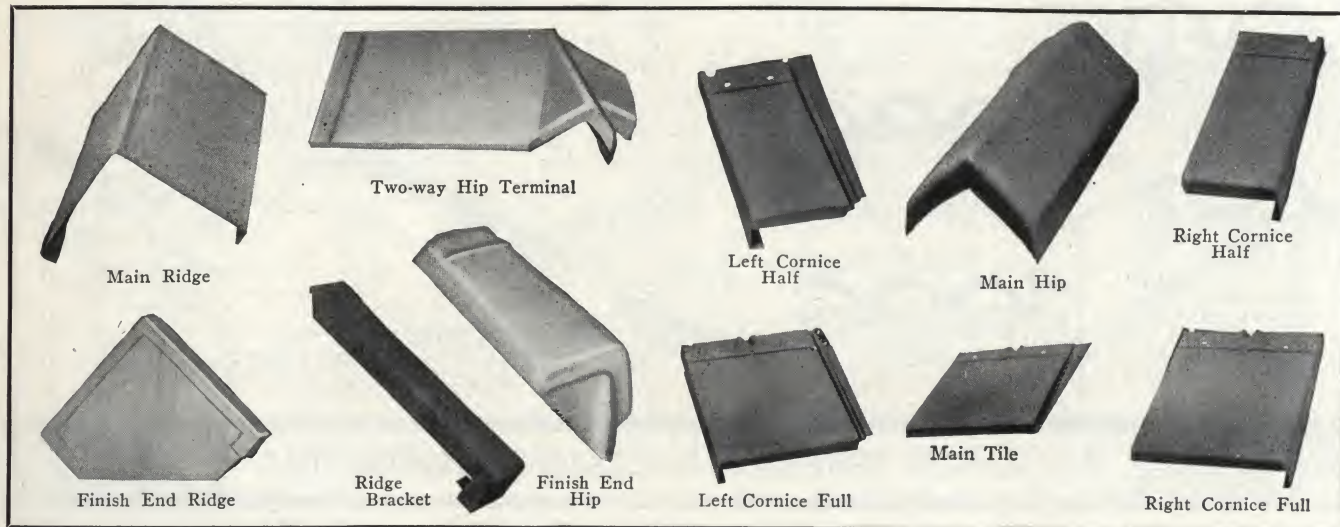
End Spacing—Finish ridge piece shall be placed over the ridge and the cornice tile spaced from eaves to ridge.

Nails—Use only Deniston "Led-Hed" copper nails 1 $\frac{1}{2}$ in. or longer; distributed by GLASIRON PRODUCTS COMPANY.

Ridge—Main ridge shall be lapped over the laying groove on the top row of tile. Leave $\frac{1}{4}$ in. between each ridge piece for nailing on ridge brackets. Bottom of ridge brackets shall be hooked under edge of main ridge at joint; the two brackets fitted together at top and nailed to wooden strip underneath with long copper nail.

Hips—Apply a $\frac{3}{8}$ in. by approximately 3 in. white pine board cleated upright. Notch upper end of hips to fit tile. Nail hips with 2 copper nails 3 in. long.

Note: Entire application to be in accordance with manufacturer's specifications in effect at the time of applying.



Glasiron Roofing Tile Units

IMPERIAL ROOFING TILES

Made by
LUDOWICI-CELADON COMPANY

GENERAL OFFICES
104 South Michigan Avenue
CHICAGO, ILL.

BRANCH OFFICES

NEW YORK, N. Y., 565 Fifth Avenue
WASHINGTON, D. C., 738 15th Street, N. W.
PHILADELPHIA, PA., 1315 Walnut Street
PITTSBURGH, PA., 355 Fifth Avenue

CLEVELAND, OHIO, 1836 Euclid Avenue
CINCINNATI, OHIO, Schmidt Building
ST. LOUIS, MO., 317 North 11th Street
KANSAS CITY, MO., 10th and Baltimore Streets

FACTORIES

NEW LEXINGTON, OHIO

COFFEYVILLE, KANSAS

PERU, KANSAS

Product

"IMPERIAL" SHALE ROOFING TILES.

Description

We manufacture vitreous shale roofing tiles in all standard shapes.

Four regular stock patterns are shown on the page following, in addition to which the "IMPERIAL Roman," the "IMPERIAL Greek," the "IMPERIAL" slab shingle, the "IMPERIAL" English and other special shapes are manufactured. These are produced in a natural red color or in glazes of almost any color.

Specifications

All pitched roofs shall be covered with (insert name of pattern) tiles made by the LUDOWICI-CELADON COMPANY with stock fitting suitable for each pattern. The tiles as specified above must be hard burned of color, and in accordance with samples deposited in the office of the architects.

Before the roofer is sent for, the owner or general contractor should construct roofs in strict accordance with plans, sheath the roofs tight, have all chimneys and walls above roof line completed, have all vent lines put through roofs, furnish all strips of required width used under hip rolls, furnish any strips that may be used under tile at eaves, and have all scaffolding ready for roofer's use. The metal contractor should have all gutters in place on the roof (gutters, whether box, hanging or

secret), to extend over the roof sheathing and run under the felt and tile at least 8 inches and should also have in place all valley metal, the width of which must be not less than 24 inches with both edges turned up $\frac{1}{4}$ inch, the entire length of the valley. The valley metal to be fastened with clips and never nailed or punctured in any manner. The valley metal must be laid over one layer of felt running lengthwise the entire distance of the valley. The metal contractor must have in readiness all flashing metal used alongside and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after arrival of the tile roofer and in accordance with the requirements of the tile.

After the roofs have thus been prepared to receive the felt and tile, the tile roofer shall cover the sheathing of the roofs with one thickness of asphalt roofing felt weighing not less than 30 pounds to the square, laying same with a $2\frac{1}{2}$ -inch lap and securing in place with capped nails. The felt should be laid parallel with the eaves and lapped over all valley metal about 4 inches and laid under all valley metal about 6 inches.

The roof having thus been prepared, the tile layer is to fasten tile with copper nails. The roofer shall see that the tiles are well locked together and lay smoothly, and no attempt shall be made to stretch the courses.

The tiles must be laid so that the vertical lines are parallel with each other and at right angles to the eaves. The tiles that verge along the hips should be cut close against the hip board, and a watertight joint made by cementing cut hip joint to hip board with elastic cement. Each piece of hip roll shall then be nailed to the hip board, and the hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with the pointing material.



Residence of E. P. Sedgwick, Highland Park, Ill.

R. E. PINGREY, CHICAGO, ILL., ARCHITECT

Roofed with "IMPERIAL" Straight Barrel Mission Tiles
in a mixture of Reds, Browns,
Purples and Buffs

"IMPERIAL"
Spanish
Roof



With 102 Hip Roll, 152 Hip Starters, 206 Ridge and Plain Terminal



Length13 $\frac{1}{4}$ inches
Width9 $\frac{3}{4}$ inches
Average exposure.....8 $\frac{1}{4}$ x10 $\frac{1}{4}$ inches
Average pieces per square.....171
Actual weight per square.....950 pounds
Shipping weight per square, with fittings.....1050 pounds

"IMPERIAL"
Straight Barrel
Mission Roof

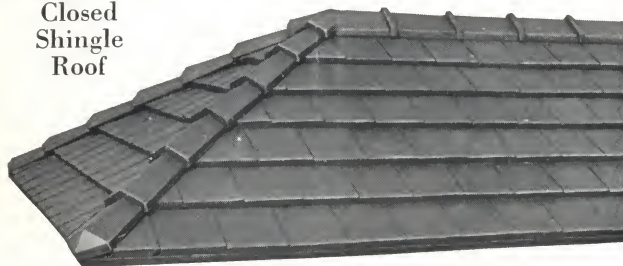


With Cover Tile Used for Hip and Ridge Treatment.
Plain Terminal



Average exposure in length.....11 $\frac{1}{4}$ inches
Width, center to center of covers.....11 $\frac{1}{2}$ inches
Average pieces per square.....224
Actual weight per square.....1280 pounds
Shipping weight per square, with fittings.....1380 pounds

"IMPERIAL"
Closed
Shingle
Roof



With 118 Hip Roll, 168 Hip Starters, 211 Ridge and Plain Terminal

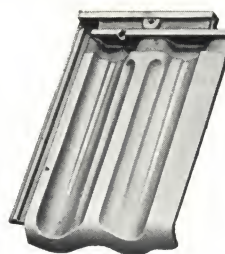


Length11 inches
Width8 $\frac{3}{4}$ inches
Average exposure8x8 inches
Average pieces per square.....225
Actual weight per square.....900 pounds
Shipping weight per square, with fittings.....1000 pounds

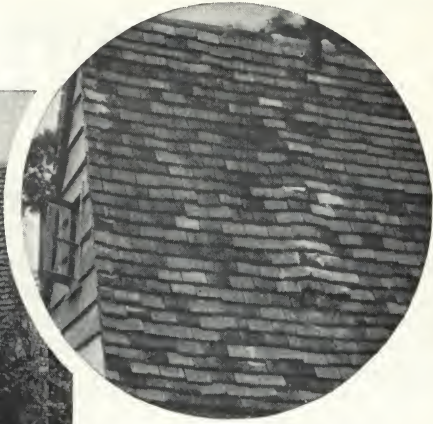
"IMPERIAL"
French
Roof



With 102 Hip Roll, 152 Hip Starters, 206 Ridge and 405 Terminal



Length16 $\frac{1}{4}$ inches
Width9 inches
Average exposure.....8 $\frac{1}{8}$ x13 $\frac{3}{8}$ inches
Average pieces per square.....133
Actual weight per square.....925 pounds
Shipping weight per square, with fittings.....1025 pounds



Above: A Close-up of the Same Roof. Showing Its Pleasing Irregularity

An English-Type House, Roofed with Imperial Brittany Shingle Tiles in Dull Reds and Sage Browns

The Brittany Shingle tile illustrated above is one of several types of special shingles made in various colors and textures. With our genuine Hand-Made and Old English shingles, and stock machine-made patterns, we have shingle tiles varying in size from 6x12x $\frac{3}{8}$ in. to as large as 8x16 x1 in.; furnished in textures and colors to suit requirements

Specifications for Brittany Shingle Tile

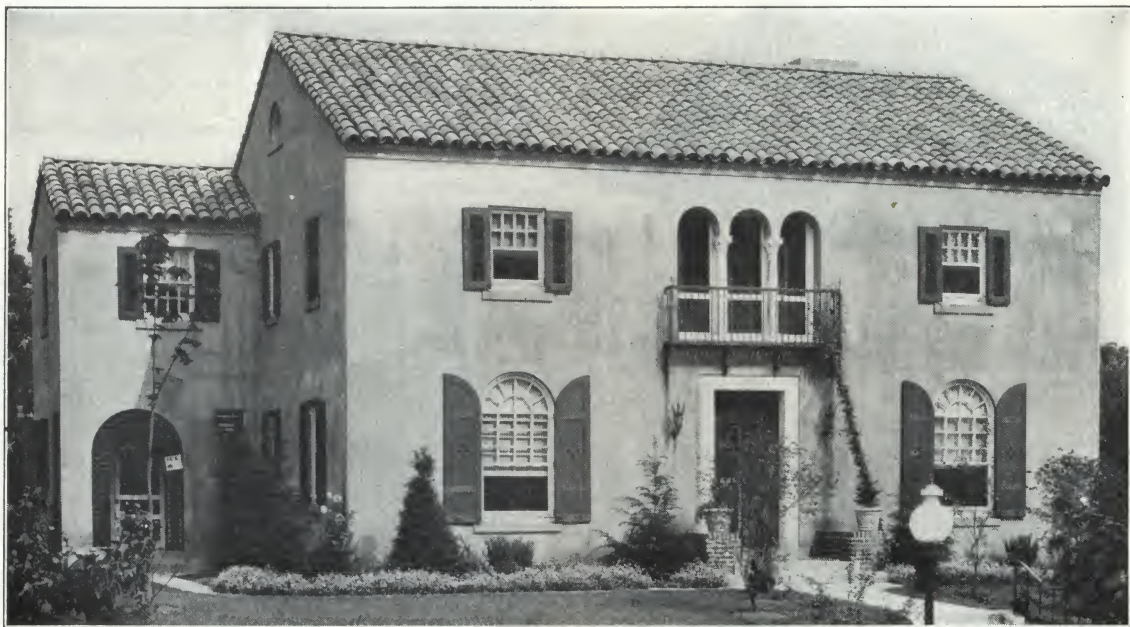
Cover all pitched roofs with "Imperial" Brittany Shingle Tile 6x12x $\frac{3}{8}$ in., as manufactured by the LUDOWICI-CELADON COMPANY, in colors as selected by the architect, including appropriate fittings such as ridge, hip, terminals, etc. Hip and valley tile to be cut to the correct pitch in the green before burning and provided with nailholes for proper fastening.

Tile to be laid with some irregularity in exposure to eliminate straight horizontal lines, but not more than 5-in. exposure nor less than 4 $\frac{1}{2}$ -in., in order to insure proper head lap.

Before tile are laid, cover sheathing with best quality asphaltum felt weighing not less than 30 lb. per square (40 lb. on low pitches), laid parallel to eave and ridge and lapped 2 $\frac{1}{2}$ in.

Apply on hips and ridges 1-in. wood stringers of proper height to carry hip and ridge and use $\frac{3}{4}$ x1-in. cant strips at eaves.

Fasten tile with 1 $\frac{3}{4}$ -in. copper nails, 2 to each tile. Where tile joins hip stringer, cement cut hip tile to hip board with a good quality elastic cement. Nail hip roll with 2-in. copper nails and ridge with 2 $\frac{1}{2}$ -in. nails.



A Residence Covered with Imperial Large Tapered Mission, Ancient Hand-Made



Greek



Roman

MOUND CITY ROOFING TILE COMPANY

3301 Morganford Road
ST. LOUIS, MO.

Mound City Roofing Tile Is Made of Finest Grade of Shale

Our shale is of the finest grade, making a roofing tile of superior quality and color, burned a solid red throughout at a temperature of 2000 degrees Fahrenheit. Our machinery is the most modern and our plant the most up-to-date in the country.

Colors

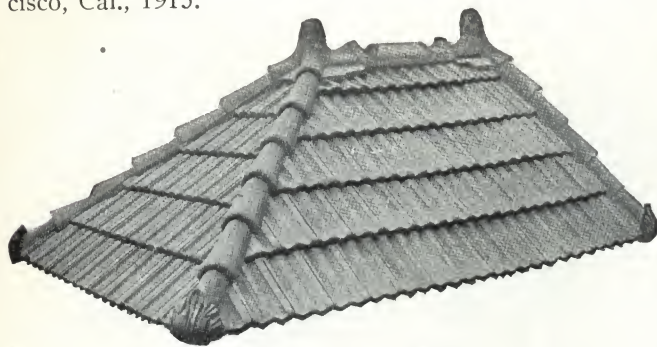
Our tile is made regularly in the various shades of red, also in dull and full green, and brown glazes. Our red tile is called Vitreous Face tile. This class of tile is preferred by a great many architects for several reasons; namely, being vitrified on the exposed surface it will not absorb any moisture from the outside and prevents the possibility of dripping caused through condensation at certain seasons of the year; it will not gather soot and dirt, but remains clean.

We also produce sage, oak, burgundy and sumac shades, which can be assembled with the red, producing the beautiful autumn foliage roofs so much in vogue at the present time. We are equipped to make any shape and color of tile or trimming the architect desires.

Awards

Highest Award, Gold Medal, World's Fair, St. Louis, Mo., 1904.

Gold Medal, Panama-Pacific Exposition, San Francisco, Cal., 1915.



"A" INTERLOCKING TILE

With No. H-5 hip and H-5 hip-starter, No. R-5 ridge and No. T-3, 2-way terminal.
Size of tile, 9x15½ in.
Shipping weight, including trimmings, 1000 lb. per square



CLOSED PANAMA TILE

With No. H-8 hip and H-8 plain hip-starter, No. R-6 ridge and No. T-2, 2-way terminal.
Size of tile, 8½x13¾ in.
Shipping weight, including trimmings, 1250 lb. per square

General Specifications

Cover all pitch roofs with one layer of asphalt felt weighing not less than thirty pounds per square. Same to be laid parallel with the eaves, each layer lapped at least three inches and nailed with capped or large-headed nails. The felt shall lap the valley metal at least six inches and on upright walls it shall lap under the tile at least four inches.

The metal contractor shall then place all valley metal, same to be held in place with clips fastened to the metal. The metal shall be bent over 1 by 2 strips running parallel on each side of the valley and must not be punctured in any manner. All eave strips and strips for hips and ridge shall be on hand ready for the roofer.

Cover all roofs so prepared with Mound City hard burned red (or green) pattern tile with trimmings as designated by the manufacturer. All tile to be fastened with copper nails.

No attempt shall be made to stretch the courses. The tile shall be so laid that the vertical lines are parallel with each other and at right angles to the eaves. The tile that verge along the hip shall be cut close to the hip board and a water tight job made by cementing the cut tile to the hip board with elastic cement. The joints of the hips and ridge should be cemented, but the interior space of the hips and ridge must not be filled with the pointing material. After roofer has completed his work he shall remove all broken and damaged tile.



"C" SPANISH TILE

With No. H-3 hip and H-3 ornamental hip-starter, No. R-1 ridge and No. T-3, 2-way terminal.
Size of tile, 12½x9½ in.
Shipping weight, including trimmings, 1100 lb. per square



MISSION TILE

Size of tile, 15½x7¾ in.
Gauge, 9½x12 in.
Shipping weight, including trimmings, 1400 lb. per square

WILLIAM L. BARRELL CO. OF N. Y., INC.

Cotton Duck—Converted Fabrics

93 Worth Street

NEW YORK, N. Y.

Product

CON-SER-TEX, a covering for roofs and floors.

Con-Ser-Tex—An Ideal Roof and Floor Covering

Con-Ser-Tex is a specially woven, chemically treated, tough cotton duck which meets the exacting requirements of an ideal covering for roofs and floors of porches, sleeping balconies, piazzas, etc.

Con-Ser-Tex is also an ideal floor covering for kitchens, laundries, garages, etc.

Con-Ser-Tex is so woven that there is absolutely no tendency to curl, as is the case with ordinary cotton fabrics. Con-Ser-Tex lies flat permanently, as is essentially necessary.

Con-Ser-Tex will never split, not even under severe vibration or strain. It is comfortable under foot and may be turned up to form a sanitary, verminproof and waterproof base, integral with the floor.

Immune to Dry Rot and Mildew

Con-Ser-Tex is subjected to a chemical treatment in which every fiber is impregnated with a special composition which protects it against the elements. This renders it permanently waterproof and immune to the ravages of dry rot and mildew. The effectiveness of the process is proved by the great endurance of the similarly bitumen soaked mummy cloths of the ancient Egyptians.

This chemical treatment also exercises a distinct rot preventive and antiseptic effect upon the wood over which Con-Ser-Tex is laid.

The chemical treatment also overcomes the detrimental oxidizing action of the oil in the paint.

Durability Proved Through Service

Con-Ser-Tex is more durable than ordinary wood shingles or tin and nearly as durable as copper. The durability of Con-Ser-Tex has been proved by the many years of service which it has rendered to the largest transportation companies, which have used it exclusively for passenger car roofing.

Con-Ser-Tex is soundproof and non-heat-radiating and is a non-conductor of heat and cold.

Con-Ser-Tex has found wide use in every climate and for every class of service with complete satisfaction.

Easily and Quickly Laid—Conserves Labor

Con-Ser-Tex is easily and quickly laid, consequently it effects great savings in time and labor. It can be applied at one-half the cost of laying other materials on the same surface and area.

A Lower Grade of Lumber May Be Used

In the construction of porch floors, sleeping balconies, etc., it has been customary to use clear pine owing to its durable nature. With the aid of Con-Ser-Tex, however, a lower grade of lumber can be used with equally satisfactory results, because Con-Ser-Tex protects the lumber from the action of the elements and a surface so covered will have greater life than would an unprotected clear pine surface.



How to Lay Con-Ser-Tex

Dress the surface to be covered with Con-Ser-Tex by eliminating rough places and sharp edges, after which apply a heavy coating of white lead thinned in linseed oil as a bedding (see note below). Over this bedding (while still wet) lay the Con-Ser-Tex, slightly stretching it so as to insure a close adhesion to the wood surface, taking care to arrange laps so as to permit free drainage.

If Con-Ser-Tex is to be laid in parallel courses with the building, the strips start from the outer or lower edge of the surface to be covered. Con-Ser-Tex should be turned up or flashed 4 to 6 in. at walls to insure a watertight result.

While Con-Ser-Tex is stretched, fasten with copper or galvanized tacks $\frac{3}{4}$ in. apart, and then apply the next strip, allowing a lap of not less than $1\frac{1}{2}$ in.

After Con-Ser-Tex is laid and set, apply a light coat of good quality lead-and-oil paint, and a second or heavier coat after the first is thoroughly dry.

Note: If desired, we can furnish a special bedding paint which has greater adhesive qualities than ordinary white lead and oil.

Grades of Con-Ser-Tex

Grade E—A light weight grade, suitable for roofing small porches and for floors where traffic is light.

Grade G—A medium weight grade, suitable for larger porch floors and roofs on residences and public buildings.

Grade I—The heaviest grade, used principally for public buildings and all places where severe conditions exist.

Reasonable in Cost

The first cost of Con-Ser-Tex is reasonable and its upkeep practically nil, requiring painting only as often as the rest of the house.

LIST PRICE OF CON-SER-TEX PER LINEAL YARD

Width, in.	Grade E	Grade G	Grade I
30	\$1.17	\$1.38	\$1.47
36	1.39	1.60	1.78

Discounts furnished on request.

Consult Us Regarding Economical Laying

On receipt of dimensions of the surface to be covered, we will submit an estimate of cost, also a diagram showing the most economical method of laying Con-Ser-Tex, eliminating to the greatest possible extent all waste in cutting.

There is no charge for this service.



Club House of the Empire City Race Track, Mt. Vernon, N. Y.

Con-Ser-Tex is giving service on the porch floor and roof

THE BARRETT COMPANY

Flashings for Brick and Concrete Walls

40 Rector Street
NEW YORK, N. Y.

For Branch Offices, see page A393

Products

FLASHING BLOCK for Brick Walls (Patented), FLASHING FORM for Concrete Walls (Patented), PLASTIC ELASTIGUM for Flashings.

For Roofing, see pages A393-395; for Roof Leader and Roof Vent Connections, see page C2333. For detailed description and specifications, see Volume III, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

Essential Features of Barrett Flashings

Barrett Flashings, which are the result of nearly three-quarters of a century of successful roofing experience, embody all of the following essential features:

(1) They provide amply for expansion and contraction. (2) Their elasticity takes care of settlement or shrinkage. (3) All joints are watertight under every weather condition. (4) They will not pull away from either roof or wall. (5) They are practical and easy to install. (6) They are adaptable to every complex wall construction. (7) They are durable and require no maintenance or repair. (8) They eliminate division of responsibility between contractors. (9) Their cost is moderate.

Barrett Flashing Blocks and Flashing for Brick Walls

These blocks provide a permanent, upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing. This cap, being an integral part of wall, is as permanent as the wall itself, and can not become detached.

The flashing material is installed over one unbroken plane, eliminating the buckling, tearing, pocketing, and special wear which so frequently occur where flashings are set in at right or acute angles. The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

For detailed specifications see Volume III, Architects' and Engineers' Built-up Roofing Reference Series.

Barrett Flashing Form and Flashing for Concrete Walls

This flashing form is identical in principle with the flashing blocks described above. The metal flashing form, shown at right, provides a permanent, upwardly inclined flashing groove in the wall, which performs the function of a cap and weather protection for the flashing. This cap, being an integral part of wall, is as permanent as the wall itself, and can not become detached.

The metal flashing form is not intended to be permanent, its only function being to shape or create the flashing groove. It is left in the wall merely as a matter of convenience.

The flashing material is installed over one unbroken plane, eliminating the buckling, tearing, pocketing, and special wear, which so frequently occur where flashings are set in at right or acute angles. The cant construction provides support from below throughout the extent of the flashing, hence there is no strain from wind and gravity.

For detailed specifications see Volume III, Architects' and Engineers' Built-Up Roofing Reference Series.

BARRETT ROOF FLASHING SYSTEM METHOD OF INSTALLING FLASHING IN FLASHING BLOCK

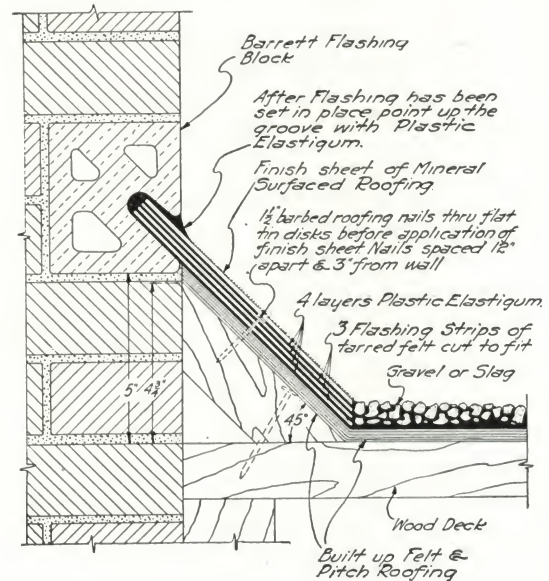


Diagram Showing Barrett Flashing Blocks and Flashing for Brick Walls

BARRETT ROOF FLASHING SYSTEM METHOD OF INSTALLING FLASHING IN FLASHING FORM

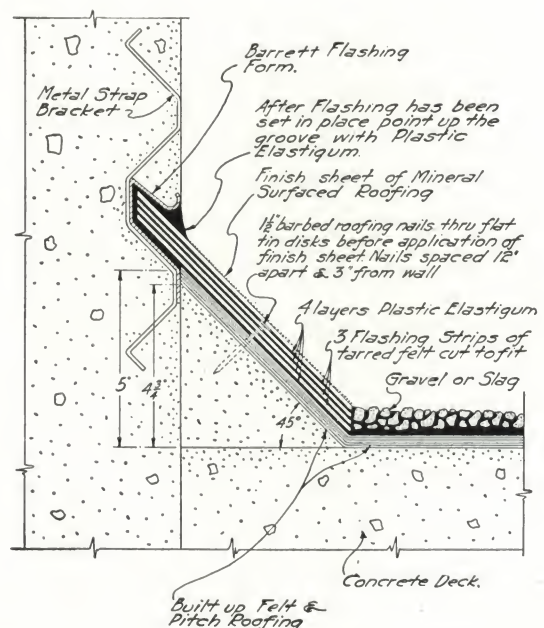


Diagram Showing Barrett Flashing Form and Flashing for Concrete Walls

THE FIGGE COMPANY

Manufacturers of the Patented Figge Roof Flashing

1110 West Adams Street

CHICAGO, ILL.

Product

FIGGE PATENTED ROOF FLASHING for all types of built-up roofings.

Figge Roof Flashing

Figge roof flashing is manufactured for the one purpose of permanently protecting the vital point in built-up roof construction.

Architects recognize that 95% of roof leaks develop in and around the flashing.

Figge flashing is furnished complete in two weights—two-ply and three-ply—the material is woven fabric thoroughly saturated with bituminous compound. The life of the Figge flashing is equal to the best built-up roof constructions. There are no nails to rust, no wood to rot, no crevices for water seepage. It forms a solid, permanent waterseal between the wall and the roof. Figge flashing presents perfect flexibility working perfectly into corners and uneven mortar courses.

How to Specify

Figge flashing requires a raggle which is formed by raking out the mortar joint between brick. This raggle should be $1\frac{1}{2}$ in. deep and at whatever height

desired. It can be taken care of in mason specification where it is raked out before it sets or can be taken care of by the roofer. Wherever concrete is used a raggle can be provided by a wood strip nailed on to the form. Under roofing specifications have subheading:

Roof Flashing—The roof flashing shall be Figge Flashing applied according to manufacturers' directions.

Specify either Two-ply, Three-ply, Standard or Extra Heavy and the width. Specify either 6, 8, 10 or 12 in.

The flashing should extend out on the roof from 1 to 2 in., to reinforce angle between roof and wall so that if necessary to flash up on the wall 6 in., specify 8 in. wide flashing. If necessary to flash up on the wall 8 in. specify 10-in. wide, etc.

How Packed

Figge flashing is packed in specially designed cartons of tough and durable fiber board which assures flashing arriving on the job in perfect condition. Each carton is labeled properly with type and size clearly shown, bound with heavy steel strapping. Direction sheet in each package.

Package contains 100 lin. ft.

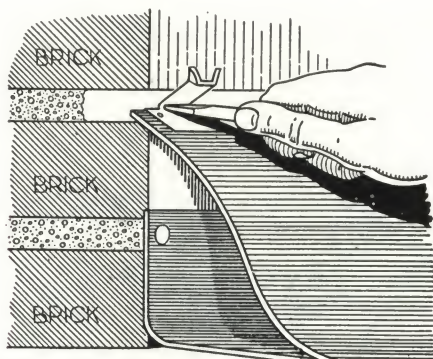


Fig. 1—Provide raggle $1\frac{1}{2}$ in. deep at required height. Place flashing so that corrugation in device is in center of raggle. Place screwdriver or flat piece of metal at corrugation in securing device and push into raggle

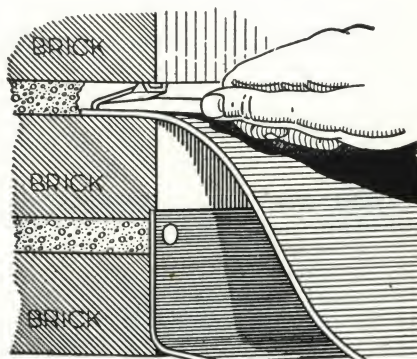


Fig. 2—When securing device in place press down so that it takes on position shown in Fig. 2

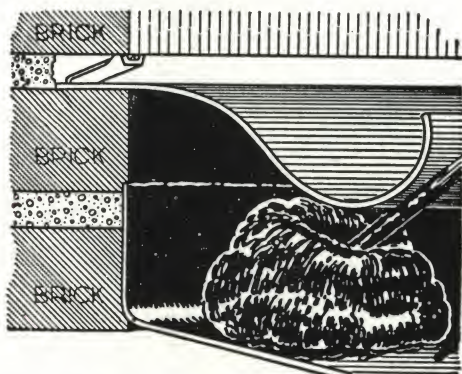


Fig. 3—Cement flashing to wall and turned-up portion of roof covering. Care should be taken here to prevent wrinkles

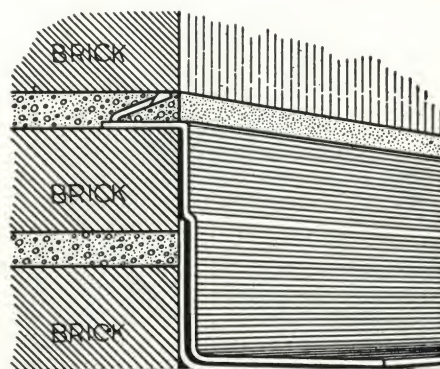


Fig. 4—Point up raggle with a rich mixture of portland cement mortar, or asphalt roof cement. In using asphalt roof cement stiffen with portland cement to form a mastic consistency. Then apply a coating of bituminous cement over entire exterior of flashing

COPPER ROOFINGS AND FLASHINGS

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway
NEW YORK, N. Y.

On the Uses and Application of Copper, Brass and Bronze, Consult Our Research and Building Service Departments

Literature

"Copper Roofings—A Manual"—Drawings, specifications and miscellaneous data on laying sheet-copper roofs. 8½x11 in., 29 pages. Sent on request.

Copper and Brass are cheaper because you pay for them only ONCE

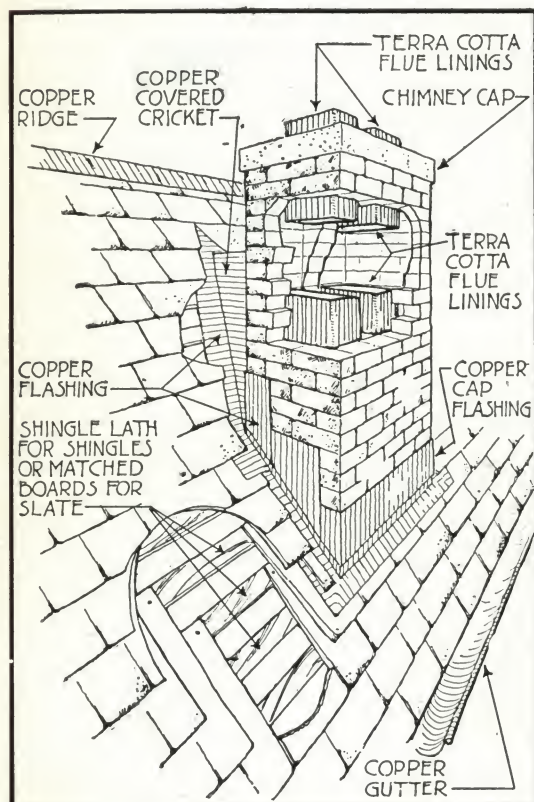
specifications and miscellaneous data on flashings of all kinds. 8½x11 in., 66 pages. Sent on request.

"Copper Flashings—A Handbook"—Drawings,

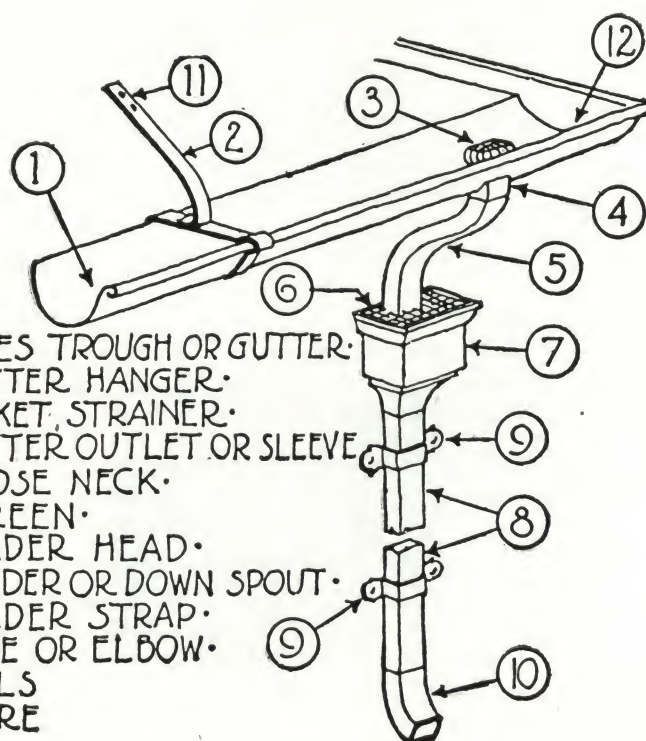
"Unfrequent Flashings"—A series of sheets of unusual and little-used flashings—published from time to time—8½x11 in. Sent on request.

CONSULTING SERVICE COVERS THESE USES

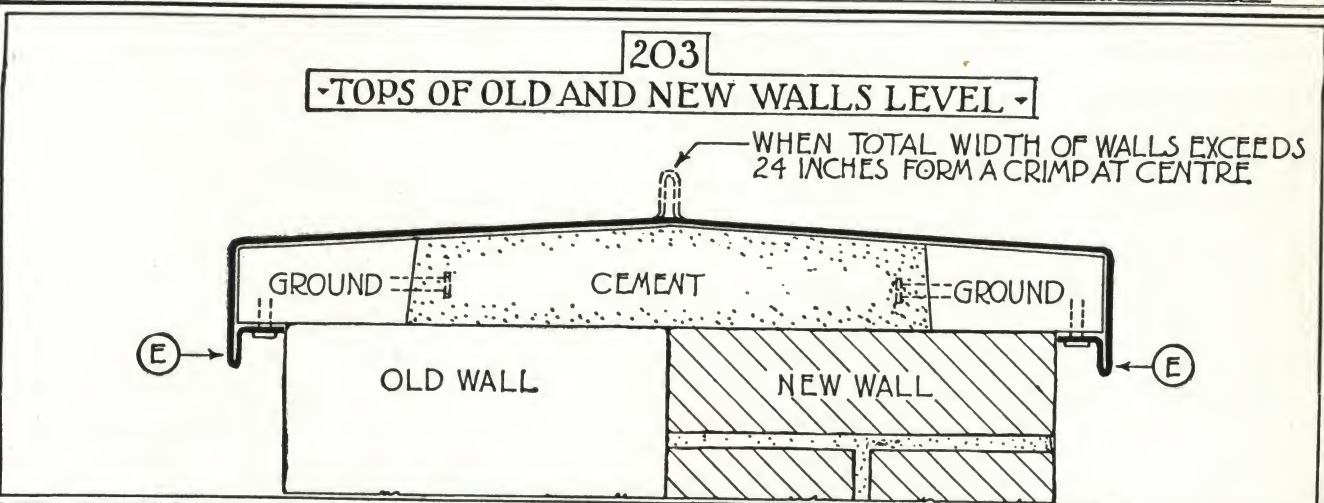
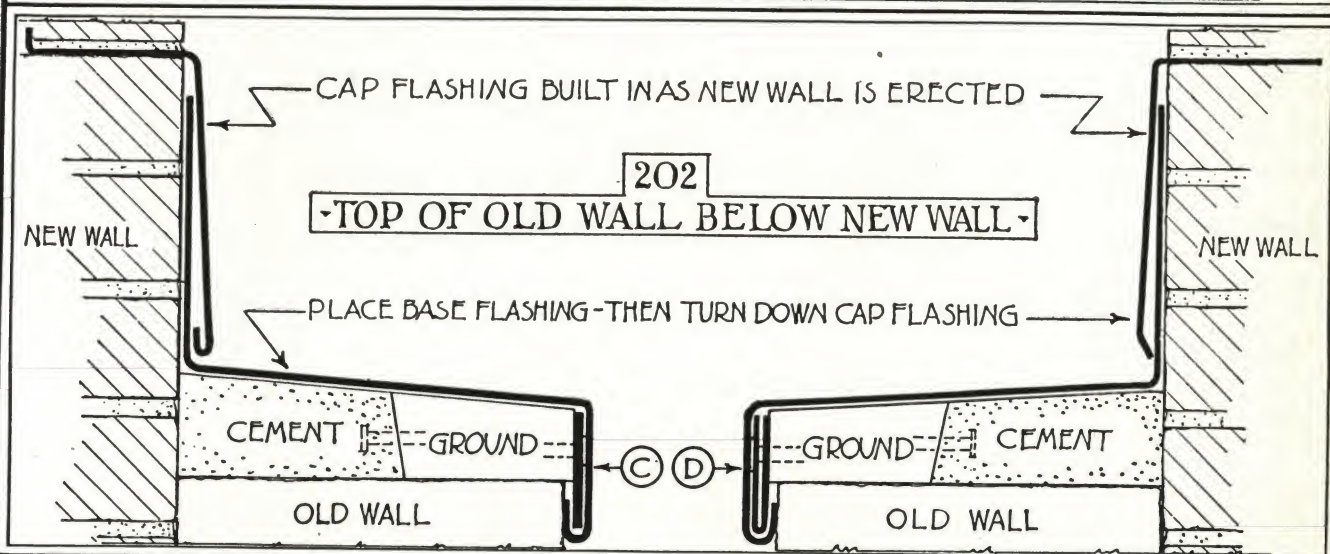
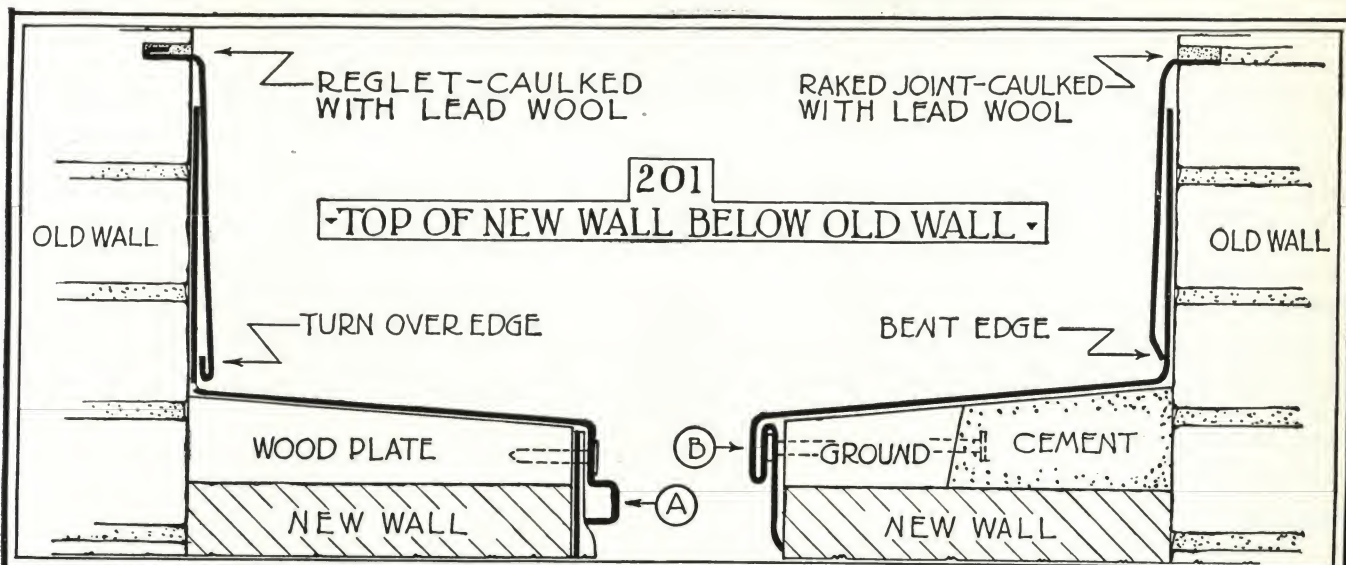
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|------------------|--------------------------|
| 1. CORNICES | 6. ROOFING—SHEET |
| 2. EAVES TROUGHS | 7. ROOFING—SHINGLES |
| 3. FLASHINGS | 8. ROOFING—SPANISH TILE* |
| 4. GUTTERS | 9. SKYLIGHTS |
| 5. LEADERS | 10. VENTILATORS |



The Roof and Chimney



Gutter and Leader Detail



SERIES
C

UNFREQUENT FLASHINGS
- OLD AND NEW WALLS -
SCALE THREE INCHES EQUAL ONE FOOT

NUMBER
ONE
JANUARY 1926

COUNTER-FLASHING RECEIVER CO.

712 Park Street, MILWAUKEE, WIS.

AGENTS IN ALL PRINCIPAL CITIES

Product

SCHNEIDER COUNTER-FLASHING RECEIVER, a permanently built-in, leakproof metal raglet for masonry parapets and walls. Receives and securely holds, without calking, the standing flat-roof counter-flashing. Fully protected by patent.



Materials

16 ounce, cold rolled copper. 26 gauge galvanized Armco iron. Furnished in 8-ft. lengths.

Adaptability

Adapted to all classes of buildings with flat or slight pitch composition roofs such as those of industrial and commercial buildings, hotels, apartments, schools, etc.

Advantages

Furnished and installed by mason. Flashing receiver is furnished and built in by the masonry or general contractor with little labor cost as the masonry work of parapets and walls progresses.

Permanence—Made up of non-corrosive metals, it lasts as long as the masonry walls. Permits the removal and replacing of counter-flashing without injury to the receiver.

Leak-proof—Most roof leaks occur at or about the flashing against parapets and walls. The counter-flashing when set with its top flange inserted in a cut out mortar joint secured with flashing hooks and calking cement is far from permanent and is the vital point where leakage occurs.

The turn-up at the back of the Counter-flashing receiver body, not only securely anchors the receiver in the masonry mortar joint, but it permanently prevents wind driven rain or the water from melting banked snow from passing over the receiver body, and penetrating through the mortar joint to the interior of the wall to appear on the walls and ceilings beneath with resultant costly damage.

This positive and permanent assurance against leaks at this most vital point is a prime reason for the inclusion of the receiver on all buildings where counter-flashing is required.

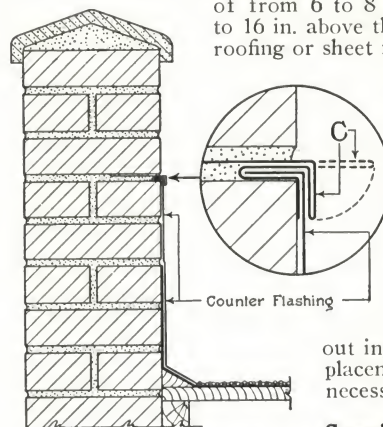
Easily and Quickly Installed—Furnished in convenient lengths of 8 ft., the Counter-flashing Receiver is easily handled and quickly installed by the mason without special tools or skill in metal working.

Reduces Labor Costs—Eliminates the usual labor costs of roofing and

sheet metal contractor in cutting out the mortar joint to receive the counter-flashing flange and the initial cost of flashing hooks and calking cement, and the labor of installation.

Application

The Schneider Counter-flashing Receiver is furnished and set by the mason in the masonry mortar joint. The body of the receiver (A) is set level in the wall with the guide flange (E) pressed close against the vertical masonry face. Splice plates with turn-up at back edge, are furnished to fit snugly into the splicing plate groove (F) to firmly join abutting ends in perfect alignment. Corners and re-entrant angles are easily made without intricate fitting or special tools. On roofs with considerable pitch the receiver is installed in steps maintaining a minimum of from 6 to 8 in. and a maximum of 12 to 16 in. above the roof surface. After the roofing or sheet metal contractor has set the counter-flashing with its top flange inserted in the counter-flashing groove (D), he bends down the projecting flange (C) securely locking the counter-flashing in place, yet allowing for its normal and natural expansion and contraction. The locking flange (C) is easily lifted and re-bent to its customary position without injury when removal and replacement of counter-flashing is necessary in reroofing.



Detail of Application

Specification

Include in Masonry Specifications—The Mason Contractor shall furnish and build into all parapet and similar walls where counter-flashing is required [copper] [galvanized Armco iron] Schneider Counter-flashing Receiver as manufactured by the COUNTER-FLASHING RECEIVER Co., Milwaukee, Wis.

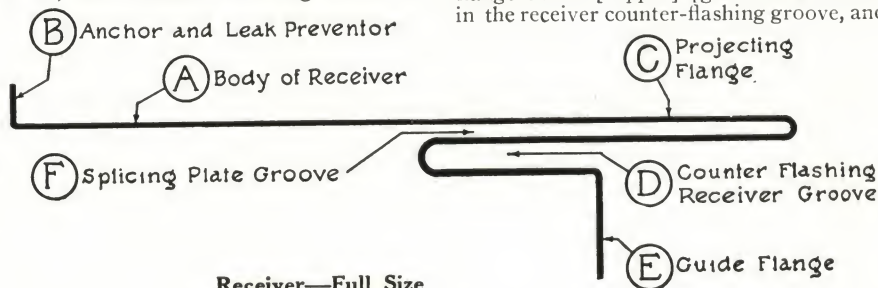
The Counter-flashing Receiver shall be set in the masonry mortar joint in accordance with the manufacturer's details. Butting end joints shall be secured in perfect alignment with splice plates, furnished by the receiver manufacturer, and all corners and re-entrant angles shall be lapped and joined as shown.

The receiver shall be set in a mortar joint approximately 9 in. at its lowest point, from the roof level. Where steps are required by changing roof level, these shall occur at points where the maximum height above the roof surface is approximately from 12 to 16 in.

Include in Roofing and Sheet Metals Specification—[Copper] [galvanized Armco iron] Schneider Counter-flashing Receiver is furnished and built in by the Mason Contractor (see page ... of specifications and details). This contractor shall insert the top flange of his [copper] [galvanized Armco iron] counter-flashing in the receiver counter-flashing groove, and bend the projecting receiver flange over the counter-flashing top.

Note: No counter-flashing hooks or calking cement are required.

Note: To prevent electrolysis, the receiver and counter-flashing must always be of the same metal, i.e. copper receiver—copper counter-flashing; galvanized Armco iron receiver—galvanized Armco iron counter-flashing.



ESTATE OF J. G. HETZEL

Manufacturers of Roofing Cements and Paints

CABLE ADDRESS
"HETZEL, NEWARK"

67 Maine Street
NEWARK, N. J.

Products

HETZEL'S ELASTIC ROOF CEMENT for all kinds of roofs, glass skylights, coping stones, etc.

HETZEL'S PLASTIC ROOF COMPOUND and FIBROUS KOTING.

HETZEL'S ELASTIC CALKING COMPOUND.

HETZEL'S PIPE JOINT COMPOUND.

HETZEL'S DAMP RESISTING PAINT for brick walls.

Also Hetzel's Asphalt Paints; Hetzel's "Rub-on" Roofing Paint; Hetzel's Enamel Paint for boiler fronts and steam pipes; Hetzel's Acidproof Paint for metal work, ammonia tanks and gas tanks; Hetzel's Structural Paint for exposed surfaces.

Hetzel's Elastic Roof Cement

Hetzel's elastic roof cement, which has been in general use throughout the United States and Europe for many years, is especially valuable for covering and repairing all holes, cracked joints, breaks, or leaks in roofs of all kinds. It is also used for pointing around chimneys, skylights, and dormer windows; for repairing coping stones, gutters, wood and stone work which requires to be made watertight; and for laying and bedding slate and tile roofs.

Asphalt shingles laid in Hetzel's cement will not curl, nor can snow or rain blow under them.

Colors: brown, gray, black, white, green and red. It is also made to order to suit every purpose, and is the only slaters', tinnners' and tile roofers' cement.

Hetzel's elastic roof cement is equally well adapted for use on slate, tin, asbestos, glass, wood and metal roofs; is permanent; does not run or loosen from joints or cracks, and is not affected by any extreme of temperature or climatic changes. It does not harden, but preserves its complete elasticity even when exposed to extreme heat, cold, dryness or humidity.

Hetzel's Plastic Roof Compound and Fibrous Koting (Liquid)

Specially prepared compounds for repairing and painting old wood, tin, iron or felt roofing; for repairing



TRADE-MARK

leaky chimneys; for waterproofing walls below and above grade, etc.

Hetzel's Elastic Calking Compound

For pointing window frames, hothouses, steel sashes, crevices, cracks in masonry, etc. Remains elastic indefinitely. Will not crack or dry up. Far superior to lead or oakum. Does not contain asphalt or coal tar. Can be painted over with any color. Also made in special consistency for use in guns.

Colors: white, gray, green, black and red.

Pipe Joint Compound (Red and Gray)

This compound is used for joints of gas, steam, water, and air pipes. It will not harden, and prevents joints from rusting. It will make absolutely tight joints, which can be disconnected at any time, without injury to fittings.

Hetzel's Damp Resisting Paint

A compound black paint for dampproofing foundations and walls above and below grade. When applied to inner side of exterior walls, forms a good dampproof surface for direct application of plaster, rendering plaster stainproof, and saving cost of furring and lathing.

Specifications for the Use of Hetzel's Elastic Roof Cement

All nailholes and joints between the slates shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J., in such quantities as to hold the slates in position should they break, or the nails rust away. (Fig. 1.)

The joints of all tiles shall be sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. To prevent leaking, the hip and ridge rolls shall be sealed in a like manner. (Fig. 2.)

All cap flashings shall be carefully pointed up with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. (Fig. 3.)

The joints of all copings shall be set and sealed with Hetzel's Elastic Roof Cement as manufactured by the ESTATE OF J. G. HETZEL, Newark, N. J. (Fig. 4.)

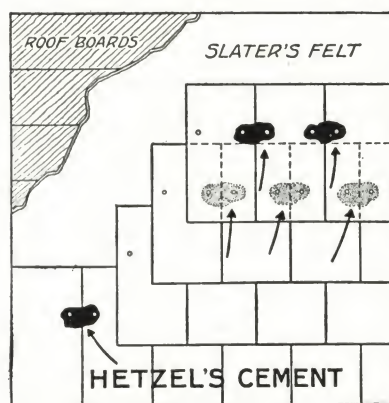


Fig. 1. For Slate Roofs

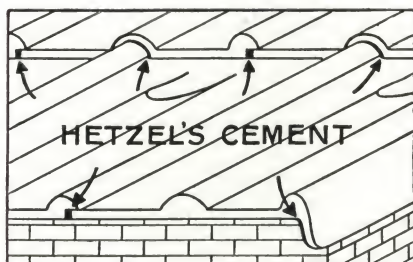


Fig. 2. For Spanish and Flat Tile Roofs

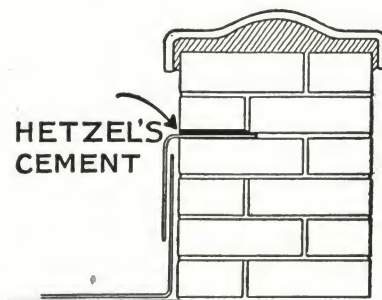


Fig. 3. For Pointing Up Cap Flashings
Applications of Hetzel's Elastic Roof Cement

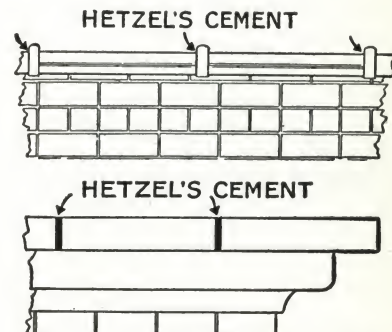


Fig. 4. For Tile and Stone Copings

COP-COR MFG. & SALES CORP.

Manufacturers of the Pfistner Copper Corner Guard

345 Central Avenue, JERSEY CITY, N. J.

The Pfistner Copper Corner Guard

The matter of finishing house corners in a manner which, while preserving the appearance of the building, at the same time provides for efficiency, economy and endurance, has engaged the serious attention of architects and builders for years. Bulky two or three-piece wood corners and methods of mitering, lapping or weaving are relatively expensive and tend to leave openings for the elements to work in, to the damage of the house and the detriment of its appearance.

The Pfistner Copper Corner Guard is a one-piece, complete, ready-to-attach product which is designed to provide an efficient ground for all types of sidings. It represents a distinctive stride forward in practical construction. The Johns-Manville Corporation unreservedly endorse and recommend the use of the Pfistner Copper Corner Guard with their rigid asbestos siding shingles, specifying size No. 1, Special.

Construction

Is of 16-oz. pure copper sheeting. The quarter-round section is reinforced with a wood filler moulding. The flanges are $1\frac{3}{4}$ in. in width corrugated with 3 deep grooves. Sections are 5 ft. in length for ease in applying and the end of each is tongued or offset to provide an overlap fit of the next section.

Sizes

Made in 3 sizes: No. 1 is for use with asbestos shingles and stucco and is provided with a turn back lip that prevents any water, which a driving rain might force beyond the corrugations, passing the edge of the flange.

No. 2 is for use with novelty board, clapboard and asbestos shingles of greater thickness.

No. 3 is for use with wood shingles and colonial board.

Features

The outstanding features of Pfistner Copper Corner Guard are:

Weatherproof—The corrugated flanges absolutely prevent seepage of water past the grooves.

Lasting—Made of pure copper. The use of copper in construction is widespread and its value is acknowledged.

Simple to Apply—One nail at each corner of each section.

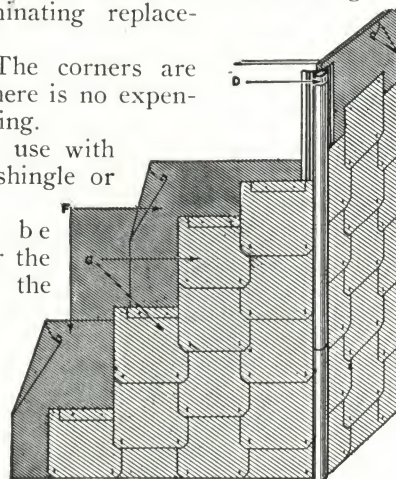
Neat—Stays in place. There is no wood to rot, no cement to chip away, and no butt end fit. It forms a uniform line.

Economical—Through saving labor in the original application and eliminating replacements.

Saves Labor—The corners are ready to apply and there is no expensive lapping or mitering.

Adaptable—For use with any style of board, shingle or stucco.

Finish—May be painted as desired for the copper will hold the paint as long or longer than wood, or if left to color naturally a pleasing tone develops.

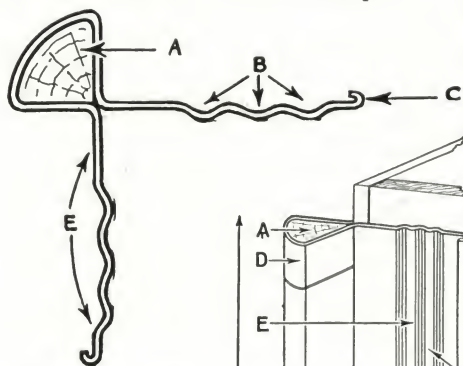


Size No. 1 Copper Corner Guard with Asbestos Shingles

A combination which defies time. D—offset which provides overlap for next section.

F—Johns-Manville 14-lb. asbestos felt.

G—Johns-Manville No. 80 rigid asbestos siding shingles



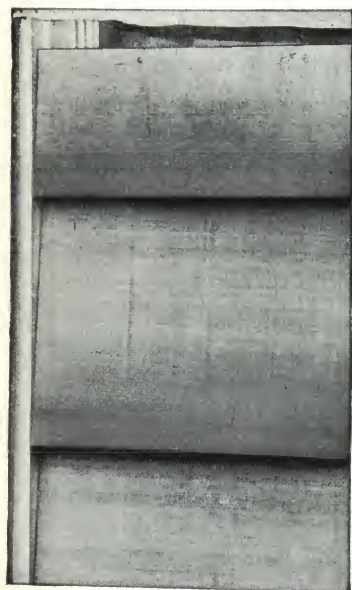
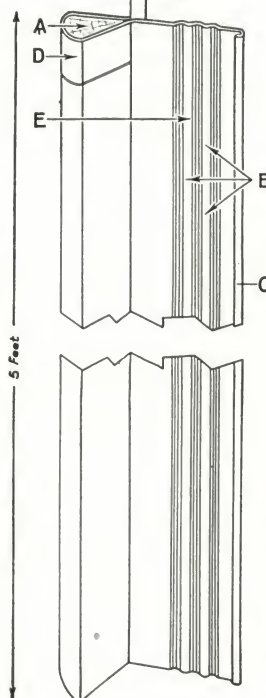
Pfistner Copper Corner Guard

A—full length wood filler insures rigidity.

B—corrugations which arrest the passage of water.

C—turn back lip which is a special feature of Size No. 1 for use with asbestos shingles.

D—offset which provides for overlap fit of next section



Size No. 3 Copper Corner Guard

For use with wood shingles and Colonial boards



Size No. 2 Copper Corner Guard

For use with clapboard and novelty boards

E. M. LONG & SONS

"Improved" O. G. Fir Gutters

CADIZ, OHIO

Product

"IMPROVED" O. G. FIR GUTTERS, for use on all types of building where exposed or hanging gutters are contemplated.

Material

"Improved" O. G. Fir Gutters are manufactured from clear, soft, old growth Douglas fir and are very strong and durable.

Stock Sizes and Weights

They can be furnished in the following stock sizes: 3x5 in., 4x6 in., 5x7 in., and in lengths from 10 to 40 ft. The 3x5 in. size weighs 1½ lb., the 4x6 in. size, 2 lb., and the 5x7 in. size 3 lb., per lineal foot.

Note: Lengths 22 ft. and under can be shipped locally in any quantity; for lengths longer than 22 ft., order should call for not less than 1500 lb.

Description

"Improved" O. G. Fir Gutters are rapidly replacing metallic gutters on all types of buildings, because they look better, last longer and are less expensive; they do not corrode or disintegrate when exposed to the elements, smoke, or acid fumes. There is no expansion or contraction.

In New England, wooden gutters have been and are in general use, and have proved very satisfactory and durable over a long period of years.

There are numerous instances where old growth, Douglas fir gutters have lasted 25 years and more without any attention or repairs.

They add to the attractiveness of a house and have architectural merit on account of their form and design. "Improved" O. G. Fir Gutters can be included as a part of the cornice profile—eliminating the unsightly appearance of the ordinary hanging metal gutter.

The ultimate cost is less than gutters of copper, galvanized iron or best tin, and they are adapted for both new construction and replacement work.

A large stock of "Improved" O. G. Fir Gutters is always available for quick shipments—half a million feet is carried in stock. "Improved" O. G. Fir Gutters



are sold through retail lumber dealers.

Specifications

General—The Contractor shall provide and install....in.

"Improved" O. G. Fir Gutters as furnished by E. M. LONG & SONS, Cadiz, Ohio.

Material—The gutters shall be manufactured from clear, soft, old growth Douglas fir.

Priming—When specifying, state whether gutters are to be furnished unprimed or treated with creosote wood preservative. Before installing the inside or trough should be well coated with a good grade of asphalt and the outside well primed with lead and oil.

How to Install

It is recommended setting all gutters level for architectural and practical reasons. Architecturally—so that straight horizontal lines will be retained. Practically—because water, always seeking its own level will find its outlet at the leader spouts. One leader is sufficient for short gutters, but long lengths require two or more, depending upon roof area to be drained.

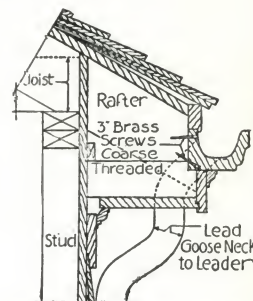
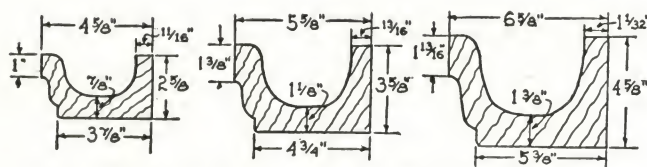
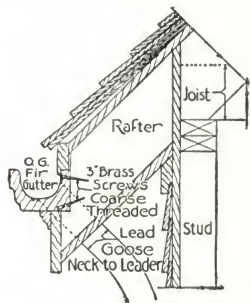
Gutters can be set with a slight pitch towards the leader end; or in long lengths, each end near a leader can be sprung downwards slightly and fastened in that position.

In joining two lengths, the ends should be cut bevel to fit closely, the joint cemented and fastened securely with two 3-in. brass screws through the bottom and two ¾-in. brass screws at the top. Screw heads should be countersunk and puttied. The ends of gutters may be rebated for a distance of 1½ in., on each side of the joint deep enough to hold sheet-lead or copper flashing which should be embedded in the rebate with elastic cement, and tacked around the edges with ¾-in. copper tacks.

Ask for booklet showing photographs, details, drawings for down-spout connections, etc.

Literature

Descriptive literature sent upon request.



BERGER BROTHERS COMPANY

Gutter Hangers and Conductor Pipe Fasteners

229-237 Arch Street, PHILADELPHIA, PA.

Products

GUTTER HANGERS and CONDUCTOR PIPE FASTENERS, of malleable iron, wrought iron, solid cast bronze and copper channel.

Also a general line of Sheet Metal Workers' Requirements; "Shurlock" Conductor Pipe and "E-Z" Fit Eaves Trough; "Quaker City" line of Mitres, Ends, Caps and Outlets.

Exclusive manufacturers of Octagon and Polygon Conductor Pipe.

The Mark of Quality Which Protects the Purchaser

We are the originators, designers and manufacturers of the best grade of gutter hangers and conductor pipe fasteners on the market.

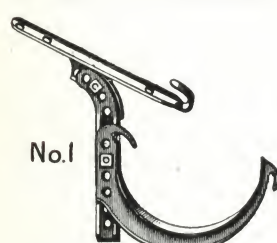


Our registered trade-mark appears on all products manufactured by us. This mark represents dependability, durability and strength and protects the purchaser against inferior imitations.

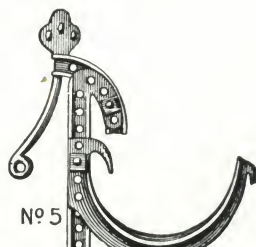
When specifying, full protection is assured by insisting that our trade-mark appear on every piece.

How Furnished—Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), solid cast bronze and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks.

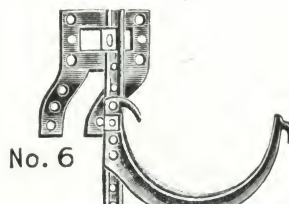
Free samples on request.



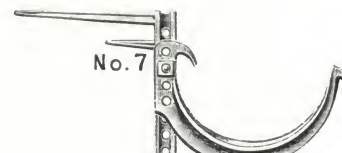
No. 1. Clamped direct to metal roof, requiring only one bolt through the iron. Especially suitable for awnings and corrugated roofs



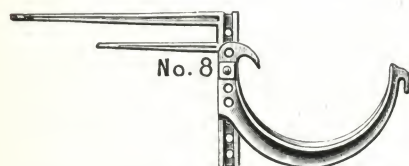
No. 5. Will span over various shaped mouldings and is easily bent larger or smaller before nailing to eave



No. 6. For nailing against O. G. mouldings. The two stays are made to fit in the cove and can be bent to suit variation



No. 7. For driving from 3 to 4 in. square in cornice. Lower prong forms a brace for the upper and makes it strong and firm



No. 8. For driving from 3 to 6 in. square in cornice. Intended for eaves where shingles project over the cornice

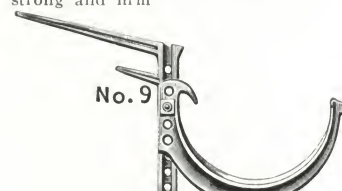


Penn Gutter Circle
For double bead gutters. Sizes, 3½, 4, 4½, 5, 6, 7 and 8 in.



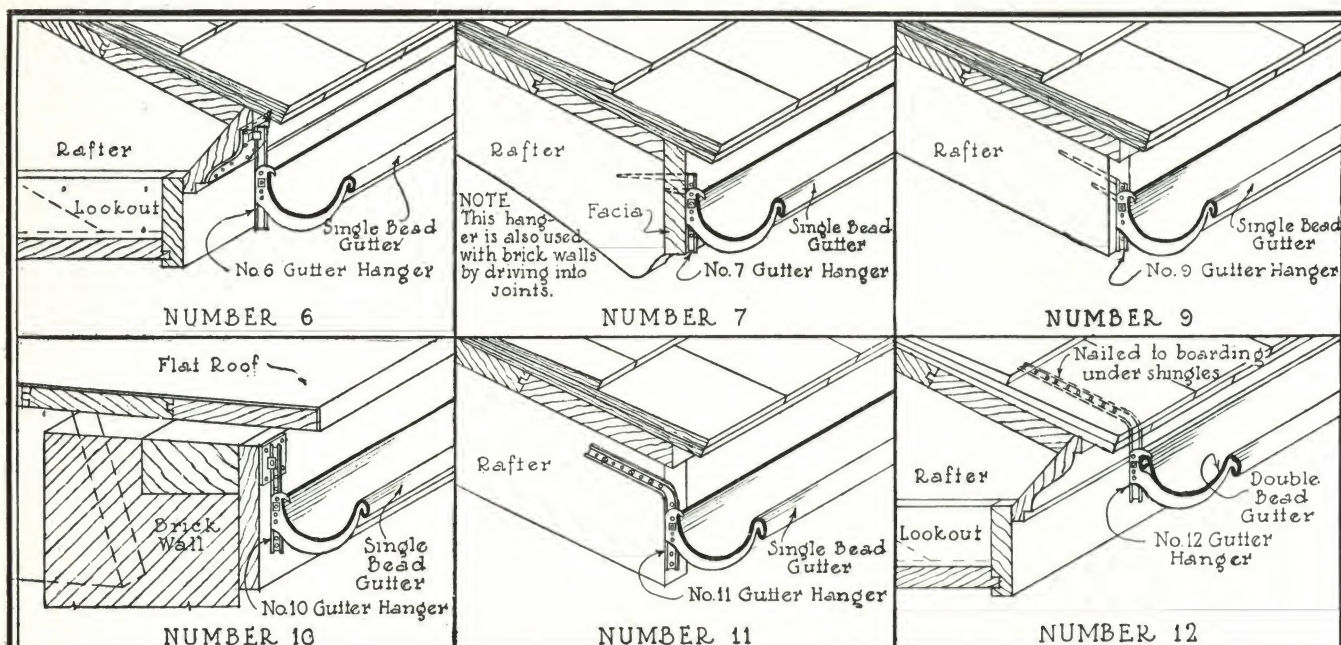
Gem Gutter Circle
For single bead gutters. Sizes, 3½, 3¾, 4, 4½, 5, 6, 7 and 8 in.

Circles are applicable to any B. B. hanger

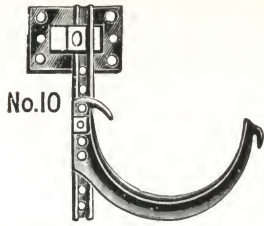


No. 9. For driving with the pitch of the roof. Suitable for narrow moulded cornice

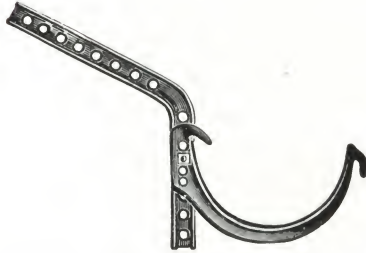
B. B. Gutter Hangers



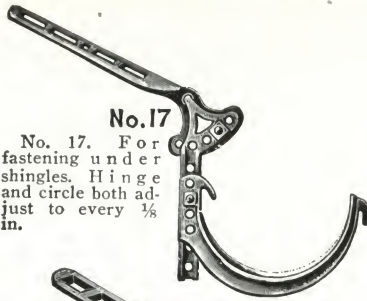
TYPICAL DETAILS SHOWING APPLICATION OF BERGER BRO'S. GUTTER HANGERS



No. 10. For nailing against square box cornice



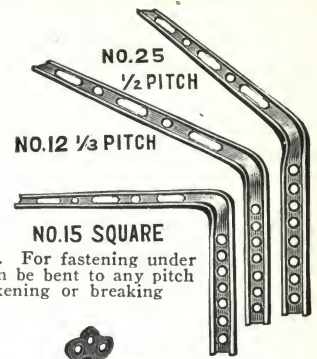
No. 11. For nailing to the side of exposed rafters



No. 17. For fastening under shingles. Hinge and circle both adjust to every $\frac{1}{8}$ in.



No. 16. For fastening under shingles



No. 12 $\frac{1}{3}$ PITCH

No. 15 SQUARE

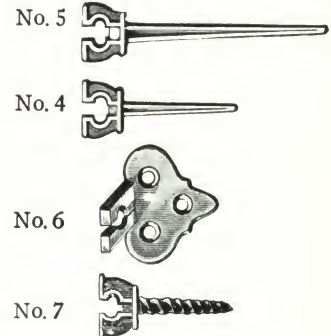
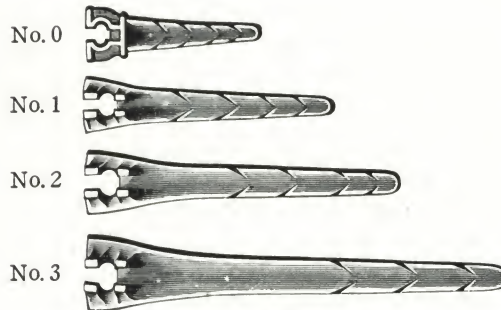
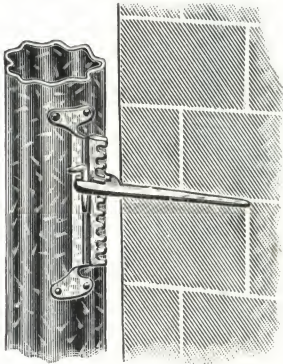
Nos. 12, 15 and 25. For fastening under shingles or slate. Can be bent to any pitch of roof without weakening or breaking



No. 20. For nailing or screwing to various shaped mouldings at any angle desired. Hinged for any pitch of roof

B. B. Gutter Hangers

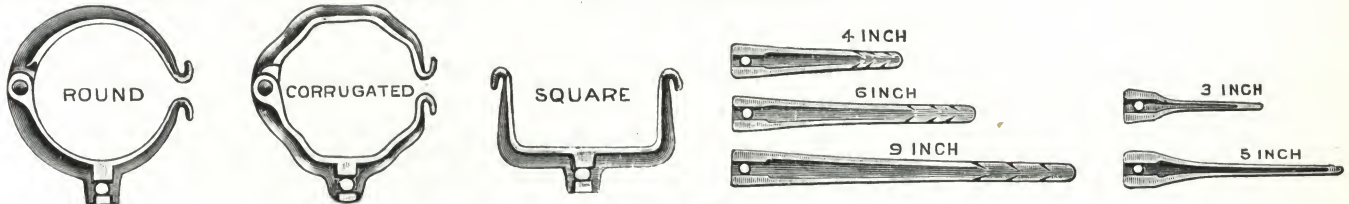
Made of malleable and wrought iron, plain or tinned (plain furnished unless otherwise specified), solid cast bronze and copper channel. All shanks and circles interchangeable. One bolt included with each hinged shank. Hinged shanks are adjustable to any pitch of roof. Shanks may be lengthened with our extension shanks. Free samples on request



Pipe Fasteners

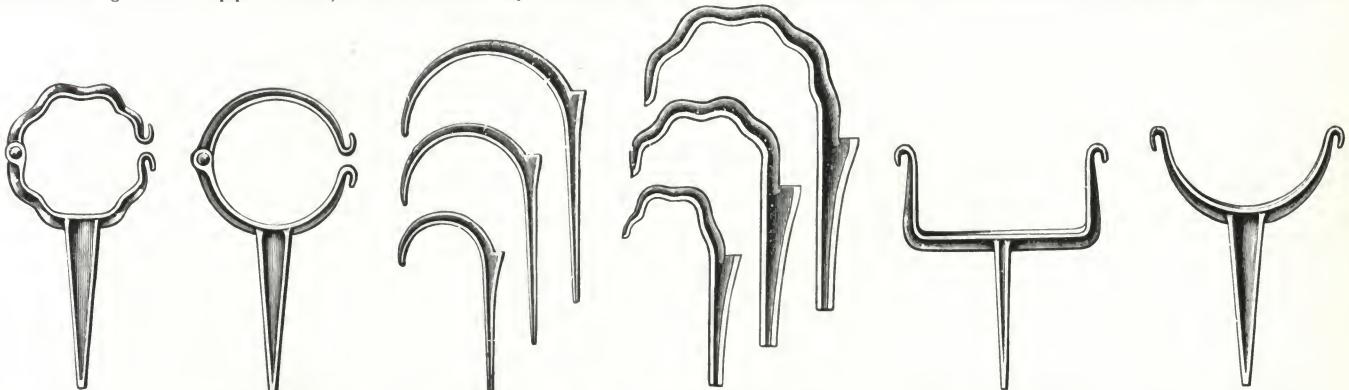
For fastening all kinds of conductor pipes at any distance from the wall. Used in any position and allow enough variation to let pipe slip together until tight in the joints. Needs no close measuring on wall to find a joint for the drive

No. 0. For brick, 3 in. No. 1. For brick or stone, $4\frac{1}{2}$ in. No. 2. For stone, 6 in. No. 3. For stone, 9 in. No. 4. For wood, 3 in.
No. 5. For wood, 5 in. No. 6. To nail on wood. No. 7. To screw in wood.



Clasp Pipe Hooks

For fastening conductor pipe to wood, brick or stone at any distance from the wall. Length drives: 3 and 5 in. for wood; 4, 6 and 9 in. for brick and stone



Round Corrugated Hinged Pipe Hook
With wood and brick drive.
Sizes, 2, 3, 4, 5 and 6 in.

Plain Round Hinged Pipe Hook
With brick drive in 2, 3, and 4 in., and wood drive in 2, 3 and 4-in. sizes.

Plain Sickle Pipe Hooks
With wood and brick drive. Sizes, 2, 3, 4, 5 and 6 in.

Corrugated Sickle Pipe Hooks
With wood and brick drive. Sizes, 2, 3 and 4 in.

Square Wired Pipe Hook
With wood and brick drive. Sizes, 3, 4, 5 and 6 in.

Round Wired Pipe Hook
With wood drive. Sizes, 3 and 4 in.

B. B. Conductor Pipe Fasteners and Hooks

Made of tinned malleable iron and of solid cast bronze

U. T. HUNGERFORD BRASS & COPPER CO.

DIVISION OF CHASE BRASS & COPPER CO., INCORPORATED

Copper Roofing Materials

80 Lafayette Street
NEW YORK, N. Y.

BRANCH OFFICES AND WAREHOUSES

BOSTON, MASS., 411-429 D Street
PHILADELPHIA, PA., 46 North 6th Street
PITTSBURGH, PA., Union Trust Building

CLEVELAND, OHIO, 5005 Superior Avenue
ST. LOUIS, MO., 312-314 North 2nd Street

BALTIMORE, MD., Lombard and South Streets
SAN FRANCISCO, CAL., 680 Second Street
LOS ANGELES, CAL., 2463 East 8th Street

Products

COPPER LEADERS, ELBOWS, SHOES, STRAPS, STRAINERS, HEADS.

COPPER GUTTERS: MITERS, END PIECES, CAPS, OUTLETS and HANGERS.

SHEET COPPER; ROOFING NAILS; COPPER SHINGLES; COPPER SPANISH TILE.

Also, Snow Guards; Copper Ridge Caps, Rolls, Valleys and Flashings; Brass and Bronze Railings; Grilles; Ornamental Wire Work.

For Bronze and Copper Screen Cloth, see page B1226; for Floor Dividing Strips and Door Saddles, see page B1412.

Hungerford Star Brand Copper Leaders

Only 16 oz. pure copper will give the satisfactory long life and permanently trim, neat appearance that rightfully should be and is expected of copper leaders and gutters.

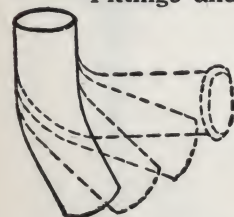
Every length of our Star Brand leader and gutter is clearly embossed with our name and the net weight of hard rolled, roofing temper pure sheet copper from which it is made. Our name and brand mark on a length of copper leader or gutter is positive assurance of full net weight, standard quality material. All Hungerford Star Brand copper products are unconditionally guaranteed.

In order to meet requirements of the building trades for prompt service we carry on hand in our warehouses, ready for *immediate* shipment an extensive stock of our Star Brand copper leaders comprising the following sizes and kinds:

Copper leader	Weight of copper, oz.	Lengths, ft.	Diameter, in.
Plain round	16	10	2, 3, 4, and 5
Corrugated round	16	10	2, 3, 4, 5 and 6
*Corrugated square	16	10	2, 3, 4, and 5

*From long custom this type of leader is termed "square," whereas it is in reality rectangular in shape. Sizes carried in our stock as noted above are standard. Actual measurement of 2-in. "square" corrugated leader is $1\frac{3}{4} \times 2\frac{1}{4}$ in.; 3 in. = $2\frac{3}{8} \times 3\frac{1}{4}$ in.; 4 in. = $2\frac{3}{4} \times 4\frac{1}{4}$ in.; 5 in. = $3\frac{3}{4} \times 5$ in.

Hungerford Star Brand Copper Leader and Gutter Fittings and Accessories



No. 1 45° No. 2 60° No. 3 75° No. 4 90° Shoe

Types of Leader Elbows

Elbows, shoes, miters, end pieces, caps and outlets are also carried in our warehouse stock in sizes and patterns to correspond with foregoing stock items of leader and gutter.

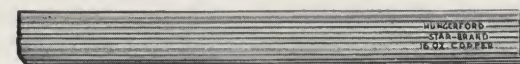
Leader elbows are ordinarily designated by "number" and diameter. "Number" indicates degree of angle (see accompanying sketch).



Round Plain Copper Leader



Round Corrugated Copper Leader



Square Corrugated Copper Leader



Brick Drive Tinned Iron Leader Hook



Diamond Pattern Copper Leader Head

Also made in fleur-de-lis pattern. All sizes



Copper Storm Nail for Asbestos Shingles



Round Corrugated Shoe

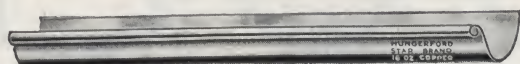


Style "B" Lockite Copper Leader Strap

Also available for round leaders



Square Corrugated Elbow



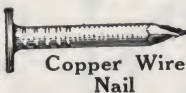
Single Bead Lap Joint Copper Gutter



Gutter End Piece with Cap and Outlet



Copper Wire Leader Strainer
Also made for round leader



Copper Wire Nail



Outside Corner Copper Gutter Miter



Copper Shingle



Cut Copper Nail



Copper Spanish Tile

Hungerford Star Brand Copper Gutter

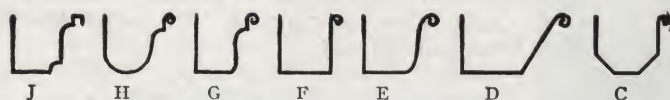
Single bead, lap joint half round. Stock sizes: 16-oz. copper, 10-ft. lengths, 4, 5, and 6-in. diam.

Double bead, half round gutter, also double or single bead, *slip* joint types can be furnished promptly to special order.

While it is possible for a skilled metal worker to make satisfactory quality copper gutter, this practice leaves the architect without positive means of knowing that full weight, 16-oz. copper has been installed on a residence, in accordance with specifications.

Like our "Star Brand" copper leader we advocate the use of *factory made* material and for purposes of quick identification and as our positive guarantee of full weight standard quality, every length of genuine Hungerford "Star Brand" copper gutter is indelibly die stamped with our name, "Star" trade-mark and the full net weight of copper from which it is made.

To meet special requirements a variety of "OG" and other types of copper gutters can be made to order promptly. The following suggested patterns give some idea of our facilities in this direction.



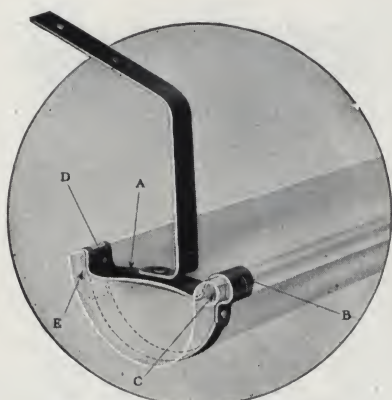
Styles of Special Copper Gutters

End or contour views showing some types of "OG" and special patterns of copper gutters that can be made promptly to special order (not drawn to scale). These designs may be varied in any particular to conform with architects' plans and can be made in any size desired

Copper Gutter Hangers

Copper hangers should of course always be used with copper gutters and it is also important that copper nails be used; iron nails of any type should never be driven through or allowed to come in contact with copper; galvanic action which is sure to result from such practice will quickly disintegrate and destroy the nails.

Rex Strap Copper Gutter Hangers—In the Rex hanger, simplicity of construction and ease with which it can be installed are outstanding features.



Rex Copper Gutter Hanger

Note the following five points of superiority in the Rex hangers:

(A) Reinforced truss type of crossbar $\frac{5}{8}$ in. thick by $\frac{5}{8}$ in. wide supports sides of gutter and prevents bending out of shape or alignment by painters' ladders.

(B) Hook is slit at this point to facilitate bending

and will automatically adjust itself to any variation in size of bead. This feature insures tight fit.

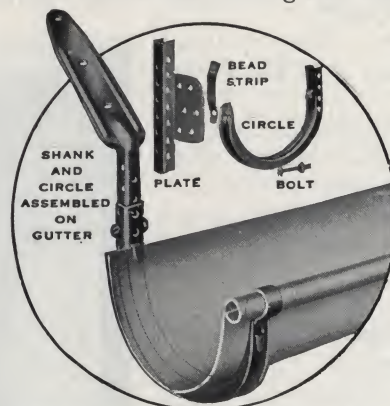
(C) Spur on understrap slips up under bead and forms a lock when strap is bent around gutter.

(D) Hole is punched for nailing through gutter and hanger into fascia board. Prevents gutter from tipping over.

(E) Adjustable locking feature permits pulling strap to a snug, tight fit all around gutter.

Monarch Shank, Plate and Circle Gutter Hanger

Built on an entirely new principle that overcomes the limitations and disadvantages of old-fashioned numbered shank and circle gutter hangers:



Monarch Shank and Circle Gutter Hanger

Monarch shanks are adjustable; only one type of shank required for any pitch of roof.

Monarch plates, for use on fascia boards and overhanging rafters, are reversible, which permits either right or left fastening; plates are adjustable up or down, same as the shanks.

A secure fastening can also be made by using the

Monarch circle alone, nailing direct to the rafter or fascia board; no other circle can be used alone in this manner.

In stock, ready for immediate delivery, in pure copper and galvanized iron for 4, 5 and 6-in. gutters.

Hungerford Star Brand Sheet Copper

Has a fifty-year old reputation with the roofing and sheet metal working trades as a dependable, uniformly satisfactory product.

Every step in the production of Star Brand sheet copper from mine to ingot and from ingot to the rolled sheet is carried out in full accordance with present day standards and improved methods. Star Brand sheet copper is as near 100% pure as any sheet copper can be made.

By writing "Hungerford Star Brand Sheet Copper" into specifications you will have the satisfaction of knowing that you are providing for material with a thoroughly tried and proved reputation for quality.

Hungerford "Old English" Lead Coated Sheet Copper

For roofs, valleys, flashings, leaders, gutters and other outside metal trim on country houses or public buildings where "English" style of architecture is a feature. Can be furnished in any required size. Coated on one or both sides, as desired. The cost is only a fraction of that of hard sheet lead or cast lead fittings. It is much lighter than pure lead and therefore easier to handle and support. It will not dent and damage as easily as pure lead. It can be worked into innumerable designs and patterns that would be impossible of attainment with cast lead.

WHEELING CORRUGATING COMPANY

WHEELING, W. VA.

WAREHOUSES

NEW YORK, N. Y.
CHICAGO, ILL.

PHILADELPHIA, PA.
ST. LOUIS, MO.

KANSAS CITY, MO.
CHATTANOOGA, TENN.

RICHMOND, VA.
MINNEAPOLIS, MINN.

Products

"WHEELING" HAND DIPPED ZINC COATED CONDUCTOR PIPE, made of Ohio Metal (Copper-Alloy), a new galvanized conductor pipe of superior rust resisting quality.

"WHEELING" EXTRA HEAVY COATED EAVES TROUGH, made of Ohio Metal (Copper-Alloy).

"WHEELING" HAND DIPPED ELBOWS.

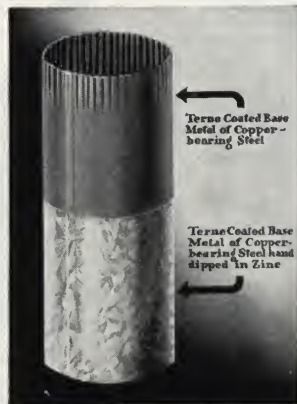
"WHEELING" HAND DIPPED TIN ROOFING (Roofing Ternes).

"WHEELING" STEEL CEILINGS.

For Metal Lath, Corner Beads, etc., see page B1308.

"Wheeling" Hand Dipped Zinc Coated Conductor Pipe

This product is formed from heavy gauge Ohio Metal (copper-alloy) and is hand dipped *after forming* in pure molten zinc. The hand dipping process embeds surfaces, edges and seams within a thick, impenetrable weatherproof, rustproof coating to an extent never before possible of attainment in a conductor having the rigid strength of steel.



Hand dipping *after forming* assures an unbroken coating, thereby obtaining the maximum protection of pure zinc, in fact, making virtually a pure zinc conductor with the added advantage of steel reinforcement.

Made in all sizes and styles and may be specified without materially increasing conductor costs.

"Wheeling" Hand Dipped Elbows

For use with "Wheeling" Hand Dipped Zinc Coated Conductor Pipe. They are made by the same process and of the same materials. Specify "Wheeling" Hand Dipped Elbows.

"Wheeling" Extra Heavy Coated Eaves Trough

Made by the same method and of the same material as "Wheeling" Hand Dipped Zinc Coated Conductor Pipe in both slip joint and lap joint styles. Sizes 4, 4½, 5 and 6 in.

Specify for gutters: "Wheeling" Extra Heavy Coated Eaves Trough.

"Wheeling" Hand Dipped Tin Roofing (Roofing Ternes)

For a third of a century "Wheeling" Hand Dipped Roofing Terne Plates have made permanent roofs for every type of building.

The base of these plates is Ohio Metal (copper-alloy) highly rust resistant in itself, and the coating consists of pure tin and lead applied by the "Wheeling" hand dipped process, assuring a heavier and longer wearing coating on both sides of the plates.

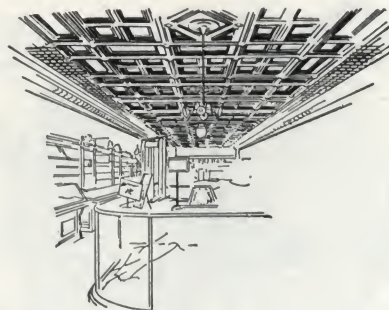
For protection of the user each plate is stamped with the "Wheeling" trade-mark and weight of coating.

To insure long lasting, fireproof roofing, specify "Wheeling" Terne Plates, which are obtainable in standard sizes with coating weights up to 47 lb. per box of 112 plates.



"Wheeling" Steel Ceilings

"Wheeling" Steel Ceilings continue to be the standard fireproof ceilings of the country and are manufac-



tured in an extensive range of designs appropriate for every type of room.

They are made with re-pressed beads and die-cut nailholes, which facilitate erection and insure perfect alignment and dustproof joints.

"Wheeling" Steel Ceilings are fireproof, sanitary and dustproof, and are carried in stock for prompt shipment at each Wheeling warehouse.

For your convenience a large catalogue of designs will be supplied upon request.

O. S. STEWART CO.

Manufacturers of Iron Protectors for Sewers and Downspouts
923 Maud Street, CLEVELAND, OHIO

Construction of Stewart Protectors

Stewart Protectors for sewers and downspouts are made of extra heavy gray iron and dipped in olive green enamel to protect them from corrosion and rust. A curve at the bottom allows the fitting to strike the center of the sewer. They are fitted with ears and a guide and equipped with bolts ready for installation. When anchored to the building they set plumb with the wall, are neat in appearance and add much to the finish of the building. They are made to fit all standard sizes of conductor pipes.

Uses

The hub of the protector is installed above the grade line. It protects both the sewer and downspout and thus eliminates the 80% of sewer stoppages caused by broken sewer pipes and rusted conductor pipes at the grade line, and the washing of sand and dirt into the traps.

The short protector may be used around residences where there is danger of breaking from lawn mowers,

etc. The long protector should be used at driveways and around commercial buildings where there is danger of vehicles coming in contact with the downspouts.

Ordering

When ordering refer to the plate and table of dimensions, and order by number to insure getting the fitting for which the downspouts have been designed.

Fittings of special size or offsets made to order.

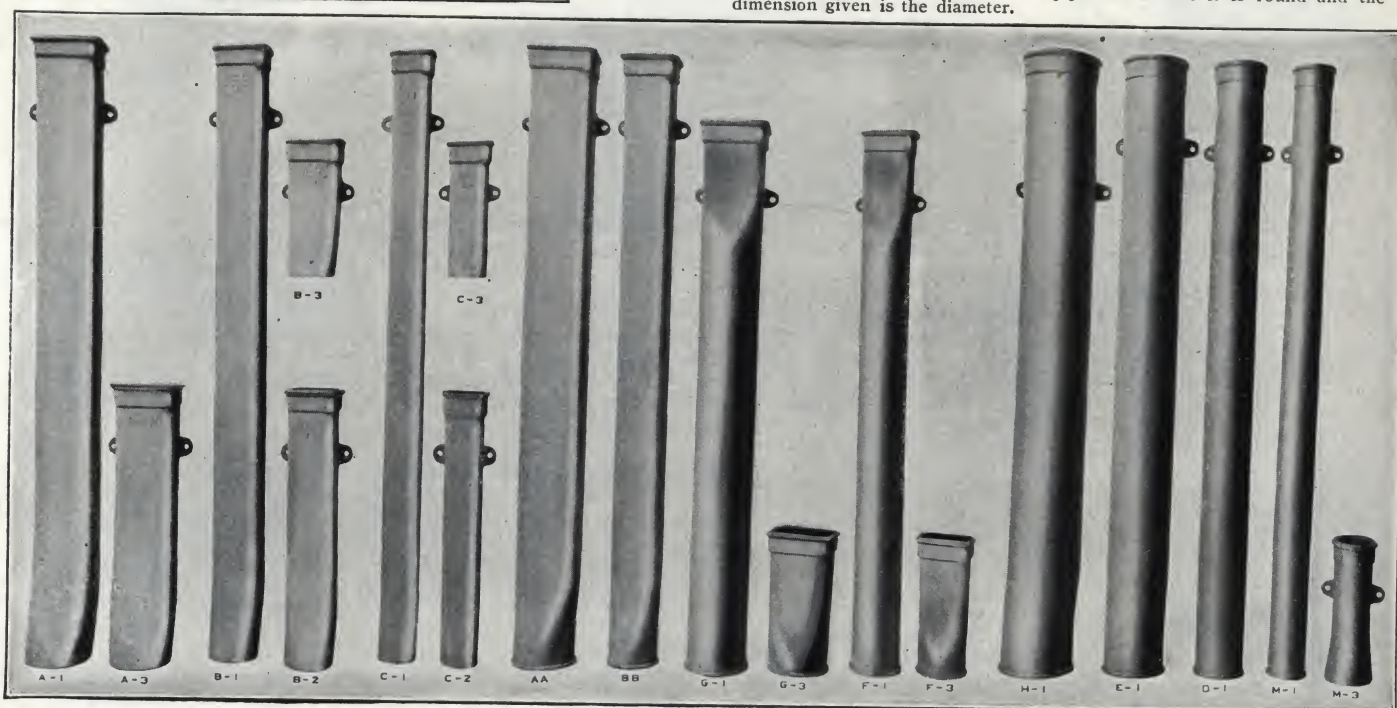
Specification

The contractor shall furnish and install at the foot of each rain water conductor one Stewart Iron Downspout Protector of proper size to fit the downspout and to connect with the sewer 6-in. below the grade line. Each protector shall be set plumb with the building and securely anchored to the same. All joints shall be properly cemented or calked.

SIZES

No.	Weight, lb.	Length, in.	Conductor size, in.	Soil sewer size, in.	Crock sewer size, in.
A-1	78	54	4x5	.....	6
A-3	35	24	4x5	.....	6
AA	78	54	4x5	5	6
B-1	58	54	3x4	.....	4
B-2	30	24	3x4	.....	4
B-3	20	12	3x4	.....	4
BB	58	54	3x4	4	4
C-1	46	54	2x3	.....	3 or 4
C-2	25	24	2x3	.....	3 or 4
C-3	15	12	2x3	.....	3 or 4
D-1	57	54	4-R	4	4
D-2	30	24	4-R	4	4
E-1	72	54	5-R	5	6
E-2	35	24	5-R	5	6
F-1	47	48	3x4	4	4
F-3	16	12	3x4	4	4
G-1	65	48	4x5	5	6
G-3	20	12	4x5	5	6
H-1	80	54	6-R	6	6
H-2	40	24	6-R	6	6
J-1	78	54	4x5	4	4
J-2	35	24	4x5	4	4
M-1	45	54	3-R	3	3 or 4
M-2	30	24	3-R	3	3 or 4
M-3	12	12	3-R	.....	4
SP-4	115	84	4x4	4	4
SP-5	121	84	5x4	4	4
SP-6	66	54	4x4	4	4
SP-7	...	24	6x3½	.....	6
L-2	...	24	2-R	2	4

R following size of conductor pipe means that it is round and the dimension given is the diameter.



Styles of Stewart Iron Protectors for Sewers and Downspouts

BLASKI MANUFACTURING CO.

Exclusive Skylight Manufacturers

4132-4138 Belmont Avenue
CHICAGO, ILL.

BRANCHES IN PRINCIPAL CITIES

Product

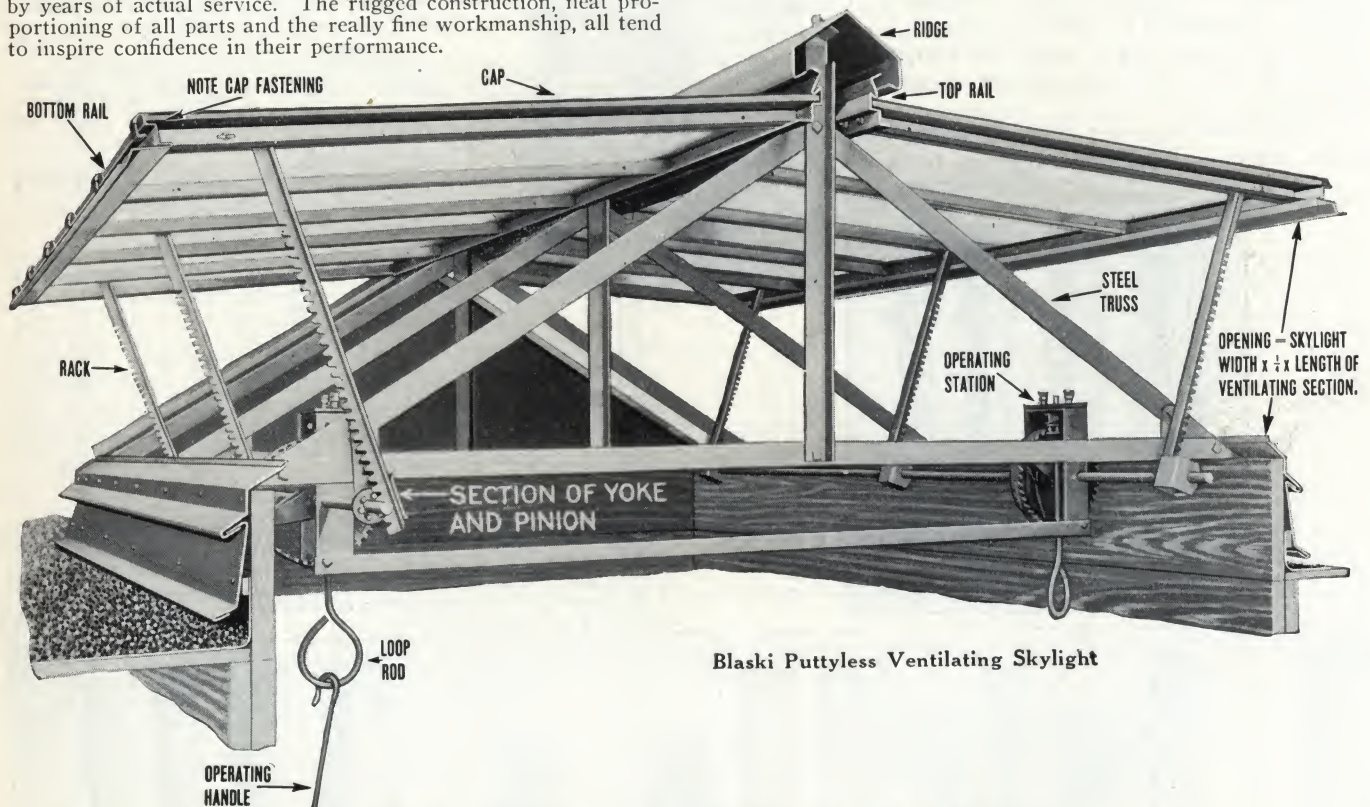
BLASKI LEAKPROOF PUTTYLESS VENTILATING SKYLIGHTS stocked in standard size widths 4 to 20 ft. wide, ready for erection in any length. Also stocked in the sawtooth type 4 to 7 ft. high and any length. All features patented or covered by patents pending.

Really Good Skylights

Types "B," "C" and "D" skylights, we believe are the outstanding examples of really good skylight construction. Every detail incorporated in these skylights is the result of long study and experimentation by experts and then proven under all conditions by years of actual service. The rugged construction, neat proportioning of all parts and the really fine workmanship, all tend to inspire confidence in their performance.

Blaski Skylights for All Uses

Types "B" and "C" skylights, in their variety of sizes and possible lengths of ventilating sections, can be placed at strategic points so as to light and ventilate the entire building chiefly through the roof. The increased efficiency and saving of electric light soon pays for the installation. The general trend when Blaski skylights have been tried is increased use, and many architects literally flood the building with Blaski skylights and ventilation. We also receive a large number of orders direct from owners who add to the quantity of Blaski skylights originally installed to cover additional requirements.



Blaski Puttyless Ventilating Skylight

Special Features

Blaski skylights are entirely self-supported by steel trusses, so do not require any special preparatory construction, except the curb. They are built entirely of 18 gauge copper bearing galvanized iron, properly fabricated and will last a lifetime.

A perfect puttyless glazing system provides for quick and easy removal of all glass for cleaning and painting of skylights.

This feature saves considerable time and money and insures a better job of painting.

The all-pressed steel operating system of Blaski skylights does away with hanging chains, and requires only one-third of the effort needed to manipulate other devices.

Quality and Quick Delivery

The quality of the die and machine made parts is of a uniform high standard, every piece being an exact duplicate of the original which was designed and made by experts. An average of over 100,000 sq. ft. of skylights are stocked for immediate delivery. The actual installation requires only a few assembling operations that are of such a nature that they cannot be performed otherwise than correctly. This is particularly desirable when skylights are ordered to be erected by mechanics already on the job.

Installation Gangs and Factory Branches

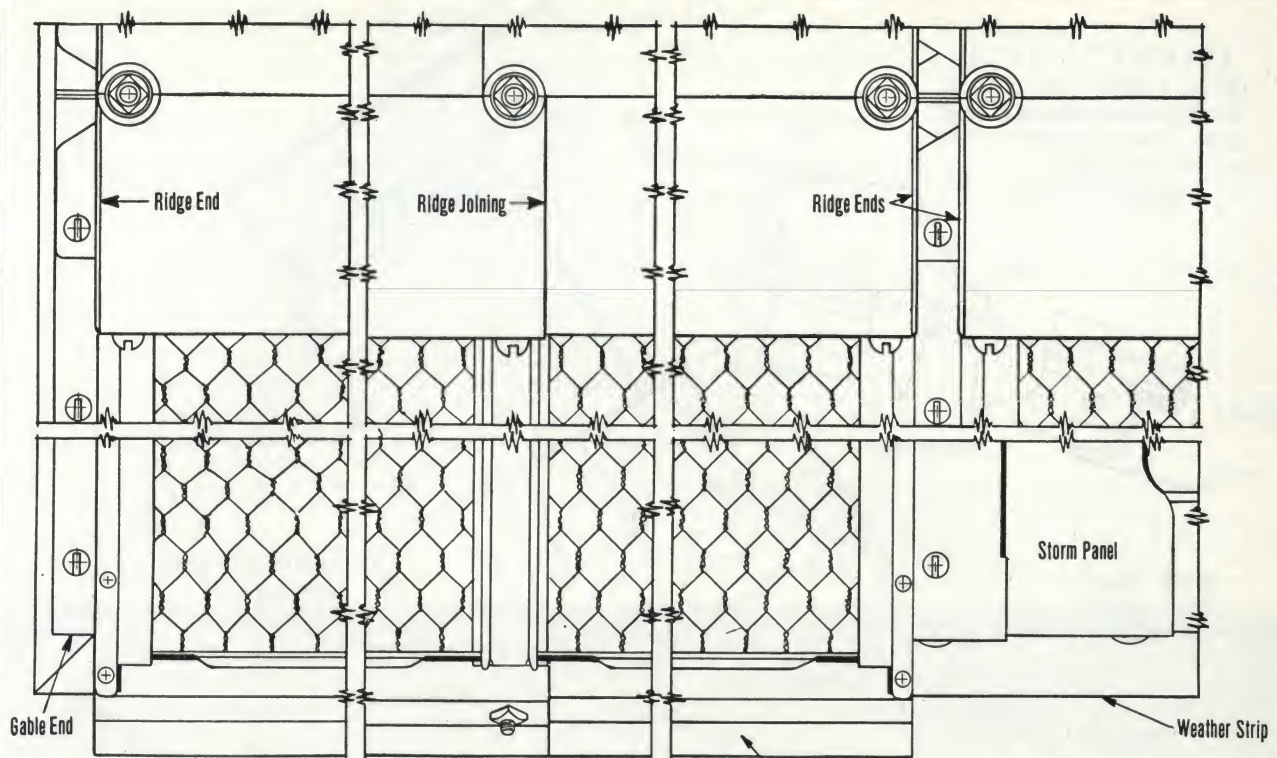
Our erection gangs are thoroughly experienced and available for service in any part of the country.

Factory branches located in most principal cities. These branches carry complete stocks and replicas of our factory service equipment so can give prices and service equal to that of the parent organization. Your inquiry will be referred to the nearest branch.

Prices, Inquiries, etc.

Inquiries as to prices should be accompanied with a list of skylight sizes, etc. Any other inquiries related to skylights are invited and will receive prompt and unqualified attention.



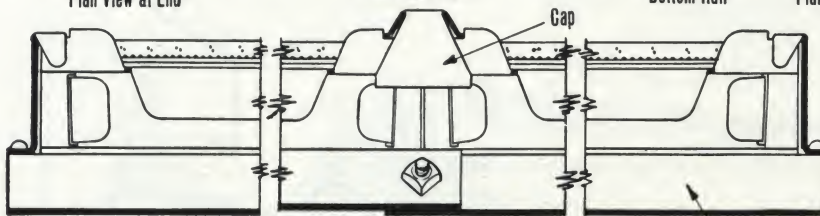


Plan View at End

Plan View at Bar

Bottom Rail

Plan View between Sections

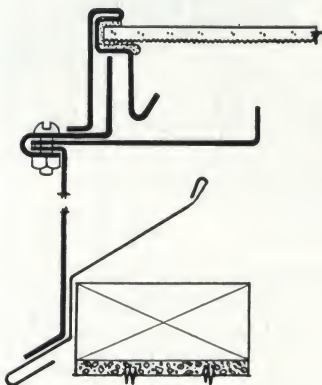


Side view taken from above plan views

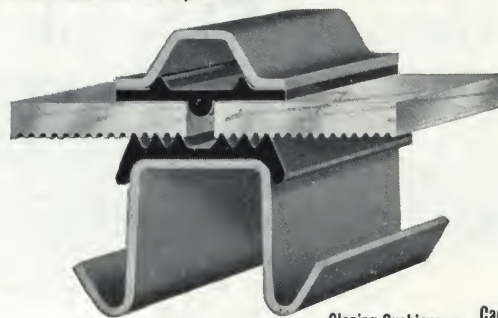
Bottom Rail

DETAILS OF TYPE 'B'
Ventilating or stationary skylight construction. Operating mechanism is shown in illustration on preceding page. Stocked to fit curbs 4-0, 6-0, 8-0 and 10-0 wide and any length.

SCALE 3" = 1'-0"



Section thru Gable End



Glazing Cushions

Cap

Bottom Rail

Bar

Section thru Bar

At left, Sections thru typical curbs showing flashing.

Opening = Skylight Width $\times \frac{1}{2}$ x Length of Ventilating Section.

Weather Strip

Curb Flashing by Others

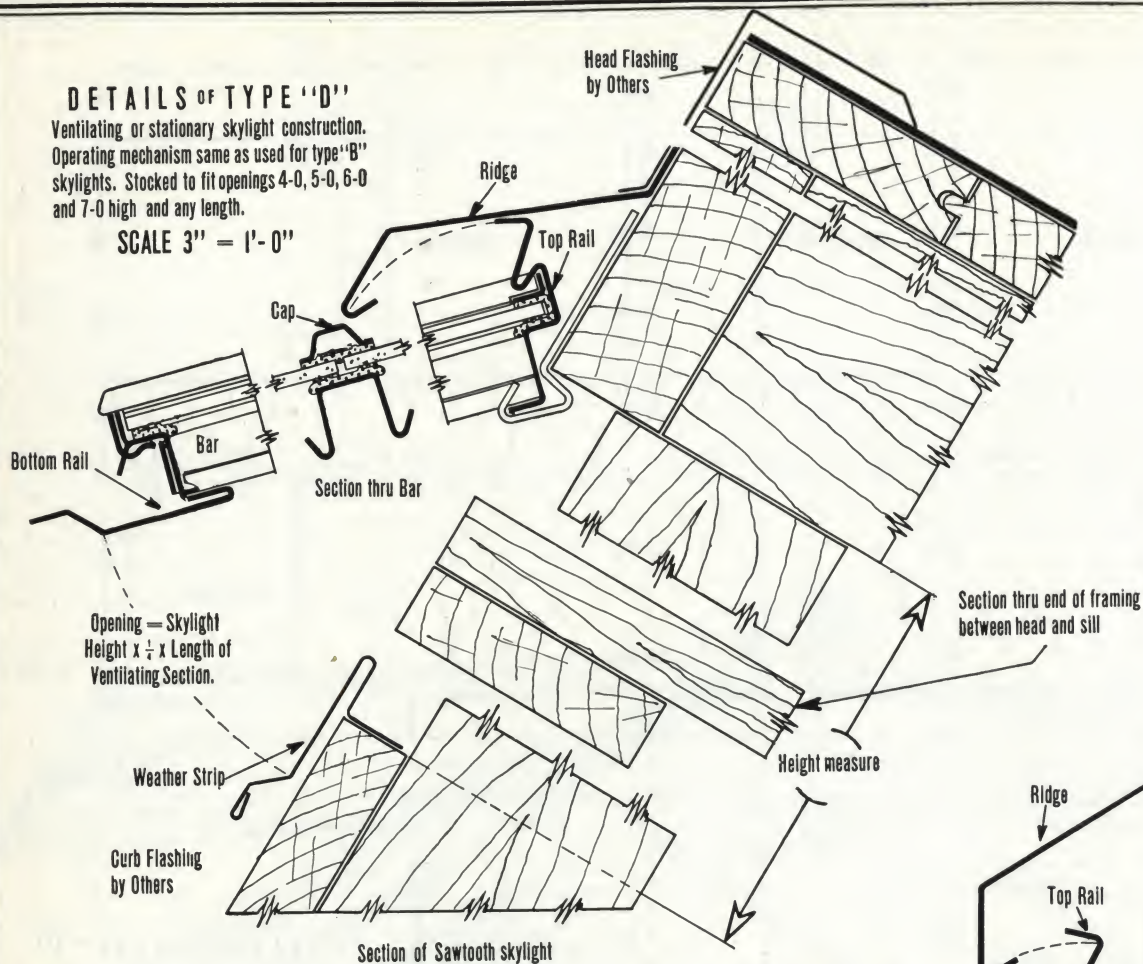
Curb measure.

Section thru skylight.

DETAILS OF TYPE "D"

Ventilating or stationary skylight construction. Operating mechanism same as used for type "B" skylights. Stocked to fit openings 4-0, 5-0, 6-0 and 7-0 high and any length.

SCALE 3" = 1'-0"



SCALE 3" = 1'-0"

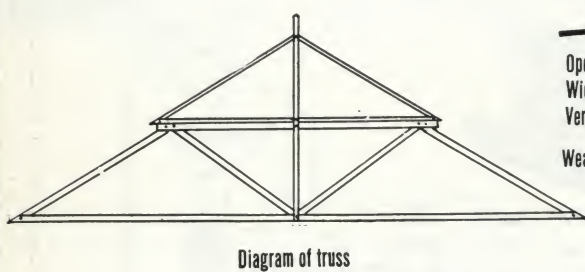
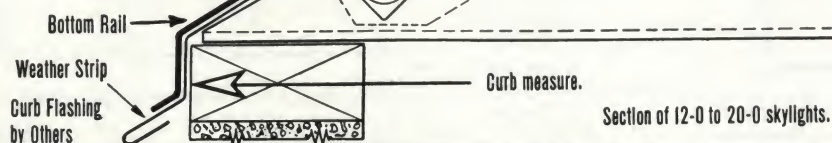


Diagram of truss

DETAILS OF TYPE "C"

Ventilating or stationary skylight construction. Upper and lower sections of skylight can be arranged to ventilate. Operating mechanism same as used on type "B" skylights. Stocked for curb widths 12-0, 14-0, 16-0, 18-0 and 20-0 wide and any length.



Construction Details

Fabrication—Complete fabrication of all parts direct from raw materials is done in plants owned by the BLASKI MANUFACTURING CO., under the strictest supervision and inspection. This we believe is the strongest guarantee of quality in any specification.

Supporting Structure—All steel angle iron trusses built from angles from $2\frac{1}{2} \times \frac{1}{8}$ in. to $2\frac{1}{2} \times 2\frac{1}{4}$ in. depending on size of skylight, but never spaced more than 67 in. apart.

Glass Bearing Members and Closures—These parts are all die and machine fabricated from 18 gauge galvanized copper-bearing iron. The galvanized coating is not injured, as is very likely with handwork. Assembly of the various parts is by bolting, lug and slot interlocking or riveting, but never soldering. Thus each joint is of a predetermined strength.

Glass and Puttyless Glazing—The $\frac{1}{4}$ -in. thick ribbed wire glass set in Blaski moulded glazing cushions is perfectly protected against expansion, contraction and flexure of skylight or glass. The cushions take up all twist and shock—as we frequently demonstrate by lifting one corner of an open sash without breakage of glass.

Operating Mechanism—All-steel rack and pinion type with all setscrews of permanent self-seating type. Shafting journaled in brass bushings which prevent rusting in. Operation by light detachable handle with friction clutch that positively prevents accidental or willful injury to operating mechanism. This operating mechanism requires only one-third the manual power as compared to the cast iron worm gear

type, and does away with the common and troublesome chain nuisance.

Hardware and Miscellaneous—Like the operating mechanism, all hardware is pressed steel and designed especially for the purpose required. A flexible 24 gauge galvanized iron weatherstrip is used between the curb and lower rails. This is the only place where metal lighter than 18 gauge is used.

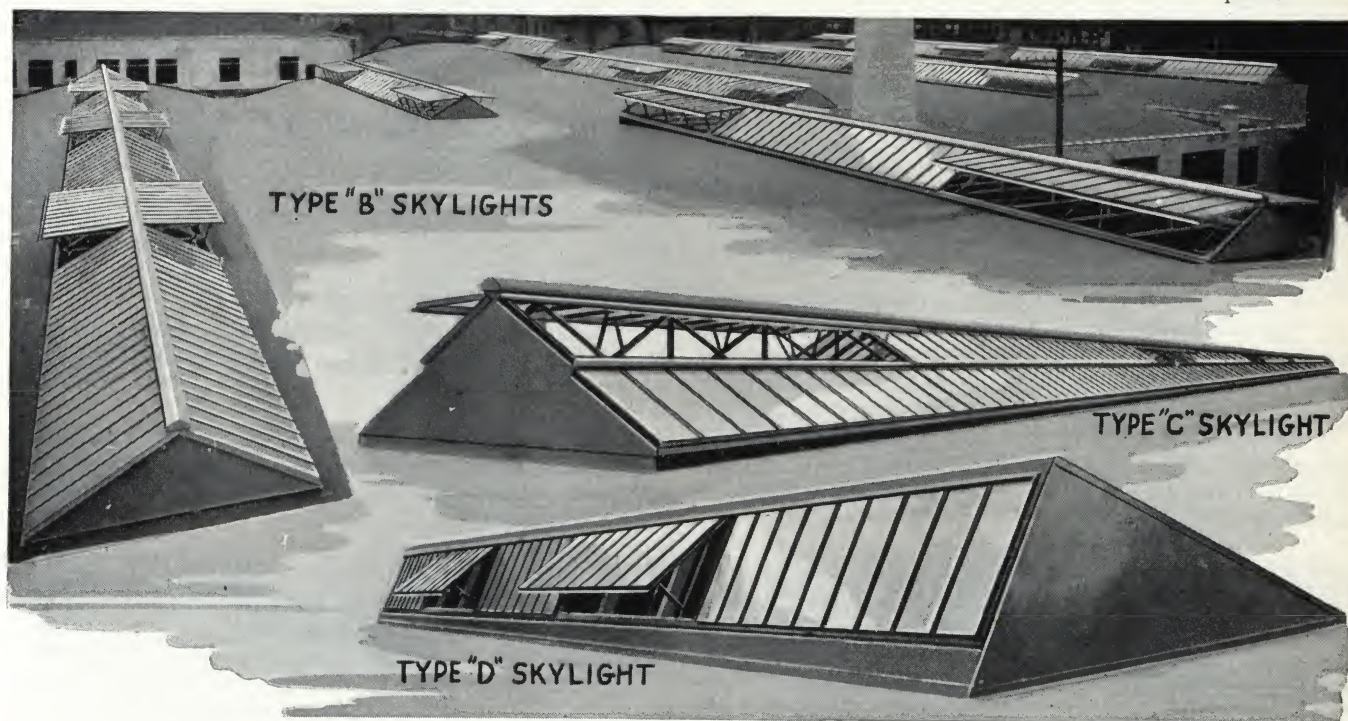
Painting—Trusses receive a shop coat of red mineral paint before assembly. Operators and mechanism receive one shop coat of black paint. Galvanized iron parts are not painted unless painting is specified.

Flashings—Our composition flashing 9 in. wide is regularly furnished with all skylights. Other kinds of flashing can be installed on special order or can be included in the specifications of other contractors.

Special Metals—For general use the metals specified above will prove satisfactory, as the careful fabrication and high quality of metals give the skylight an expected life of from 50 to 75 years. For abnormal conditions skylights of a variety of metals can be made to stand up under any kind of requirements.

Recommended Architects' Specifications

Skylights to be of the ventilating type as manufactured by the BLASKI MANUFACTURING CO., 4132-4138 Belmont Avenue, Chicago, Ill. The size of skylights and lengths of ventilating sections to be in accordance with sizes shown on plans.



General Information

Curbs and Flashings—Curbs for Type "B" skylights should be 4, 6, 8 or 10 ft. wide, and any length. For Type "C" the curbs should be 12, 14, 16, 18 or 20 ft. wide, and any length. Measurements in both cases are outside measure. Measures for opening in sawtooth framing are from head to sill and inside between ends. Variation of $\frac{1}{4}$ in. over or under is the maximum allowance for all skylight curbs or openings. A typical wood and concrete curb is shown in section on detail of Type "B" skylight, and typical sawtooth framing on detail of Type "D" skylight. Any other style of curb can be built, however, as the only requisites for Blaski skylights are continuous fastening grounds or wood plate on the top of the curb, and continuous nailing strip about 6 in. above the roof line for fastening of roofing and flashing. Type "D" skylight framing can also be of any style with provisions for fastening of skylight and flashings. The details on the two preceding pages are drawn to a 3-in. scale. Necessary dimensions can be scaled directly from them.

The height of curbs or sills above the roof line depends on circumstances. A high curb must be metal flashed. Low curbs, such as possible on rounded truss roof construction, can be finished with our composition flashing as shown by typical curb sections on detail of Type "B." This type of flashing has been used by us very successfully for over six years and effects

considerable economies both in first cost and later re-roofing. The joint being roofing to a similar material is very tight and is much better than joints made to brick walls. The joint is also protected by the large overhang of the galvanized weather-strip.

Skylight Sizes and Lighting Efficiency—A general statement can be made, that about 15% to 25% of the floor area should be the area of skylights, and this percentage can vary with the nature of the work performed in the building. Large skylights in preference to smaller sizes are recommended. As an example; a room 40x80 ft. 20% lighted requires a 10x64 ft. skylight. The same amount of money spent for, say four smaller skylights, would probably buy only 10% to 15% of the floor area in skylights on account of the greater cost of small skylights, extra curb framing, etc.

Length of Ventilating Sections—The maximum length of ventilating sections for 4, 6, 8 and 10-ft. wide skylights are 40, 35, 30 and 25 ft. respectively; for 12, 14, 16, 18 and 20-ft. wide are 40, 35, 30, 25 and 20 ft. respectively; and for sawtooths 4, 5, 6 and 7-ft. are 40, 35, 30 and 25 ft. respectively.

Any combination of ventilating and stationary sections are possible, but all skylights are recommended full ventilating, especially when the length of skylight is less than the possible length of ventilating section.

THE G. DROUVÉ COMPANY

Manufacturers of Puttyless Skylights and Sash Operators

TELEPHONE

NOBLE 1950

CABLE

Western Union Code

(Post Office Address)

BRIDGEPORT, CONN.

FACTORY
FAIRFIELD

AGENCY: E. K. GEYSER & Co., 921 Fulton Building, PITTSBURGH, PA.

Products

"ANTI-PLUVIUS" PUTTYLESS SKYLIGHT, trade-marked and patented.

"ANTI-PLUVIUS" (NON-CORROSIVE) PUTTYLESS SKYLIGHT, trade-marked and patented.

DROU-VE-LITE GLASS STRUCTURE, patent pending.

DROU-VE-LITE (NON-CORROSIVE) GLASS STRUCTURE, patent pending.

"STRAIGHT-PUSH" SASH OPERATOR, tension type.

"DROUVÉ LOVELL" SASH OPERATOR, tension type.

WORM and GEAR SASH OPERATOR, torsion type.

Also manufacturers of the "Drouvé" Double Gutter Ventilators.

Facilities and Service

A modern one-story factory building containing 40,000 sq. ft. of floor space, equipped complete with the most modern sheet metal and skylight working machinery known to the trade.

This entire plant, one of the largest of its kind in the country, is devoted exclusively to the manufacture of our "Anti-Pluvius" puttyless skylights, ventilators and various types of sash operating devices.

A competent Engineering Department, invested with our twenty years of experience in the manufacture of puttyless skylights, is maintained for the purpose of furnishing you with practical information pertaining to all types of skylight construction.

Detailed drawings of different types of skylights embodying various conditions of installation will be forwarded on request, if you will advise us approximately regarding requirements.

We maintain an erecting force thoroughly skilled in the erection of our skylights.

Catalogues and estimates will be furnished on request.

"Straight-Push" Sash Operator

Designed to operate all types and makes of sash in monitors, skylights and sidewalls of buildings. Designed to withstand all manhandling and unexpected conditions.

Guide rolls mounted on brass pins to prevent rusting. All working parts have brass-to-iron connections. The sweep of levers is level.

Leverage force applied is uniform throughout length of line, insuring equal opening and closing of all sash.

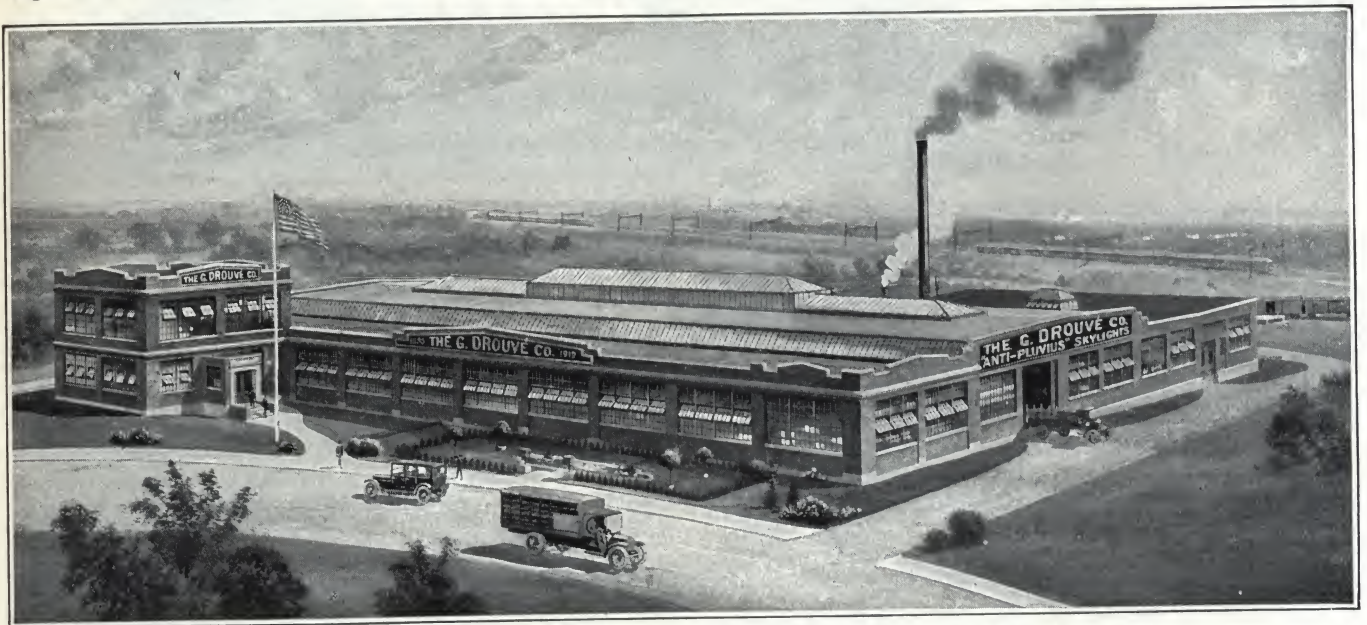
"Improved Lovell Dreadnought" Sash Operator

This design, with its sweeping movement, gives large openings to heavy top hung sash. All parts made extra heavy, with phosphor bronze working joints.

Worm and Gear Operators

Practically all types of standard worm and gear devices supplied as desired for operating lines of ventilating sash in sidewalls, pitched roofs, sawtooth roofs and monitors, and for pivoted or hinged sash.

Details of standard worm and gear operating devices forwarded on application and, when sufficient information is given, recommendations will be made as to efficient and economical procedure.



Forty Thousand Square Feet of Floor Space Devoted Exclusively to the Manufacture of:
 The "Anti-Pluvius" Puttyless Skylight
 The Drou-Ve-Lite Glass Structure
 The Drouvé "Improved Lovell" Sash Operators
 The Drouvé "Straight Push" Sash Operators
 The Drouvé Worm and Gear Sash Operators

"Anti-Pluvius" Puttyless Skylights

"Anti-Pluvius" is one of the original puttyless type skylights to be introduced into this country. Thirty years of practical experience obtained under the most exacting conditions, from installations in all parts of the United States has enabled us to produce a perfect puttyless construction, one which will serve its owners satisfactorily under any and all climatic and atmospheric conditions. This type of construction was designed to eliminate sweating of the main supporting bars, or channels as we call them, so prevalent, naturally, in skylights and this we have very successfully accomplished by the simple method of isolating the glass and its rest from the main supporting bars (channels) and permitting of free circulation of air between this main supporting bar and the glass. Secondly, this construction combines into one its main supporting bars and condensation gutters by reason of the fact that the main supporting bars are U-shaped channels and in consequence, are utilized as condensation gutters as well as ample support for the skylight structure. This gives you an exceptionally large condensation gutter due to the depth of these channels without cutting down excessively on your glass area which, in skylights, is always desired in the maximum. The over-all width of the channels at their widest point is only $2\frac{1}{4}$ inches.

Other exceptional features, all necessary and proper to good skylight construction, to be found in the "Anti-Pluvius" construction are phosphor-bronze tension springs to allow for expansion, contraction and vibration and hence reducing glass crackage, so prevalent in skylights, to an absolute minimum; three-point contact caps; safety walk-bridges; overhang construction at curbs permitting the successful discharge of condensation to outside of building, and unusually high grade materials (see material specifications) well balanced and perfectly fitted in their respective places in the structure.

"Anti-Pluvius" (Non-corrosive) Puttyless Skylights

This skylight in design and construction is identical with our "Anti-Pluvius," the difference being only in the metals used. These are of non-corrosive materials (not a protective process). This construction is guaranteed absolutely against any form of deterioration for an indefinite length of time. The cost of this construction is surprisingly low considering the fact that it is a skylight entirely free from any maintenance expense. This construction is ideal for use on powerhouses, chemical plants, railroad shops, foundries, etc., as it is the only construction that will stand up under the conditions existing in these types of buildings.

Advantages of "Anti-Pluvius" Puttyless Skylights

The "Anti-Pluvius" puttyless skylight (either type) will satisfy the most exacting requirements for strength.

It is positively watertight. The strength of materials of the structure is ideal (see specifications following page). The glass may be readily cleaned by laying planks across the bridge sections, on which men can stand without injury to any part of the skylight structure.

The frames are flexible and ample allowances are made for expansion and contraction, vibration and wind pressures; the skylight is adaptable to all types of roof construction. It can be erected by anybody, anywhere.

Each light of glass as placed in the skylight is independent of every other light. The lights do not come in contact with each other nor do they come in contact with any metal.

The glass rests on pure non-rotting cattle hair felt.

Drou-Ve-Lite Glass Structure

In late years there has been a tendency to eliminate, as much as possible, structural steel work for the support of the skylight itself. In the successful development of a self-supporting skylight, regardless of length of span, a considerable saving is effected where exceptionally wide skylights are desired, by reason of the fact that the self-supporting skylight does not require any steel work for its support other than that which is a part of the skylight itself, and last, but not least, the elimination of unsightly steel trusses, etc., in a skylight well opening eliminates the casting of shadows and obstruction of light.

The Drou-Ve-Lite glass structure represents the last word in *self-supporting* skylight construction. Study our construction details of this skylight on the third page following. Take particular note of the methods of assembling this structure into one unit. Every part of the structure from ridge bar to curb functions in harmony. Its interlocking sections prevent, beyond any question of a doubt, sagging at the ridge and in consequence, spreading at the curbs. The rafter bars are $\frac{5}{8}$ inch thick by a depth suitable for span without any intermediate supports whatsoever. Intermediate rafter bar spacers are employed at certain points between ridge and eave, usually directly under glass laps, thereby holding the rafter bars absolutely parallel and in perfect alignment between the ridge and eave. The rigidity of this structure when assembled, is amazing. In the development of the Drou-Ve-Lite glass structure, we have, as in the now famous "Anti-Pluvius" construction, eliminated sweating of the main supporting bars and also we employ springs, although in a little different manner, to allow for expansion, contraction and vibration. While this structure does not give the exceptionally large condensation gutter to be found in "Anti-Pluvius," it does, however, give a condensation gutter decidedly in keeping with any number of competitive skylight constructions with the one advantage that this skylight obstructs less light than any other. The over-all width from out to out of condensation gutter (this being the widest point of light obstruction) is $1\frac{5}{8}$ inches.

Drou-Ve-Lite (Non-corrosive) Glass Structures

This skylight in design and construction is identical with our Drou-Ve-Lite, the difference being only in the metals used. These are of non-corrosive materials (not a protective process). This construction is guaranteed absolutely against any form of deterioration for an indefinite length of time. The cost of this construction is surprisingly low considering the fact that it is a skylight entirely free from any maintenance expense. This construction is ideal for use on powerhouses, chemical plants, railroad shops, foundries, etc., as it is the only construction that will stand up indefinitely under the conditions existing in these types of buildings.

Advantages of Drou-Ve-Lite Glass Structures

Construction is entirely suitable for use over very small openings as well as exceptionally long spans, because its rafter bars are furnished proportionately to the size of the skylight; easily adaptable to all types of roof construction; each light of glass, as placed in the skylight, is independent of every other light and lights do not come in contact with each other.

Drou-Ve-Lite glass structures admit more daylight and in consequence, cast less shadow; they are positively watertight and, furthermore, the construction is such as to eliminate sweating of the rafter bars, thereby preventing condensation dripping into the room.

They can be erected by anybody.

Specifications Covering the "Anti-Pluvius" Puttyless Skylight

Skylight shall be of the "Anti-Pluvius" puttyless construction as manufactured by The G. Drouvé Company, Bridgeport, Conn., having all metal parts which are exposed to the weather of { copper. } galvanized iron. Skylight ribs or main supporting channels to be U-shaped and of high carbon steel painted one good shop coat of metallic paint. Glass to be and to be laid on pure non-rotting cattle hair

felt cushions. The cushions shall be confined and supported by continuous metal guides so constructed, that the underside of the glass, when installed, will not come in contact with any materials other than the felt. The glass rest shall be raised above channels sufficiently so that there will be a free circulation of air between the glass and the channels. Skylight studs and caps to be so constructed, as to allow for expansion, contraction and vibration, by the use of phosphor bronze springs.

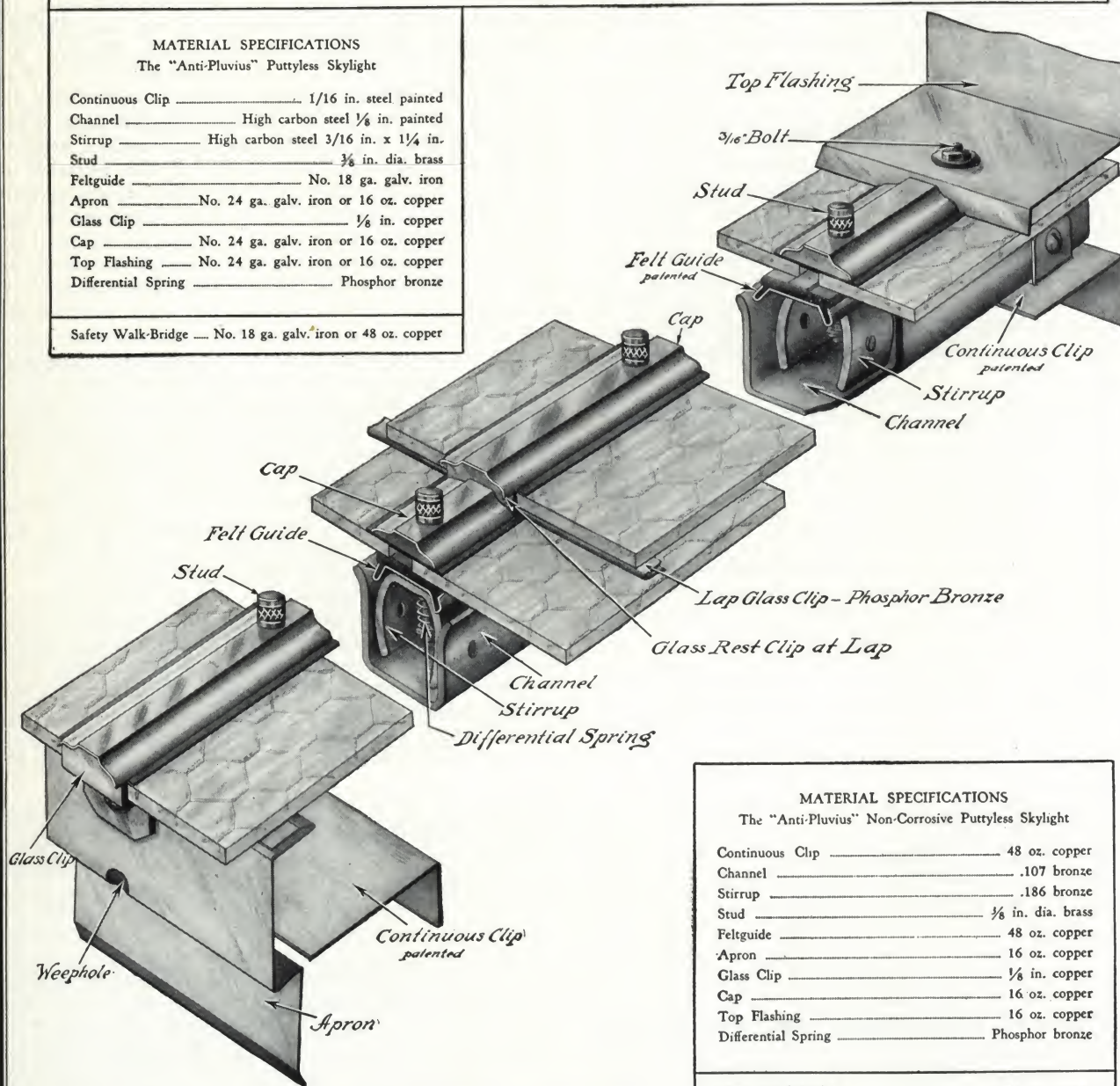
(OPTIONAL)

SAFETY WALK-BRIDGES. Safety walk-bridges shall be supplied above each channel and supported from the channel for use in cleaning and maintaining skylights.

MATERIAL SPECIFICATIONS The "Anti-Pluvius" Puttyless Skylight

Continuous Clip 1/16 in. steel painted
Channel High carbon steel 1/8 in. painted
Stirrup High carbon steel 3/16 in. x 1 1/4 in.
Stud 1/8 in. dia. brass
Feltguide No. 18 ga. galv. iron
Apron No. 24 ga. galv. iron or 16 oz. copper
Glass Clip 1/8 in. copper
Cap No. 24 ga. galv. iron or 16 oz. copper
Top Flashing No. 24 ga. galv. iron or 16 oz. copper
Differential Spring Phosphor bronze

Safety Walk-Bridge No. 18 ga. galv. iron or 48 oz. copper



MATERIAL SPECIFICATIONS

The "Anti-Pluvius" Non-Corrosive Puttyless Skylight

Continuous Clip 48 oz. copper
Channel107 bronze
Stirrup186 bronze
Stud 1/8 in. dia. brass
Feltguide 48 oz. copper
Apron 16 oz. copper
Glass Clip 1/8 in. copper
Cap 16 oz. copper
Top Flashing 16 oz. copper
Differential Spring Phosphor bronze

Safety Walk-Bridge 48 oz. copper

Specifications Covering the "Anti-Pluvius" NON-CORROSIVE Puttyless Skylight

Skylights shall be of the "Anti-Pluvius" NON-CORROSIVE puttyless construction as manufactured by The G. Drouvé Company, Bridgeport, Conn., having all metal parts which are exposed to the interior of the building of bronze and all metal parts which are exposed to the weather of copper. Glass to be and to be laid on pure non-rotting cattle hair felt cushion. The cushions shall be

confined and supported by continuous metal guides so constructed that the underside of the glass, when installed, will not come in contact with any materials other than the felt. The glass rest shall be raised above the channels sufficiently so that there will be a free circulation of air between the glass and the channels. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration, by the use of phosphor bronze springs.

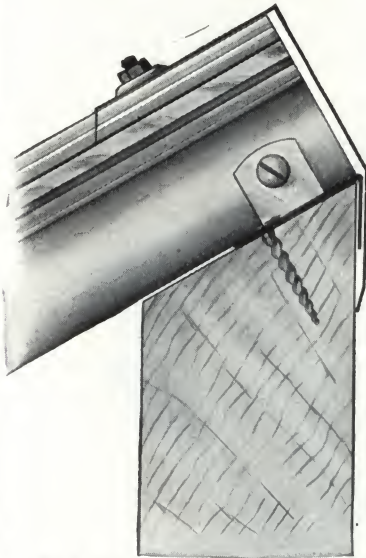
(OPTIONAL)

SAFETY WALK-BRIDGES. Safety walk-bridges shall be supplied above each channel and supported from the channel for use in cleaning and maintaining skylights.

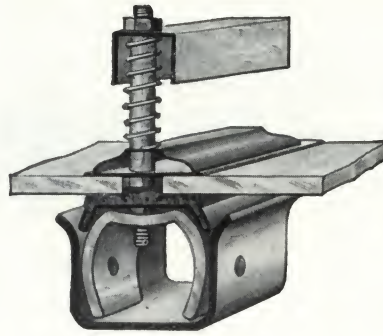
THE G-DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • **ANTI-PLUVIUS** • SKYLIGHT

MANUFACTURED UNDER
DROUVÉ PATENT NO. 892034
HAWES PATENT NO. 1513809
HAWES PATENT NO. 1513810



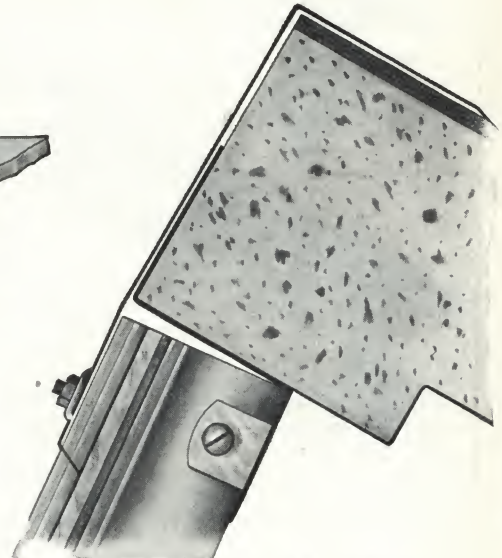
SINGLE PITCH AT TOP



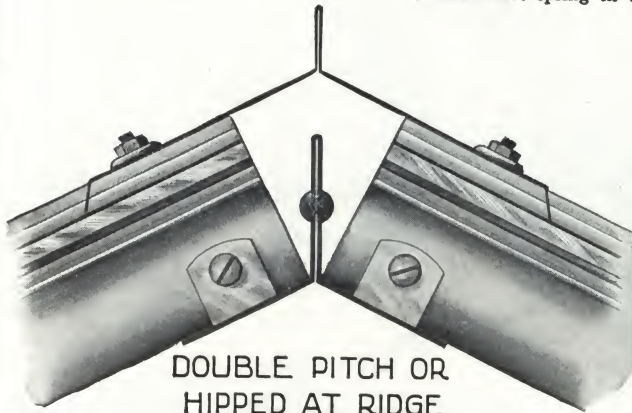
On skylights, the span of which exceeds six feet from ridge to eave, the Walk-Bridge permits one to stand or walk on the skylights to clean it without injury to the glass or other parts of the structure.

On skylights, the span of which does not exceed six feet from ridge to eave, the Walk-Bridge is unnecessary and therefore not recommended.

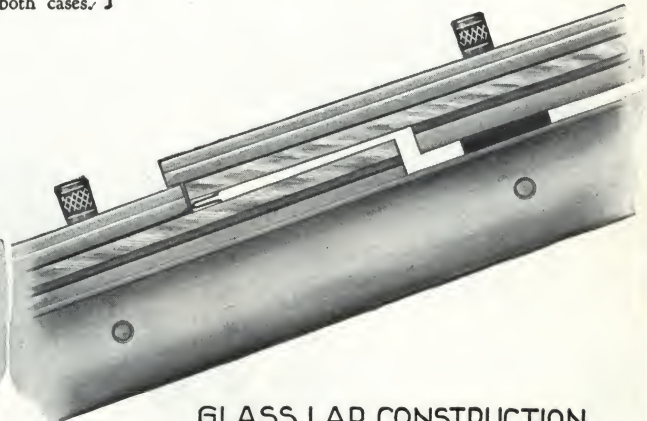
{The difference in expansion between glass and metal is adjusted by the differential spring in both cases.}



SAWTOOTH AT TOP

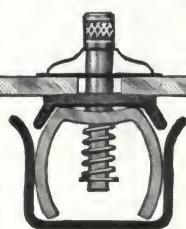
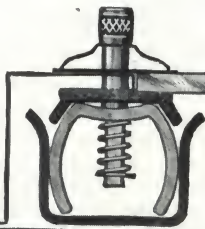


DOUBLE PITCH OR HIPPED AT RIDGE

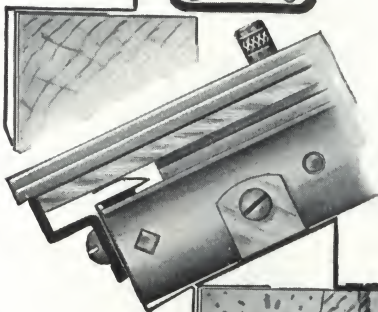


GLASS LAP CONSTRUCTION

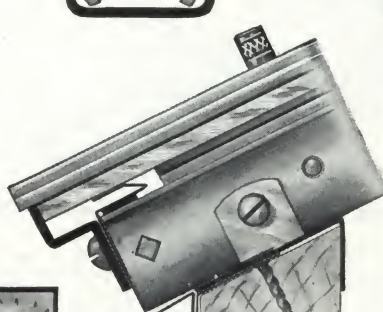
END FINISH



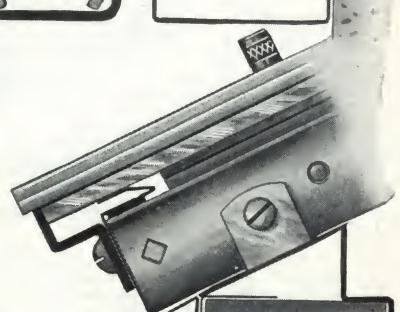
VALLEY



FLAT TOP CURB



BEVEL TOP CURB



STRUCTURAL STEEL CURB

THE G. DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • ANTI-PLUVIUS • SKYLIGHT

MANUFACTURED UNDER
DROUVÉ PATENT NO. 892034.
HAWES PATENT NO. 1513809.
HAWES PATENT NO. 1513810.

Specifications Covering the Drou-Ve-Lite Glass Structure

Skylights shall be of the Drou-Ve-Lite puttyless construction as manufactured by The G. Drouvé Company, Bridgeport, Conn., having all metal parts which are exposed to the weather of } copper.
 Rafter bars to be 5/16" thick by required depth to suit span and painted one good shop coat paint. Glass to be and to be laid on asphaltic felt bedding, the bedding to be continuous and so

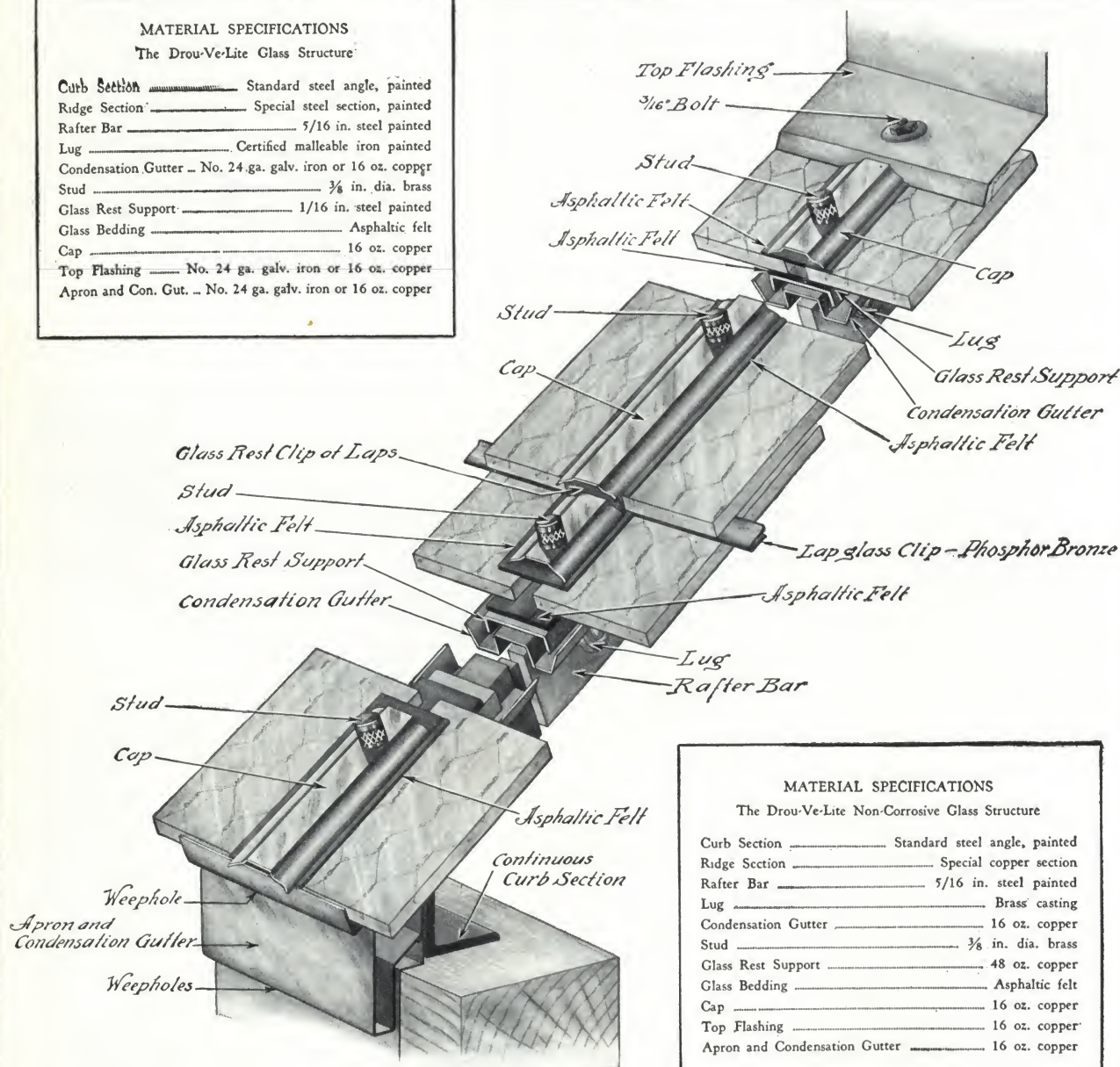
constructed that the glass, when installed, will not come in contact with any metal. The glass rest shall be raised above rafter bars so that there will be a free circulation of air between the glass and these bars. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration by the use of resilient washers.

Skylights shall be self supporting without the use of any structural steel other than that steel which is part of the skylight itself.

MATERIAL SPECIFICATIONS

The Drou-Ve-Lite Glass Structure

Curb Section Standard steel angle, painted
 Ridge Section Special steel section, painted
 Rafter Bar 5/16 in. steel painted
 Lug Certified malleable iron painted
 Condensation Gutter No. 24 ga. galv. iron or 16 oz. copper
 Stud 3/8 in. dia. brass
 Glass Rest Support 1/16 in. steel painted
 Glass Bedding Asphaltic felt
 Cap 16 oz. copper
 Top Flashing No. 24 ga. galv. iron or 16 oz. copper
 Apron and Con. Gut. No. 24 ga. galv. iron or 16 oz. copper



MATERIAL SPECIFICATIONS

The Drou-Ve-Lite Non-Corrosive Glass Structure

Curb Section Standard steel angle, painted
 Ridge Section Special copper section
 Rafter Bar 5/16 in. steel painted
 Lug Brass casting
 Condensation Gutter 16 oz. copper
 Stud 3/8 in. dia. brass
 Glass Rest Support 48 oz. copper
 Glass Bedding Asphaltic felt
 Cap 16 oz. copper
 Top Flashing 16 oz. copper
 Apron and Condensation Gutter 16 oz. copper

Specifications Covering the Drou-Ve-Lite NON-CORROSIVE Glass Structure

Skylights shall be of the "Anti-Pluvius" NON-CORROSIVE puttyless construction as manufactured by The G. Drouvé Company, Bridgeport, Conn., having all metal parts which are exposed to the interior of the building of brass with the exception of rafter bars and curb sections, which are to be of steel painted and all metal parts which are exposed to the weather of copper. Glass to be and to be laid on asphaltic felt bedding, the bedding to be continuous and so constructed that the glass, when installed, will not come in

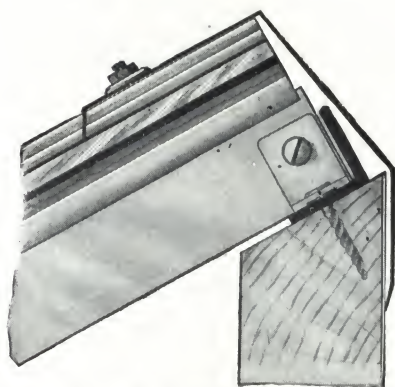
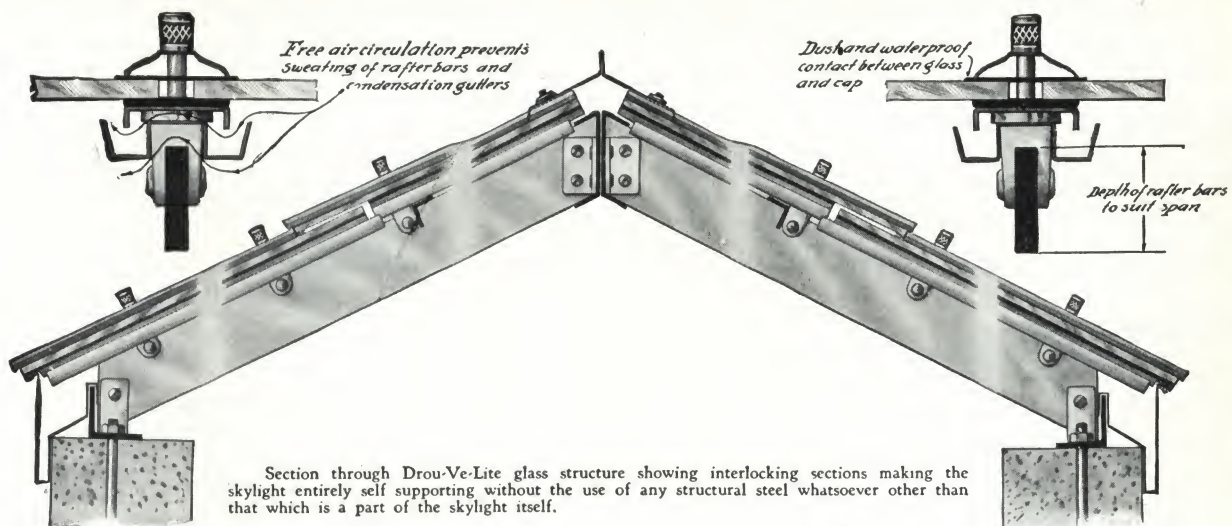
contact with any metal. The 'glass rest' shall be raised above rafter bars so that there will be a free circulation of air between the glass and these bars. Skylight studs and caps to be so constructed as to allow for expansion, contraction and vibration by the use of resilient washers.

Skylights shall be self supporting without the use of any structural steel other than that steel which is part of the skylight itself.

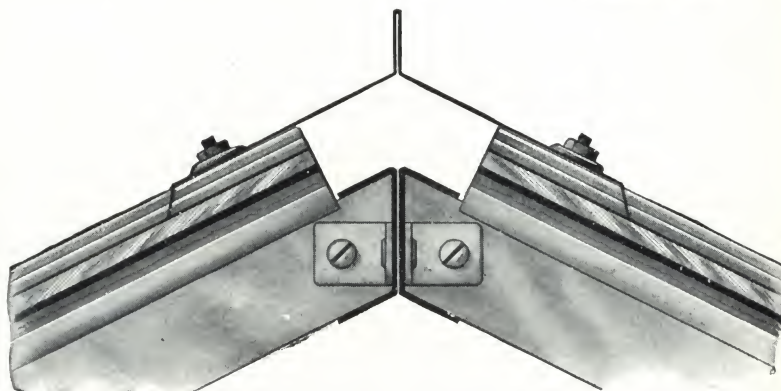
THE G-DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • **DROU-VE-LITE** • GLASS STRUCTURE

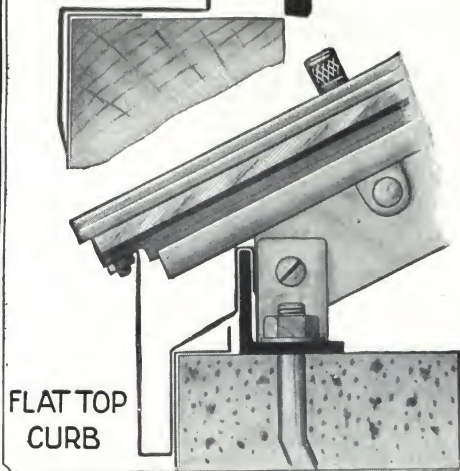
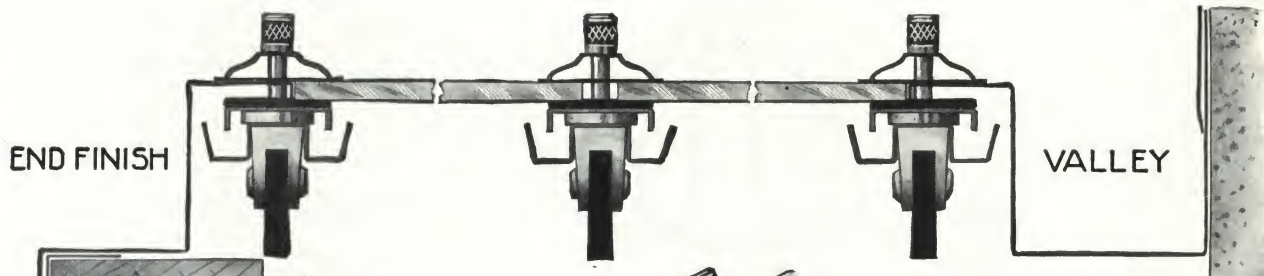
PATENTS PENDING



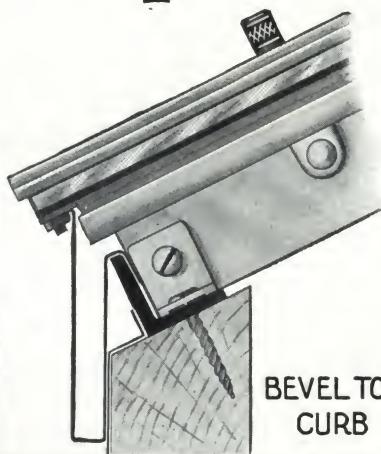
SINGLE PITCH AT TOP



DOUBLE PITCH OR HIPPED AT RIDGE



FLAT TOP CURB



BEVEL TOP CURB



STRUCTURAL STEEL CURB

THE G. DROUVÉ CO.
BRIDGEPORT, CONN.

CONSTRUCTION DETAILS
OF THE PUTTYLESS • **DROU-VE-LITE** • GLASS STRUCTURE

PATENTS PENDING

GENERAL SHEET METAL WORKS

Manufacturers of Skylights and Pressed Steel Sash Operators
BRIDGEPORT, CONN.

Cibulas Puttyless Skylights

Cibulas puttyless skylights are not carried in stock, but are built to take care of the proper span and conditions.

They are furnished with or without ventilators, in the following types: hip, turret, sawtooth, double pitch, single pitch and marquise.

Glazed with either ribbed or rough plain or wire glass, or plain actinic glass.

Outstanding Features

(1) Cibulas skylights are made entirely of heavy gauge, non-corrosive metals, No. 18 or No. 16 gauge copper, aluminum or galvanized rust-resisting metal. They are lasting; there is nothing to rot or deteriorate.

(2) They are built to prevent sagging or breakage under heavy wind or snow pressures and are perfectly weathertight and watertight.

(3) Their construction includes complete provision for contraction and expansion.

(4) They are suitable for all classes of buildings.

(5) They safely support a weight of 35 to 40 lb. per sq. ft., the bars being made in direct proportion to the length of the span.

(6) They dispose of all condensation. Gutters are made large enough to carry off water and prevent accumulation of dust and dirt.

Our Service to Architects

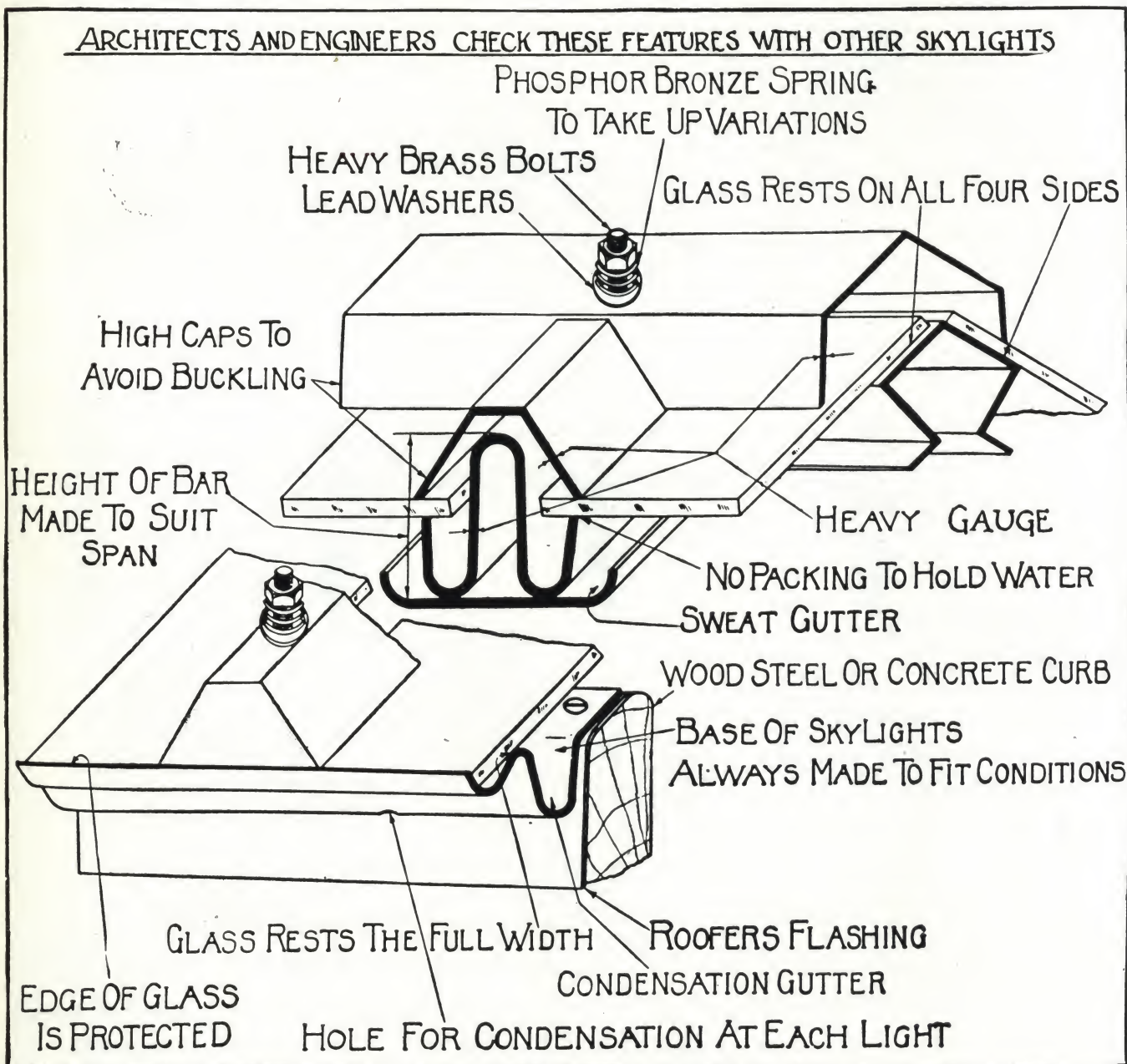
When desired, our engineers furnish complete detail drawings and estimates without obligating the architect.

Send for our latest catalogues, and chart for making curbs for all conditions to receive Cibulas skylights.

Specifications for Cibulas Skylights

Furnish and erect, where shown on plans, Cibulas Puttyless Skylights, manufactured by GENERAL SHEET METAL WORKS, Bridgeport, Conn., made of No. 16 [No. 18] gauge galvanized rust-resisting metals [of copper, using 48 oz. for the supporting bars and 18 oz. for the caps and gutter] [all-aluminum, $\frac{1}{8}$ -in. thick].

Note: The glass commonly used in skylights is ribbed or rough plain glass, or ribbed or rough wired glass.



Detail of the Cibulas Puttyless Skylight

THE HOWIE COMPANY, INC.

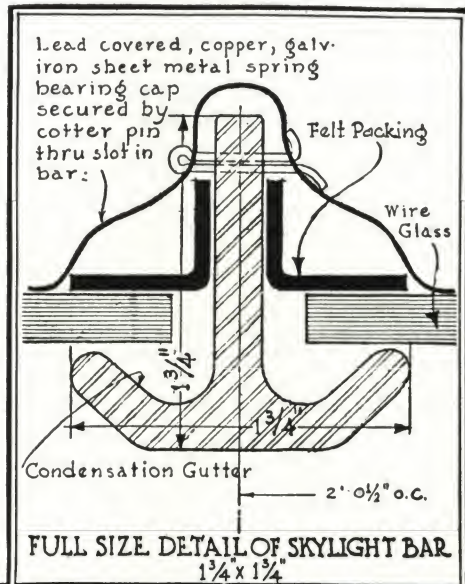
Manufacturers of Skylights

9011 Central Avenue
DETROIT, MICH.

Products

PEERLESS SKYLIGHTS.

Also manufacturers of Fireproof Windows, Tin Clad and Metal Covered Doors, approved by Underwriters' Laboratories, Inc.; Copper and Bronze Doors, Architectural Sheet Metal Work.



Peerless Skylight, Sawtooth and Marquise Constructions

These are designed to provide a weatherproof and dustproof skylight construction and one guaranteed against any and all possible glass breakage due to vibration, or through expansion and contraction due to temperature changes.

Specifications for Peerless Skylight and Marquise

Intent—This specification together with the accompanying drawings and details is intended to provide for all labor and material required for the completion and erection of all skylights as shown or mentioned.

Work by Others—All steel framing, wood curbs, nailing strips, gutters and roof flashings, shall be provided for under another contract, unless otherwise specified.

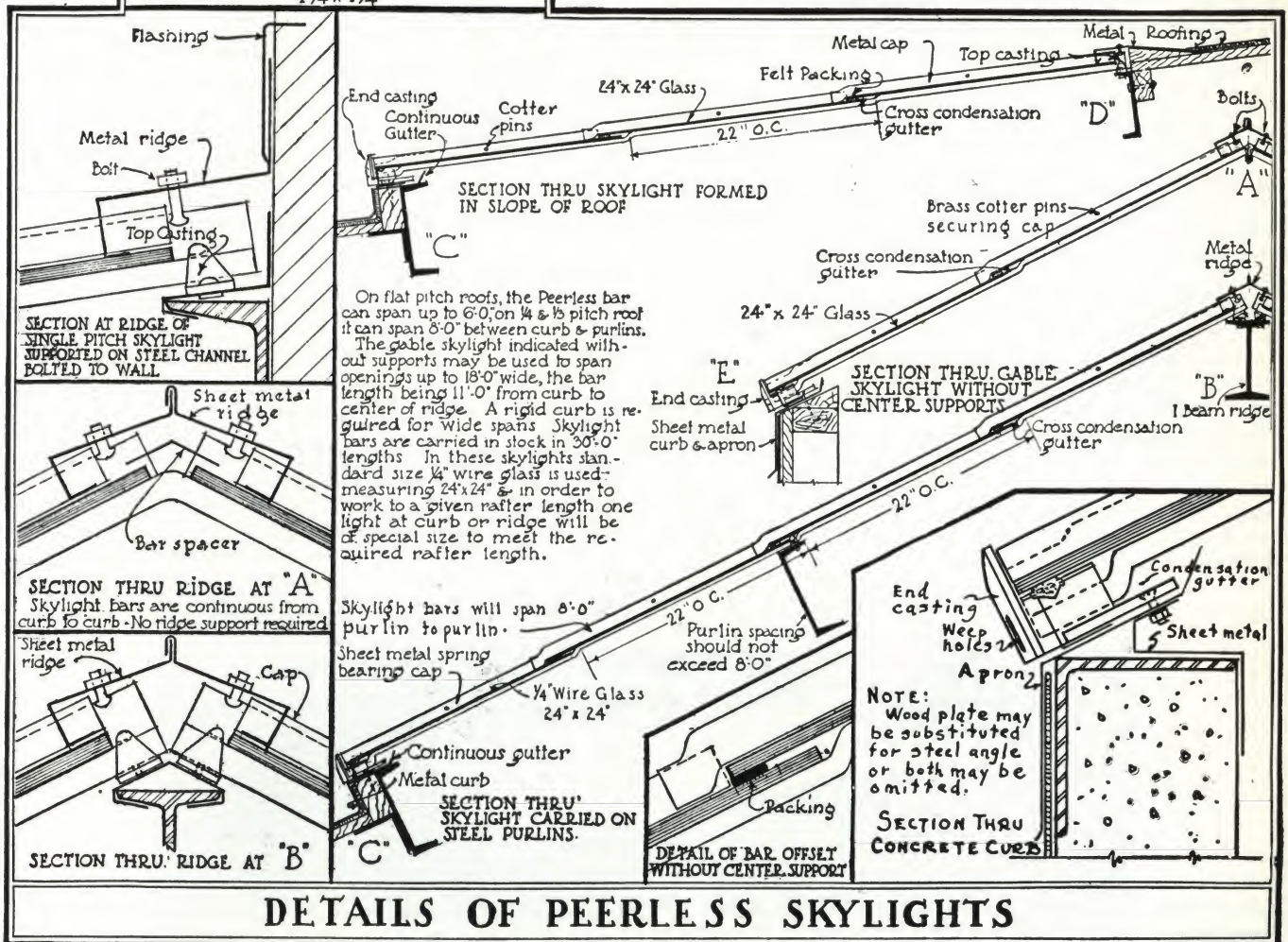
Work Required—Provide and install all skylights as shown or indicated on drawings. All skylights shall be "Peerless" skylight construction as manufactured by THE HOWIE COMPANY, INC., DETROIT, MICH., complete as shown by their standard details, and adapted to the construction of the building.

All sheet metal trimming shall be of No. 24 gauge galvanized iron [or 16 oz. cold rolled copper] [or No. 11 zinc].

Glazing—All skylights to be glazed with best quality 1/4-in. rough wire glass not to exceed 24 in. in width. All glass to be left whole and clean at completion of the work.

Painting—All metal work in connection with skylight, except copper or zinc, shall be painted; also paint all skylight bars with 1 good coat of approved paint.

Guarantee—This contractor is to furnish a written guarantee for 5 years.



A. H. JETER & COMPANY, INC.

Manufacturers of Puttyless Steel Skylights

TELEPHONE
ASTORIA 4940

GENERAL OFFICE AND WORKS
496-498 Hancock Street
LONG ISLAND CITY, N. Y.

Products

PUTTYLESS STEEL SKYLIGHTS.

Also Sheet Metal Skylights, Turrets and Louvers; Architectural Sheet Metal Work of every description; Metal, Tile and Slate Roofing.

Services and Estimates

This company's estimating and drafting department is at the disposal of architects, engineers and owners. Estimates, suggestions, specifications and plans for its products will be gladly given on request. A large force of experienced men is employed, who have been carefully trained to erect the company's products.

When material only is supplied, complete instructions and drawings are furnished.

Facilities

This company's factory is situated in Long Island City, near the Long Island Railroad and Brooklyn Eastern District Terminal. This gives direct shipping facilities to any point in the world, either by railroad or water.

Jeter's Puttyless Skylights

Special Features—The sash bar of Jeter's patented puttyless steel skylight is composed of a lower channel, over which is placed a special moulded glass rest, secured to the bottom channel by means of wrought iron stirrups and tap bolts.

The glass rest is held in position by a brass bolt, which is of sufficient length to engage and secure the metal cap that covers the edges of the glass.

On the rolled steel glass rest, a cushion of heavy saturated asbestos is provided, running entirely across the glass rest. After the glass is laid in place, a saturated asbestos sealing strip is provided, which is securely held in place by the metal cap. This feature insures against any dust or moisture getting under the glass and into the sash bars or gutters.

A special moulded section is used as a continuous bottom support for the glass. This section also contains a pocket, on which is placed a strip of saturated asbestos upon which the glass rests. Connections at intervals of about 20½ in. are provided in the continuous bottom members, which receive and secure the bars. This method of asbestos cushioning device makes the skylight waterproof and dustproof and, being of a soft indestructible material, reduces the cracking of the glass to a minimum.

Adaptability—Jeter's patented system of puttyless steel glazing is adaptable for use in railroad terminals, museums, schools, hospitals, factories, machine-shops, etc.

The very simplicity of construction enables any mechanic to readily erect this system.

Specification for Jeter's Puttyless Skylights—Suggested for Architects' Use

All skylights shall be of rolled steel, of a type to allow for free expansion and contraction and made tight without use of paint, cement or putty.

Sash bar shall be composed of a special U-channel 2 in. wide and 1½ in. deep, made of high carbon steel ⅜ in. in thickness.

A rolled steel glass rest made of 1½x½x⅛-in. channel shall be provided. This glass rest shall be in the shape of a trough and shall be supported on wrought iron stirrups which will be tap-bolted through the walls of the special U-bar.

A heavy non-absorbent asbestos cushion shall be placed over the glass rest. Cushion and glass rest shall be securely fastened to the wrought iron stirrup by means of brass or copper machine screw.

A special continuous moulded member shall be provided at eaves of skylights. Between this member and the glass shall be placed a non-absorbent asbestos cushion and same drawn up tight under glass by means of bolts at bar centers.

After glass is set in place, provide a metal spring cap 1¼ in. out to out of flanges. This cap shall be underlined with a sealing strip of non-absorbent asbestos material, held in position by being punched and strung over the cap bolts. Edges of sealing strip shall not protrude beyond edges of cap. Securely fasten cap by means of a brass nut.

All skylights to be glazed with ¼-in. ribbed wire glass.

All caps, combing and trim shall be of (specify copper, zinc or galvanized iron).

After fabrication and before assembling the sash bars, all parts, shall be thoroughly coated with an application of bitumastic solution (or specify hot galvanizing).

Jeter's Top Ventilating Puttyless Skylights

A puttyless steel skylight made from the same steel section as our regular skylights, previously described. The steel channel bars form the top chord of a truss and are securely bolted top and bottom to a steel curb and ridge plate, of the same gage metal as the bar. When the curbs are tied by either angles or rods a perfect truss is thus formed which obviates the necessity of building up an independent steel truss as is usually the case. This method is successful in skylights not exceeding 12 ft. in width, but any length.

The ventilating sections at the ridge are made from sheet metal, either galvanized iron or copper, and are top hung by means of heavy iron butts, securely bolted



Installation of Jeter Top Ventilating Puttyless Skylights

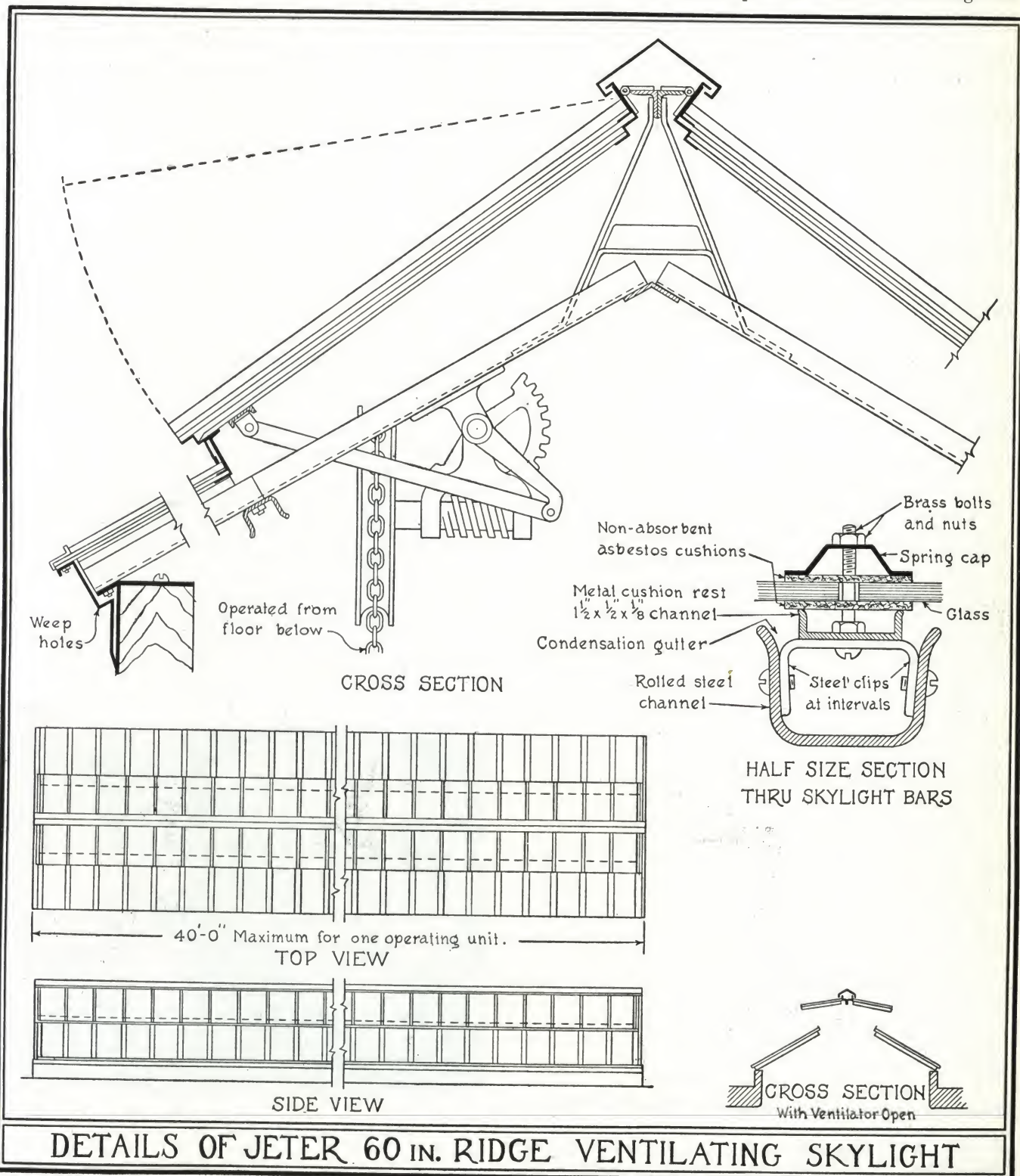
to continuous angles which run the entire length of the skylight. The sheet metal sash bars of this ventilator, besides being securely fastened to a stiffening member top and bottom, are again reinforced and tied with a $2\frac{1}{2} \times \frac{1}{2} \times \frac{1}{8}$ -in. channel which is fastened to the bars the entire length of the skylight with two $\frac{1}{4}$ -in. bolts at each sash bar. This channel also receives the hinges of the operating device into which the push arms of the operators work.

The ventilating section is operated by heavy chain operators of the worm and gear type. Either side can be operated separately or independently of the other.

Thus when one side is opened and the other is closed a suction is caused which "pulls" the dead air from the building; both sides can be opened if desired, which causes a natural forced ventilation from the building.

Standard Details

We have prepared drawings, showing plans, elevations, sections and details of this and many different styles of skylights, which will be forwarded on application, and when sufficient information accompanies request, recommendations will be cheerfully given as to the most economical and efficient practice. Send for drawing S-13.



NATIONAL VENTILATING COMPANY

Manufacturers of Puttyless Skylights

GENERAL OFFICE AND FACTORY

TELEPHONE

STILLWELL 5733, 5734

75 Tenth Street

LONG ISLAND CITY, N. Y.

Products

MULTI-UNIT PUTTYLESS SKYLIGHTS.

Also manufacturers of Side Lights, Operating Sash, and National Ventilating Devices; all kinds of Sheet Metal Products; Drawing and Stamping.

Adaptability

Skylights for railway terminals, power stations, machineshops, factories, foundries, libraries, museums, art galleries, and all other buildings whereon permanent watertight skylights of large area are required.

Advantages and Distinctive Features

Referring to Fig. 4 on following page, the bar and upper lights are supported in a fixed manner by the purlin thereunder; while the lower bar, supporting the lower lights, is secured by the same purlin in a loose manner, permitting it to expand freely.

This construction, being repeated at each purlin, permits movement, all in same direction, due to expansion, contraction, or vibration (along the slope of the skylight) of the cap, glass and bar of each unit or tier of glass, independently of every other unit or tier.

Along the longitudinal line of the skylight the steel frame of the building and the entire length of the glass are each taken as separate units, and the difference, nearly 100%, in the expansion and contraction of these materials (glass and steel) is likewise thoroughly taken care of by the copper spreader clips shown in transverse section at supporting bar (Fig. 2). These spreader clips are placed over each cap bolt, spaced about 10 in. along each skylight bar, and incidentally they serve also to better secure in place the brass bolts for holding the caps.

The cap is strong and yet resilient. Its upper half is of an inverted "U" shape, which provides strength and rigidity; while the lower half, especially at the lower extremities, is resilient, so as to conform thoroughly, when secured in position, to the surface of the the glass.

All gutters and parts that are non-accessible, without removing the glass, are of non-corrosive material. The entire top of the bar is covered with 8-oz. copper, the same being applied while the last coat of bar-paint is still wet; and a flexible bearing for the glass is formed, which adjusts itself to any warps or irregularity of the glass along its bearing line.

The company is equipped to cover the bottom of the bar also. Both the top and bottom bar covers are made by special dies and both fit the bar snugly.

No packing or filling substance of any kind is required, and no material is used other than glass and metal.

Standard Specification, Multi-unit System Puttyless Skylights

All curb and roof flashings shall be included under heading "Sheet Metal Work." They must be well connected, ready

to receive the skylight work, and must include all necessary counter flashing, well secured to roof flashings and made watertight.

The skylights shall be of the puttyless type, of a design to allow for free expansion and contraction, or movement due to vibration, of the glass and supporting bars in line with the pitch of roof, *all in the same direction.*

Each light of glass shall be entirely independent of every other light, so that one light does not support another; and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

The bearing for the glass shall be flexible, so as to adjust itself to any warps or irregularities of the glass along its bearing line.

The caps shall be spring bearing, in order to thoroughly conform along the lines of contact, when secured in position, to the surface of the glass.

All bar gutters shall be of copper and all exposed parts other than sheet metal shall be of brass.

The supporting bars shall be of rolled steel, and shall be held in a loose manner at the upper end and in a fixed manner at the lower end.

Packing, filling substance of whatever kind, or material other than glass and metal shall not be used.

All skylight sheet metal work shall be [copper, zinc, or galvanized iron].

The glass shall be $\frac{3}{8}$ in. thick [wire, plain or ribbed].

Adopted by Leading Railroads

The Pennsylvania Railroad Company, after carefully examining all other types of puttyless skylights in actual service, adopted the construction herein shown and described for its new New York & Long Island Railroad Passenger Station, 31st to 33d Streets and 7th and 8th Avenues, New York City, on which building this company completed, about 15 years ago, the erection of 83,000 sq. ft. of skylight, embracing nearly every known variety, such as hipped, ridge, flat, barrel-roof, sawtooth with bowed ridges, circular, elliptical, etc., all constructed with flat glass.



Fig. 1. Group of Multi-unit Skylights Over Concourse of Pennsylvania Terminal, New York, N. Y.

Area of this group, about 50,000 sq. ft. Total area on the terminal, 83,000 sq. ft.

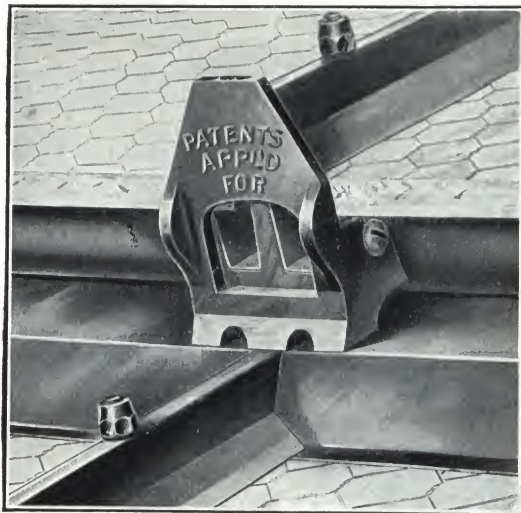
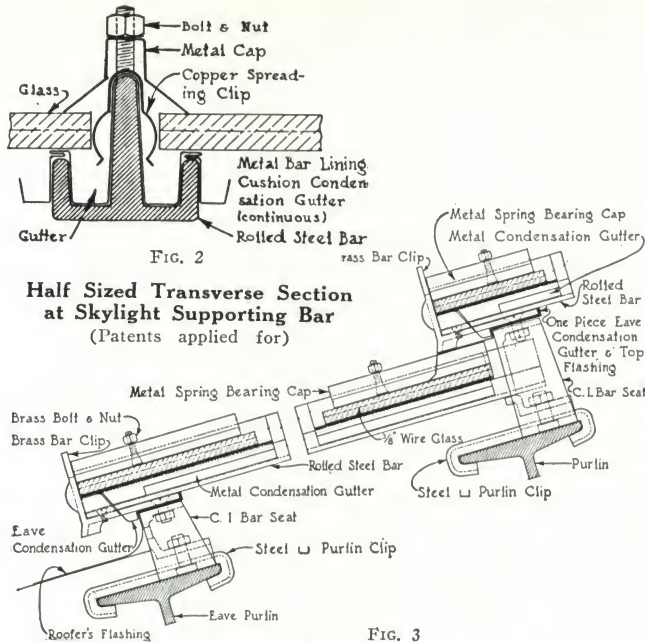


Fig. 4. Half Sized Perspective

Showing exterior view over each purlin between the eave and the ridge

The Central Railroad of New Jersey adopted this system of skylights for its new terminal at Jersey City, N. J., where 116,000 sq. ft. of this construction has been installed.

The New York Central Railroad Co. also has this construction on its new Grand Central Terminal at 42nd Street, New York City; on its New York City Power House at 50th Street and Lexington Avenue; Power Stations at Yonkers and Port Morris, N. Y.; Boiler Shops at West Albany, N. Y., Reed & Stem, Architects, and for their new Passenger Station at Utica, N. Y., Stem & Fellheimer, Architects.

Result of Thorough Investigation

The system of skylight construction described here is the result of experience and investigations made by the NATIONAL VENTILATING COMPANY in this line over a period of nearly 20 years.

All efforts during this time have been directed to producing, not the cheapest, but the best construction.

As to skylights, true economy does not consist in buying the cheapest.

Public Buildings and Other Notable Installations

The following are a few, among many, installations made by this company during the past 24 years; in some cases replacing other work with the new and improved system above described. They include building, location and architect.

New Library Building, Bar Harbor, Me., Delano & Aldrich
Sun Parlor for E. Parmalee Prentice, New York, N. Y., Delano & Aldrich

International Paper Co. Mills at Niagara Falls, Palmer and Fort Edward, N. Y., and Rumford Falls and Chisholm, Me.
Maryland Institute, Baltimore, Md., Pell & Corbett
Auditorium Building, Springfield, Mass., Pell & Corbett
Municipal Building, Springfield, Mass., Pell & Corbett
New York Edison Co. Waterside Power Station, New York, N. Y.

U. S. Navy Yards at Norfolk, Va., Charlestown, Mass., Brooklyn, N. Y., Pensacola, Fla., and Washington, D. C.

Brooklyn Rapid Transit Co. Shops, Maspeth, N. Y.

American Steel & Wire Co. Mill, Worcester, Mass.

Terminal Passenger Station, Norfolk, Va., Reed & Stem

New York Stock Exchange Building, New York, N. Y.

New U. S. Post office, New York, N. Y., McKim, Mead & White

New Municipal Building, New York, N. Y., McKim, Mead & White

Munsey Building, Washington, D. C., McKim, Mead & White
Brockton Library, Brockton, Mass.

New York, Westchester & Boston R. R., Quaker Ridge Station, New Rochelle, N. Y., and 180th Street Station, Bronx, N. Y., Stem & Fellheimer.

United Electric Light & Power Co. Powerhouse, 201st Street Station, New York, N. Y.

Institute of Arts and Sciences, Brooklyn, N. Y., McKim, Mead & White

The Beaver Companies' Mill, Thorold, Ont., Canada

Museum of Fine Arts, Minneapolis, Minn., McKim, Mead & White

Administration Building, Balboa, Canal Zone, Panama

Metropolitan Museum of Art Building, Sections "J" and "K," New York, N. Y., McKim, Mead & White

Robert Brewster's Enclosed Tennis Court at Mount Kisco, New York, Walter D. Blair

Enclosed Pastime Tennis Court, Long Island City, N. Y., Walter D. Blair

Ford Motor Co. Service Building, Long Island City, N. Y.

Union Passenger Station, Macon, Ga., Alfred Fellheimer

John J. Raskob's Residence, Claymont, Del., McClure & Harper

Buffalo General Electric Co., 1917 River Station Extension, Black Rock, N. Y., Stone & Webster, Engineers

American Tobacco Co. Building, Brooklyn, N. Y., Francisco & Jacobus

American Can Co. Building, Brooklyn, N. Y., N. M. Loney

U. S. Naval Operating Base, Hampton Roads, Va.

National City Bank, New York, N. Y.

Trenton Bank Building, Trenton, N. J., Dennison & Hiron

Commodore Hotel, New York, N. Y., Warren & Wetmore

Amherst College Library, Amherst, Mass., McKim, Mead & White

Standard Oil Company, Devoe Works, Long Island City, N. Y.

Kwang Tung Electric Supply Co. Building, Canton, China

U. S. Assay Building, New York, N. Y.

Westinghouse Electric Co. Warehouse, Essington, Pa.

S. W. Straus Building, New York, N. Y., Warren & Wetmore

Continental Can Co., Jersey City, N. J., Francisco & Jacobus

Empire City Bank, New York, N. Y., Trowbridge & Livingston

New York Telephone Co., 6 Central Exchange Buildings, McKenzie, Voorhees & Gmelin

S. W. Straus & Co. Building, Chicago, Ill., Graham, Anderson, Probst & White

Paterson Paper Parchment Co., Edgerly, Pa., Abbott, Merkt & Co.

Federal Sugar Refining Co., Yonkers, N. Y., Dwight P. Robinson Co.

Tryon Art Gallery, Northampton, Mass., Frederick L. Ackerman

Fine Arts Building, Geo. Peabody College, Nashville, Tenn., McKim, Mead & White

Kleinberger Art Gallery, 12 East 54th Street, New York, N. Y., Harry Allen Jacobs

International Motor Co., Long Island City, White Plains, Rochester and Albany, N. Y., and Camden, N. J., Faile & Seelye

GLENDON A. RICHARDS CO.

Manufacturers of Puttyless Skylights and Revolving Ventilators

Winter Avenue and Blumerich Street, Northwest
GRAND RAPIDS, MICH.

Products

The SIMPLICITY PUTTYLESS SKYLIGHT; the SIMPLICITY SKYLIGHT VENTILATOR; the VENTWELL REVOLVING VENTILATOR.

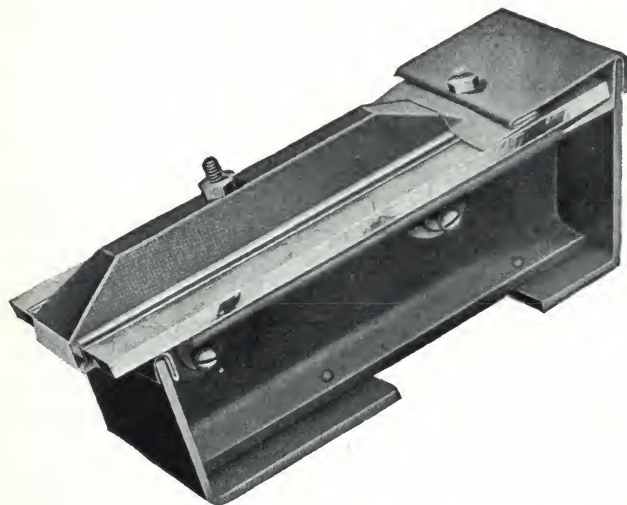
Simplicity Puttyless Skylight

Our aim in designing this skylight was to provide a product which would combine the maximum amount of daylight per square foot of area, with the lowest maintenance cost possible, and at the same time be of such construction as to lend itself to erection in the field with a minimum amount of time and labor.

The simplicity Puttyless Skylight consists of a steel supporting frame of tee iron rafters with angle curb and ridge members. The rafters are provided with sheet metal condensation gutters over which the glass (set in came lead glazing strips or channels) is laid. The mounting caps are set in place over the glass and secured, compressing the glazing channel firmly against both sides of the glass. The ridge cap and end flashing is then applied completing the assembly.

Steel Frame—The sizes of the steel members comprising the frame vary to suit conditions. Ridge and hip members are made in two sections (details on following page); this form of construction allows the frame for each slope, consisting of rafters, ridge and hip members, to be assembled complete at the factory. The erection work in the field is reduced to bolting the ridges and hips together and anchoring frame at curb.

Glazing Strips—These strips are small channels of came lead placed on the edges of the glass resting on the rafter members. When the mounting caps are set and secured they compress the lead firmly against both sides of the glass, making an absolutely windtight and weathertight joint. The soft lead takes up any unevenness in the surface of the glass and gives a continuous bearing surface; it also permits enough come and go in the glass to provide for contraction and expansion, thereby eliminating glass breakage from either of these sources.



SECTION OF SIMPLICITY PUTTYLESS SKYLIGHT BAR

Materials—The sheet metal work consisting of the mounting cap, ridge cover, condensation gutter and flashing may be of lead coated metal, galvanized iron or copper.

Advantages—Absolutely weathertight construction; maximum amount of daylight; condensation conducted to the exterior; glass breakage reduced to a minimum by use of lead glazing strip; ease of erection; ease of glass replacement.

Specification—Furnish and erect where shown on plan, skylights of the puttyless type, of a design to allow for free expansion and contraction of the glass, or movements due to vibration.

Each light of glass shall be entirely independent of every other light and the glass shall be held laterally in a manner to prevent its coming in contact with any rigid part.

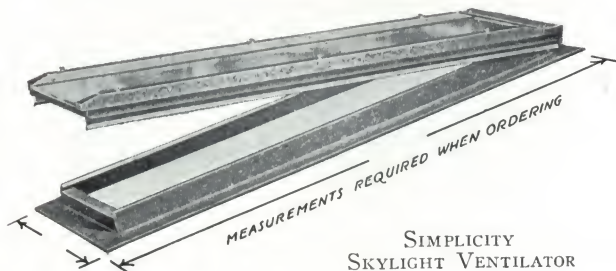
The bearing of the glass shall be flexible, so as to adjust itself to any warps or irregularities in the glass.

Simplicity Skylight Ventilator

These ventilators may be placed in any of our skylights by removing the glass and substituting the ventilating frame.

These ventilators are also made with flat flanges for use on shingle or composition roofs.

We manufacture an efficient and reliable operating device for these ventilators. Prices and description will be sent on request.



"Ventwell" Revolving Ventilator

This ventilator revolves with the wind and is so constructed that the action of the outside air creates a vacuum in the ventilator itself thereby drawing up the air to be expelled. It is efficient, and guaranteed to give satisfaction under all weather conditions.

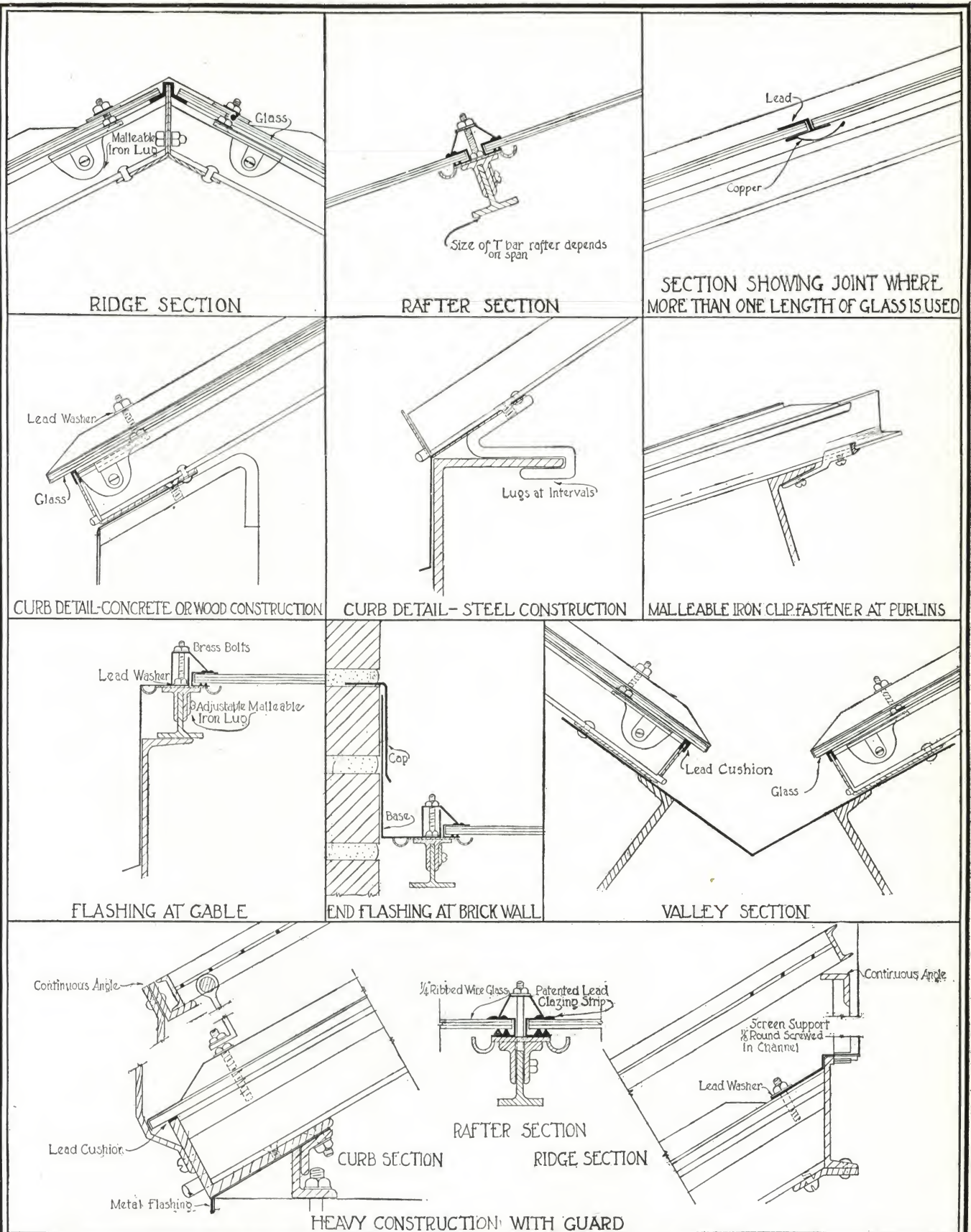
It may be had in either galvanized iron or copper.

Bases and dampers extra.

Prices quoted on application.



VENTWELL REVOLVING VENTILATOR



DRAWN BY
SWEET'S CATALOGUE
SERVICE INC.

STANDARD DETAILS OF
SIMPLICITY PUTTYLESS SKYLIGHT CONSTRUCTION

SCALE 3" = 1'-0"
DATE JULY 24
DRWG 1

H. H. ROBERTSON COMPANY

Robertson Glazing Construction and Robertson Protected Metal
PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES

BALTIMORE, MD. BIRMINGHAM, ALA. BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO HOUSTON, TEX.
NEW YORK, N. Y. PHILADELPHIA, PA. PITTSBURGH, PA. ST. LOUIS, MO. SAN FRANCISCO, CAL.

AGENCIES

ALLENTOWN, PA.	EASTON, PA.	JACKSONVILLE, FLA.	PHOENIX, ARIZ.	SCRANTON, PA.
ATLANTA, GA.	EL PASO, TEX.	KNOXVILLE, TENN.	PORTLAND, ORE.	SEATTLE, WASH.
BOSTON, MASS.	GREENVILLE, S. C.	LOS ANGELES, CAL.	RICHMOND, VA.	SYRACUSE, N. Y.
BUTTE, MONT.	HOUGHTON, MICH.	MILWAUKEE, WIS.	SAGINAW, MICH.	TULSA, OKLA.
DENVER, COLO.	HUNTINGTON, W. VA.	NASHVILLE, TENN.	ST. PAUL, MINN.	WASHINGTON, D. C.
DETROIT, MICH.	INDIANAPOLIS, IND.	NEW ORLEANS, LA.	SALT LAKE CITY, UTAH	WILTON, CONN.

ENGLAND, ELLESMERE PORT, CHESHIRE: MERSEY IRON WORKS

CANADA AND NEWFOUNDLAND: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

ROBERTSON GLAZING CONSTRUCTION.

ROBERTSON PROTECTED METAL (RPM).

Also manufacturers of Robertson Process Asphalts, Robertson Mineral Rubber (RMR); Battery Sealing, Insulation, Saturation and Waterproofing Compounds.

For Robertson Ventilators, see pages A548-549.



TRADE-MARK

Robertson Glazing Construction

Robertson Glazing Construction offers the following valuable advantages:

(1) It does away with all avoidable skylight glass breakage; (2) it is designed to eliminate leakage; (3) it can be made proof against corrosion and the consequent deflection and weakening of load carrying members; (4) it provides the lowest possible combination of first cost, maintenance and depreciation.

Available in All Forms—Robertson Glazing Construction comes in all skylight forms, from a single hip skylight, to complete glass roofs; and in all types of sash: namely, monitor, sawtooth, sidewall, fixed, operating, etc.

Also in Standardized Unit Skylights—This is a new development in which the H. H. ROBERTSON COMPANY has put into the skylights all the benefits of standardization. These standardized units come in double pitch and hip skylights, in any desired lengths, and in standard widths from 3 to 20 ft. Any unit can be promptly furnished from pre-fabricated parts, carried in stock, and the parts can be easily assembled and erected on any properly designed curbs. These units mean simplification of the work of designing and specifying skylights, they lessen cutting and fabricating on the job, and they give the assurance of a thoroughly satisfactory skylight installation.

Two Basic Types—Robertson Glazing Construction is manufactured in two basic types.

Type A combines all of the essential characteristics of an ideal skylight, in a design of remarkable simplicity, and at a very moderate cost (see illustration and details on following page).

Type B is especially adapted to the requirements of buildings exposed to severely corrosive influences.

Glass Breakage Minimized—The chief causes of broken glass in skylights are deflection of supporting members or improper cushioning and separating methods.

Robertson Glazing Construction provides a double safeguard against glass breakage. A rolled steel bar

provides a firm, rigid, durable supporting member. The maximum deflection of the Robertson bars (1/30 in. per lin. ft.) is never such that glass breakage will result from lack of initial bar stiffness.

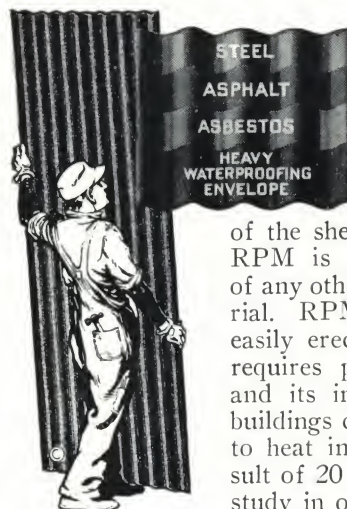
Furthermore, Robertson Skylight Construction provides a non-absorbent, resilient, insulating bed for the glass.

Robertson Glazing Construction is backed by a complete engineering service which assures perfect installation and complete satisfaction. The Robertson Daylighting Catalogue containing simple, practical and complete information on how to introduce natural light into industrial and commercial buildings, will be sent to you upon request. It also gives complete and detailed information regarding all types of Robertson Glazing Construction and Robertson Skylight Engineering Service. Specifications for Robertson Glazing Construction are shown on following page.

Robertson Protected Metal (RPM)

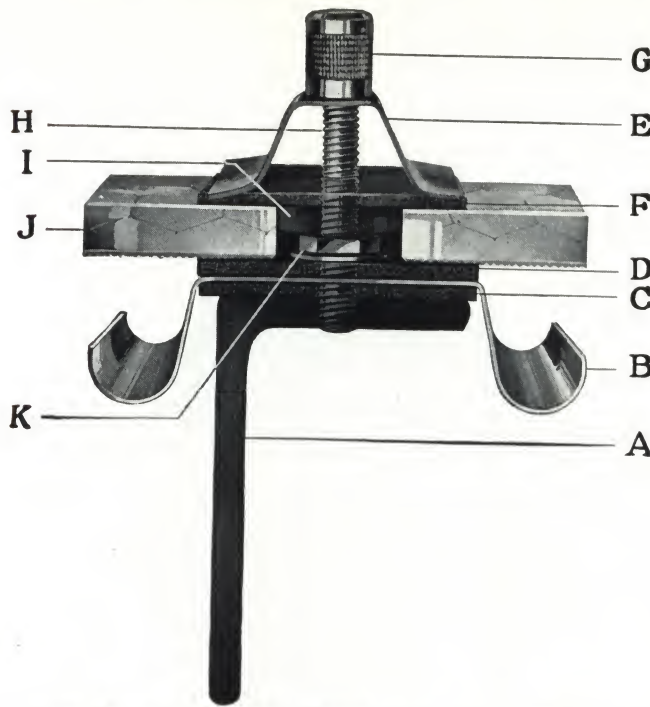
A permanent building material made by enveloping a steel sheet with three protective coatings: (1) asphalt, (2) asphalt-impregnated asbestos felt applied under heat and heavy pressure, (3) waterproofing.

The finished sheets weigh from 138 to 224 lb. per 100 sq. ft., depending on gauge of the core sheet. Their strength and light weight allow the same savings in the cost of foundations, structural steel, transportation and erection that characterize the use of ordinary corrugated steel. To these are added the advantages of having a factory built-up roofing applied to both sides



Robertson Protected Metal (RPM)

of the sheets. The covering area of RPM is greater per ton than that of any other durable corrugated material. RPM is moderate in first cost; easily erected, never needs painting, requires practically no maintenance and its insulating advantages make buildings cooler in summer and easier to heat in winter. RPM is the result of 20 years of experience and of study in our own and other research laboratories. A sample showing the processes by which the material is made will be sent on request.



Cross Section Robertson Glazing Construction, Type A

Robertson Glazing Construction (Type A)

This type of Robertson Glazing Construction represents a tremendous advance in skylight design. There is no type of skylight on the market today that offers such an ideal combination of durability, simplicity of construction, economy and attractive appearance.

Robertson Glazing Construction (Type A) can be furnished with caps and gutters made of any of the standard sheet metals that may be desired, but it possesses far greater durability than the ordinary skylight of copper, galvanized iron or aluminum construction because of the more efficient way in which the metal is utilized and because of the superior method used in supporting the skylight glass.

In the first place, it will be noted that all construction details are above the supporting bar (A) and that the condensation gutter (B) is not a part of the supporting member. This is a vast improvement over the usual type of glazing construction in which the bar and the gutter are formed as a single unit with the result that the bar is subjected to the corrosive action of the water of condensation which the gutter is designed to carry away. In Robertson Glazing Construction (Type A) there is absolutely no contact between the supporting member and the gutter. The two are completely separated by insulation (C).

In Robertson Glazing Construction (Type A) the glass (J) rests on a durable, watertight asphaltic cushion (D). This material is ideally adapted to the purpose it fulfills. Because of its flexibility and adhesive character, the Robertson asphaltic cushion adapts itself to all irregularities in the surface of the glass, forming a continuous, leakproof union. Thus it does away with one of the most common causes of glass breakage, for glass which lies on an irregular surface, touching in some places and not in others, is constantly subjected to destructive stresses and strains.

The Robertson skylight cap (E), scientifically designed and efficiently secured by the stud (H) and nut (G), contribute further strength, rigidity and durability to this type of Robertson Glazing Construction. The cap is extremely simple in construction, but it is perfectly suited to the job it has to do, for it is so designed that it is absolutely rigid between the studs. The pressure it exerts is continuous and equal at all points. Pressure is easily regulated by simply screwing the cap nut up or down. The lock nut and washer (K) do away with the possibility of leakage below the gutter.

You will see from the cross section view that the glass in this type of glazing construction does not touch metal at any point. The glass "spacer" (I) prevents the contacting of the glass with the lock nut (K).

The Robertson Unit Skylights—How to Specify and Order

All the information the H. H. ROBERTSON COMPANY needs for filling an order for Robertson Unit Skylights is:

The outside dimensions of curbs; width and length (see diagram below).

Thickness of the curb.

Type of skylights (double pitch or hip).

Type of end construction—hip or double pitch gables (if gable type, are gables to be glass or sheet metal?).

Kind of skylight trim—copper or galvanized.

Kind of glass.

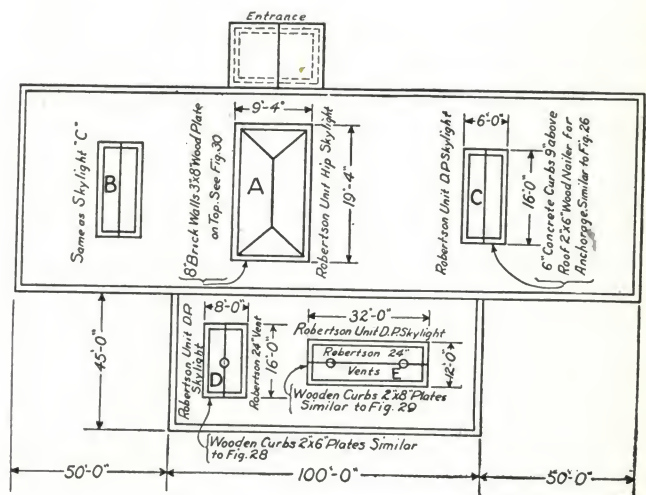
Kind of curb construction. (We will be glad to send a bulletin showing a wide variety of curb types, and methods of attaching unit skylights to each type).

The fifty-two standard sizes in which Robertson Unit Skylights are furnished (and the 4 in. variation possible in each size) are given in the table below. Length can be anything desired.

ROBERTSON UNIT SKYLIGHTS—STANDARD SIZES

(Sizes in bold type are most readily available)

Size	Suitable for curb widths, outside to outside	Size	Suitable for curb widths, outside to outside
3'0"	2'9" to 3'1"	11'8"	11'5" to 11'9"
3'4"	3'1" to 3'5"	12'0"	11'9" to 12'1"
3'8"	3'5" to 3'9"	12'4"	12'1" to 12'5"
4'0"	3'9" to 4'1"	12'8"	12'5" to 12'9"
4'4"	4'1" to 4'5"	13'0"	12'9" to 13'1"
4'8"	4'5" to 4'9"	13'4"	13'1" to 13'5"
5'0"	4'9" to 5'1"	13'8"	13'5" to 13'9"
5'4"	5'1" to 5'5"	14'0"	13'9" to 14'1"
5'8"	5'5" to 5'9"	14'4"	14'1" to 14'5"
6'0"	5'9" to 6'1"	14'8"	14'5" to 14'9"
6'4"	6'1" to 6'5"	15'0"	14'9" to 15'1"
6'8"	6'5" to 6'9"	15'4"	15'1" to 15'5"
7'0"	6'9" to 7'1"	15'8"	15'5" to 15'9"
7'4"	7'1" to 7'5"	16'0"	15'9" to 16'1"
7'8"	7'5" to 7'9"	16'4"	16'1" to 16'5"
8'0"	7'9" to 8'1"	16'8"	16'5" to 16'9"
8'4"	8'1" to 8'5"	17'0"	16'9" to 17'1"
8'8"	8'5" to 8'9"	17'4"	17'1" to 17'5"
9'0"	8'9" to 9'1"	17'8"	17'5" to 17'9"
9'4"	9'1" to 9'5"	18'0"	17'9" to 18'1"
9'8"	9'5" to 9'9"	18'4"	18'1" to 18'5"
10'0"	9'9" to 10'1"	18'8"	18'5" to 18'9"
10'4"	10'1" to 10'5"	19'0"	18'9" to 19'1"
10'8"	10'5" to 10'9"	19'4"	19'1" to 19'5"
11'0"	10'9" to 11'1"	19'8"	19'5" to 19'9"
11'4"	11'1" to 11'5"	20'0"	19'9" to 20'1"



Typical Roof Plan, Showing Manner of Detailing Skylights for Contract Plans on Architects Drawings

NONPAREIL SKYLIGHT CO.

Manufacturers of Nonpareil Puttyless Skylights

MAIN OFFICE

2609-2611 Pennsylvania Avenue, N. W., WASHINGTON, D. C.

Product

The NONPAREIL PUTTYLESS SKYLIGHT (patented November 1, 1910; October 3, 1911; October 14, 1913).

Some of Our Claims, for Our Construction

- (1) It can not, and does not leak.
- (2) Glass breakage with this construction is reduced to a minimum.
- (3) A highly practical construction.
- (4) Our lead glazing cushions are practical and lasting. Detail 5, Fig. 1.
- (5) These cushions are *not* attached until after all field work is done, therefore, they are always in perfect condition when the glass is put in place.
- (6) They are reversible, so that in case of accident to the glass and they are injured, they can be reversed for installing new lights of glass—very advantageous feature.
- (7) Our condensation gutters are so made, and of such size, as to really and properly perform the functions they are supposed to perform. Details 6 and 7, Fig. 1.
- (8) Our bars are made from lead coated Armco Iron, where the skylights are copper trimmed; and from galvanized steel, where they are galvanized trimmed. They are also of the proper size and section, to make the best and most practical job. Details 6 and 7, Fig. 1.
- (9) Our bolts and nuts, are made from cold drawn brass (*not cast brass*) and all our castings are brass.

Specifications for Nonpareil Skylights

The skylights must be of a type that can be made watertight without the use of putty, and shall *not* contain any material other than metal and glass, in their construction.

Some Recent Installations of Nonpareil Skylights

Lincoln Memorial, Washington, D. C.
 United States Navy Yard, Building No. 41, Washington, D. C.
 Central High School, Washington, D. C.
 Cuban Legation, Washington, D. C.
 United States Treasury Building, Washington, D. C.
 Canadian Pacific Railway, Montreal, Que.
 Pratt Tennis Court, Glen Cove, L. I., N. Y.
 Vitagraph Building, Brooklyn, N. Y.
 New Corcoran Gallery of Art,
 Washington, D. C.

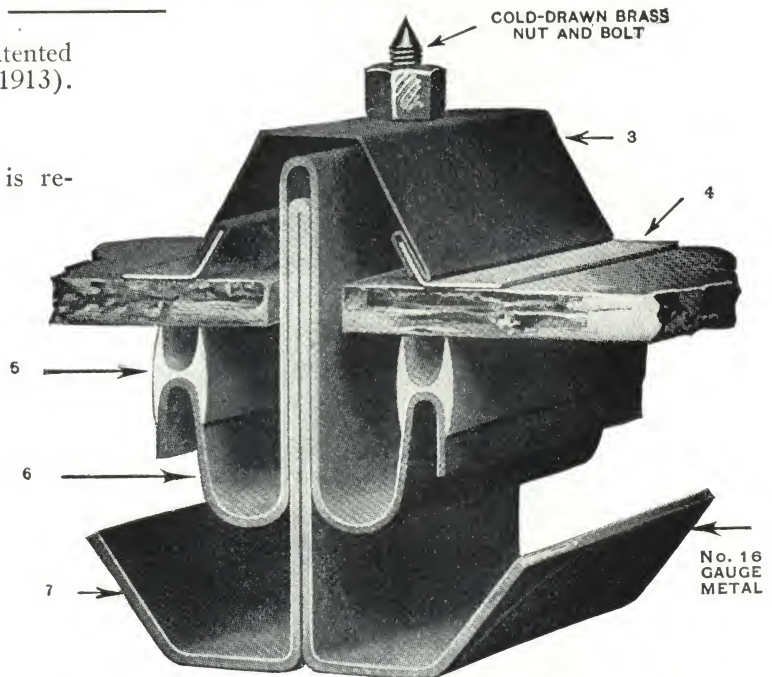


Fig. 1. Complete Bar Assembled, Showing the Glass and Details of Construction

(Patented November 1, 1910; October 3, 1911; October 14, 1913)

United States Hospital for the Insane (Boiler House), Washington, D. C.
 New York Central R. R. Station, Watertown, N. Y.
 United States Post Office, Santa Barbara, Cal.
 Biograph Building, New York, N. Y.
 Capital Traction Co., Powerhouse and Car Barns, Washington, D. C.
 Eastern High School, Washington, D. C.
 Beloit State Bank, Beloit, Wis.

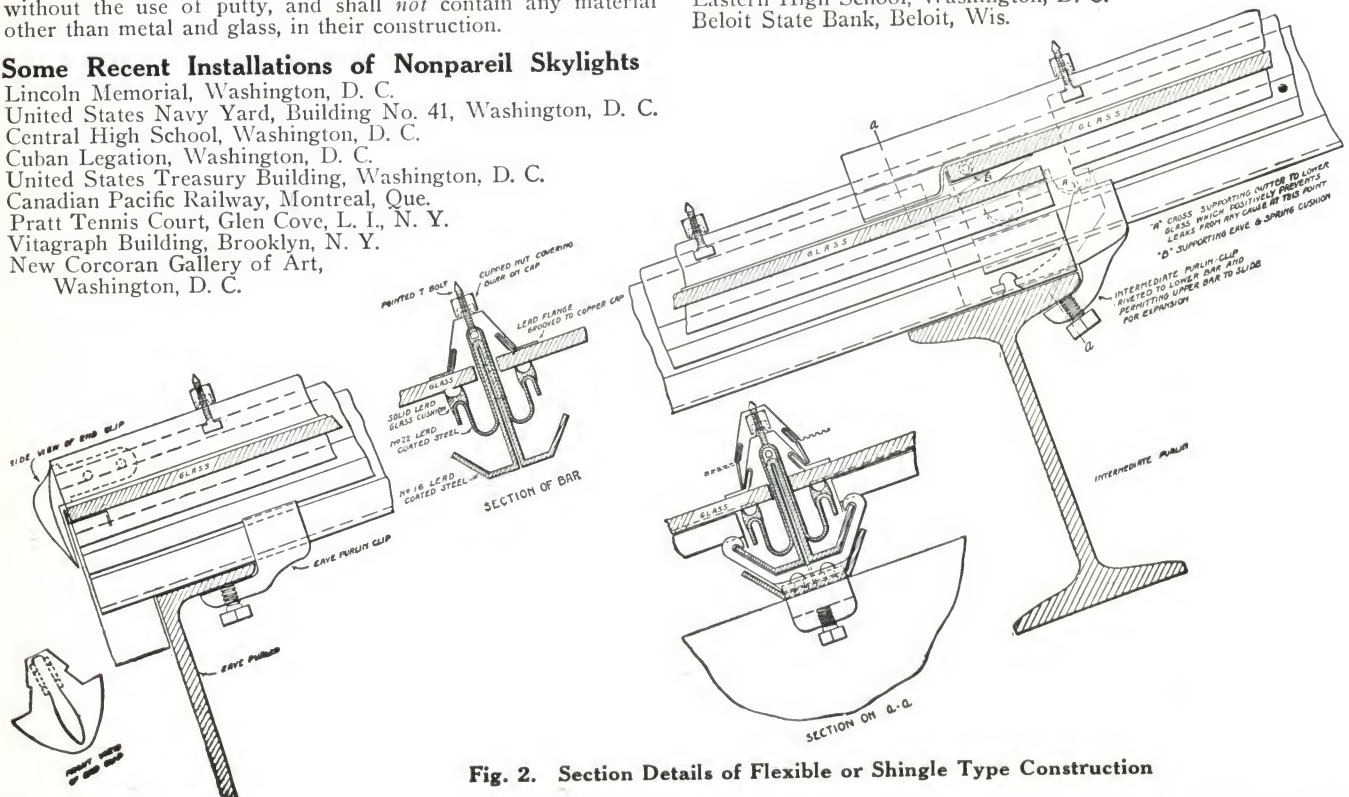


Fig. 2. Section Details of Flexible or Shingle Type Construction

ESTABLISHED 1873

E. VAN NOORDEN COMPANY**Puttyless Skylights**

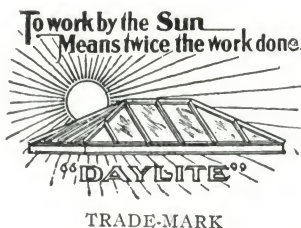
TELEPHONE 100 Magazine Street, near Massachusetts Avenue
HIGHLANDS 3040, 3041, 3042 BOSTON, MASS.

Products

Manufacturers of "ANCHOR-BAR"
ROLLED STEEL, PUTTYLESS SKYLIGHTS.

Also manufacturers of Sheet Steel and Copper Skylights of every type, Sheet Steel or Copper Windows and Trim, Kalamein Doors and Windows; Bois Steel Stairs.

For Roof Ventilators and Steel Door Bucks, see page A556.

**Rolled Steel, Puttyless Skylights—"Anchor-bar" Type (Patent No. 931638)**

The Van Noorden rolled steel "Anchor-bar" puttyless skylight is designed particularly for large skylight areas, and is a most economical construction for skylights where the bar length exceeds 8 ft. Fewer purlins and steel supports are required than for any other skylight.

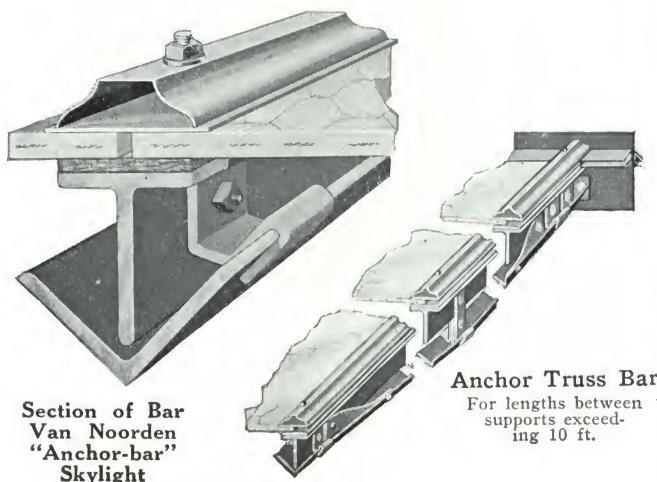
This company solicits from architects an opportunity of suggesting framework for any type of glazed roof structure, and a saving in the steel framework required is assured.

The structural parts of rolled steel, and the trim of sheet metal (generally copper), form a combination which can not be surpassed; namely—steel for strength and copper for weather protection.

Bar—The bar consists of a tee and angle combination as shown. The angle member serves as a gutter for condensation. Glass rests loosely on cushion of pure wool felt.

Curb—The "Anchor-bar" skylight is the only skylight of prominence which has continuous steel reinforcement at the base. The thrust of skylight bars is directly against this member, which can not give way while the curb holds.

General Features—The distinctive feature of "Anchor-bar" skylight is the unit steel frame, consisting of bars, base and ridge—an independent self-supporting steel structure, upon which the glass is loosely bedded; after which, the exposed portions, such as bar caps, ridge caps, base and side apron of sheet metal (generally copper), are applied. Caps are secured with brass bolts.



Expansion and Contraction—Owing to the fact that the sheet metal parts of "Anchor-bar" skylights are independent of the rolled steel parts, expansion and contraction are amply provided for. Glass sets loosely on the cushion of wool felt, thus there is no possibility of breakage due to expansion and contraction.

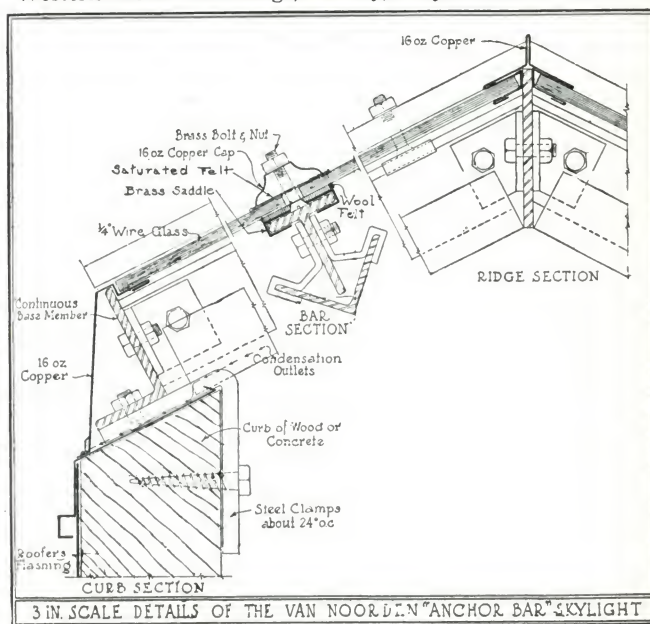
Accessibility for Re-painting—A feature to be recommended in "Anchor-bar" skylights is their accessibility for the easy re-painting of the rolled steel portions. The sheet metal portions, being preferably of copper, are impervious to weather conditions.

Adaptability—"Anchor-bar" skylights are recommended wherever overhead light is desired. Inquiries should state over-all length of outside of curb, bar length, pitch of skylight (5 in. to the foot, or more) and distance between intermediate purlins.

"Anchor Truss Bar" (Patent No. 1140909)—"Anchor Truss Bars" are used where bar length is more than 10 ft., unless intermediate purlins are provided. Truss bars are self-supporting for a bar length up to 15 ft. The saving effected in the steel frame support is far greater than the excess cost of truss bar construction. Details on application.

Notable Installations of "Anchor-bar" Skylights

U. S. Treasury Annex, Washington, D. C.
U. S. Naval Hangar, Lakehurst, N. J.
General Electric Co., Lynn, Mass.
Base Ball Cages at Harvard University, Cambridge, Mass.;
Yale University, New Haven, Conn.; Bates College, Me.;
Amherst College, Amherst, Mass.; Phillips-Andover, Andover, Mass.
Pontiac Plant, General Motors Co., Pontiac, Mich.
West Virginia Pulp and Paper Co., Mills at Mechanicville, N. Y. and Piedmont, W. Va.
State Capitol, Augusta, Me.
Widener Library, Cambridge, Mass.
U.S. Post Offices: New Haven, Conn.; Ashtabula, Ohio; Brazil, Ind.
Western Electric Buildings, Kearny, N. J.



PENNSYLVANIA WIRE GLASS COMPANY

EXECUTIVE OFFICE

WALTER COX, PRESIDENT

Pennsylvania Building
PHILADELPHIA, PA.

WORKS
DUNBAR, PA.

HIRES TURNER GLASS COMPANY, DISTRIBUTORS

ALBANY, N. Y.

BALTIMORE, MD.

ROCHESTER, N. Y.

PHILADELPHIA, PA.

WASHINGTON, D. C.

PACIFIC SLOPE DISTRIBUTORS, H. B. MILLS Co., SAN FRANCISCO, CALIF.

Products

SKYLIGHTS and GLAZED ROOFING; MARQUESSES; GLAZED CANOPIES; SIDEWALLS, etc.

SOLID WIRE GLASS—Rough, Ribbed, Polished, Corrugated (CWG), Figured, and ACTINIC GLASS.

Also Glass without wire netting, in various patterns and thicknesses, to suit every requirement.



TRADE-MARK

The color of Actinic is technically described as an "unsaturated yellow," although it is some times spoken of as "light amber."

Surfaces and Thicknesses—Actinic Glass is made in rough and ribbed surfaces, in $\frac{1}{8}$ -in. plain, and in $\frac{1}{8}$ and $\frac{1}{4}$ -in. wire; also in the corrugated wire pattern, $\frac{5}{16}$ in. in thickness.

Wire Glass

Process—Solid wire glass, made by the Pennsylvania continuous process, is completely formed by one pouring and one rolling; the only process that makes possible the manufacture of wire glass as thin as $\frac{1}{8}$ in.

Fire Protection—Wire glass is a valuable fire retardant—it prevents flames from attacking adjacent buildings.

Approval (Distinguishing Mark)—All of our wire glass, $\frac{1}{4}$ in. and over in thickness, has the full approval of the National Board of Fire Underwriters as a fire retardant, which requires a distinguishing mark to identify the glass. Our distinguishing mark is our *cabled strand*, appearing every 10 in. across the sheet and the full length of each sheet.

Service—We offer gratuitous engineering advice on all glass problems.

Samples—Samples, catalogues and circulars on request.

Specifications—Architects should always specify "Solid Wire Glass manufactured by the PENNSYLVANIA WIRE GLASS COMPANY," (mention the kind desired).



Actinic Glass

This improved form of tinted glass possesses the following extraordinary combination of advantages.

- (1) In various ways it greatly reduces glare.
- (2) It materially reduces the radiant heat in direct sunlight.
- (3) It greatly retards quite a number of undesirable chemical changes, such as the fading of colors.
- (4) On dark days illuminating effects are produced, more like pleasantly diffused sunlight than the somber light from the sky.

The above claims are verified by extensive practical experience. Users report increased general satisfaction.

Corrugated Wire Glass

CWG is a corrugated sheet of glass with wire netting incorporated.

Corrugated Wire Glass Skylight—Corrugated wire glass is made to meet the demand for a substantial skylight, admitting properly diffused light. CWG can be placed on a roof of any material, including corrugated iron and corrugated asbestos.

Uses—CWG can also be used on roofs, sidewalls, marquees, canopies and wherever *daylight* is desired.

Weight—CWG weighs about $4\frac{1}{2}$ lbs. to the sq. ft.

Strength—CWG has strength many times greater than any other glass of equal thickness, owing to the corrugations.

Kind—CWG is made in deep angle, $2\frac{1}{2}$ in. center to center of corrugations.

Standard Size— $27\frac{3}{4}$ in. wide by 42 or 64 in. long, or any length up to 126 in., conditions governing.

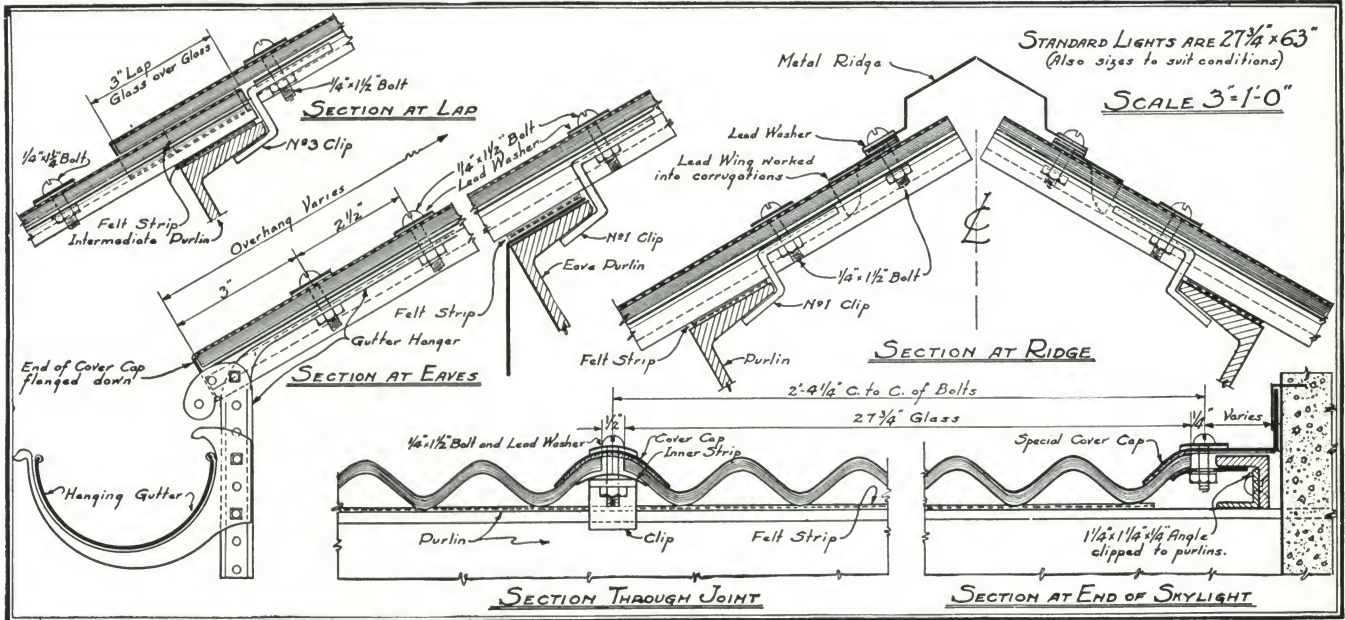


Corrugated Wire Glass Canopy at American Tobacco Co., Durham, N. C.

Specifications for Installation of CWG

The skylights, roof or sidewall construction, where marked "Corrugated Wire Glass" on the plans and elevations, shall be formed of Corrugated Wire Glass (if Actinic Corrugated Wire Glass is wanted,

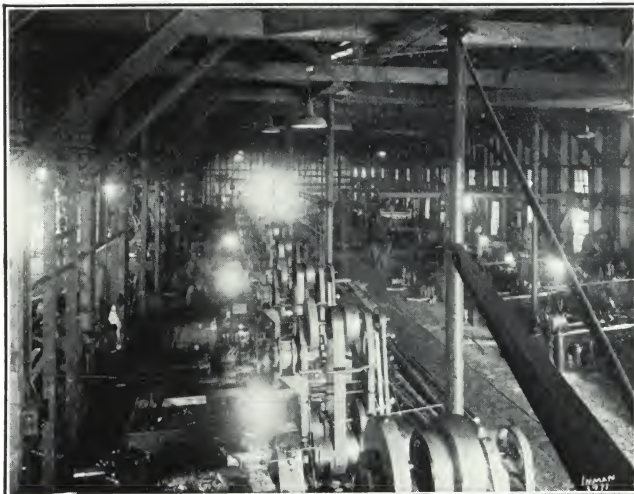
say "Actinic Corrugated Wire Glass"), with standard fittings of 18-oz. copper and brass (can be furnished, if desired, in Armco iron, zinc, aluminum or lead), in accordance with details and instructions submitted.



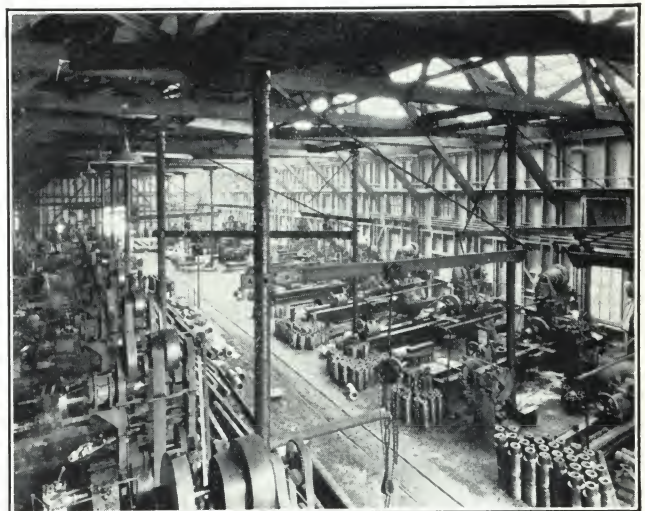
Important Details Showing Installation of Corrugated Wire Glass
For further information send for CWG Catalogue



Corrugated Wire Glass Roof Over Indoor Tennis Court of Ralph Pulitzer, Manhasset, L. I., N. Y.



Before CWG Was Installed in Roof



After CWG Was Installed in Roof

Interior View of U. S. Tool Company's Building, Long Beach, Calif.

AMERICAN 3 WAY-LUXFER PRISM CO.

Skylight Engineers

1313-1315 South 55th Court
CICERO, ILL.
(Suburb of Chicago)

37-28 30th Street
LONG ISLAND CITY, N. Y.

For 3-Way Armored Glass Sidewalk Lights, see page A387; for Transoms, see page B1751

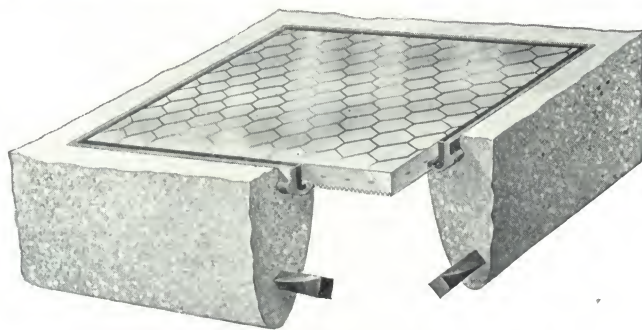
3-Way Armored Wired Glass Skylights (Glass Guaranteed for 5 Years)

This construction combines the everlasting advantages of the reinforced concrete skylight with the great daylighting value of the metallic wired glass constructions. It has great light area; is absolutely fire resisting, weatherproof, burglarproof, everlasting, requires no upkeep, no protecting screen, can be walked on, and broken glass is instantly replaceable. So perfected is this construction that we supply all glass for replacement for a period of 5 years.

The glass is cut from standard $\frac{1}{2}$ -in. thick wired glass into panels $8\frac{1}{4}$ in. square. These are firmly and tightly caulked into galvanized cast iron shields. These in turn are embedded in the concrete. The shields protect the glass from the expansion pressure, and at the same time permit the instant and easy replacement of any one broken.

Factory-built in ready-to-set slabs for installation by contractor or installed by our own skilled workmen. These 3-Way Reinforced Concrete Skylights can be laid flush with the roof, but we recommend that they be raised on curbs and provided with a definite pitch. Weight is 33 lb. per sq. ft.

Specifications—All skylights shown on plans shall be of the reinforced concrete type known as 3-Way Armored Wired



Construction of 3-Way Armored Glass Skylight

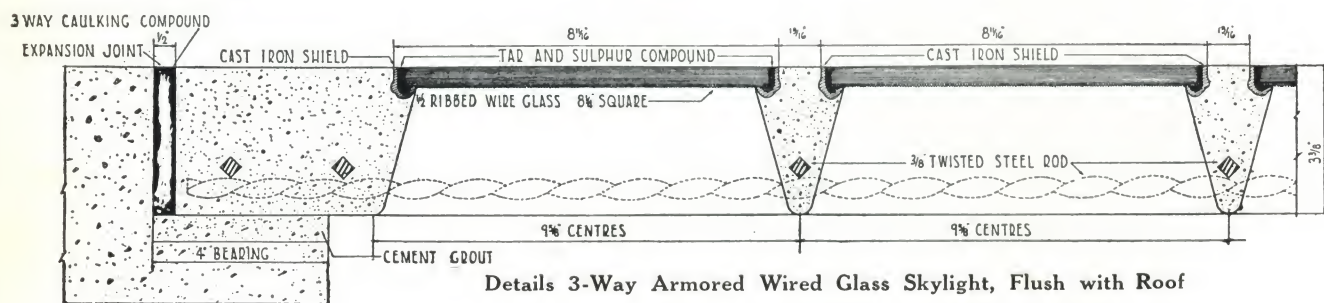
Glass Construction as manufactured by the AMERICAN 3 WAY-LUXFER PRISM CO., Cicero, Ill.

Glass shall be standard $\frac{1}{2}$ -in. wired glass cut into squares of $8\frac{1}{4}$ in., set and caulked with tar and sulphur compound, into tight-galvanized cast iron shields which are embedded in the concrete.

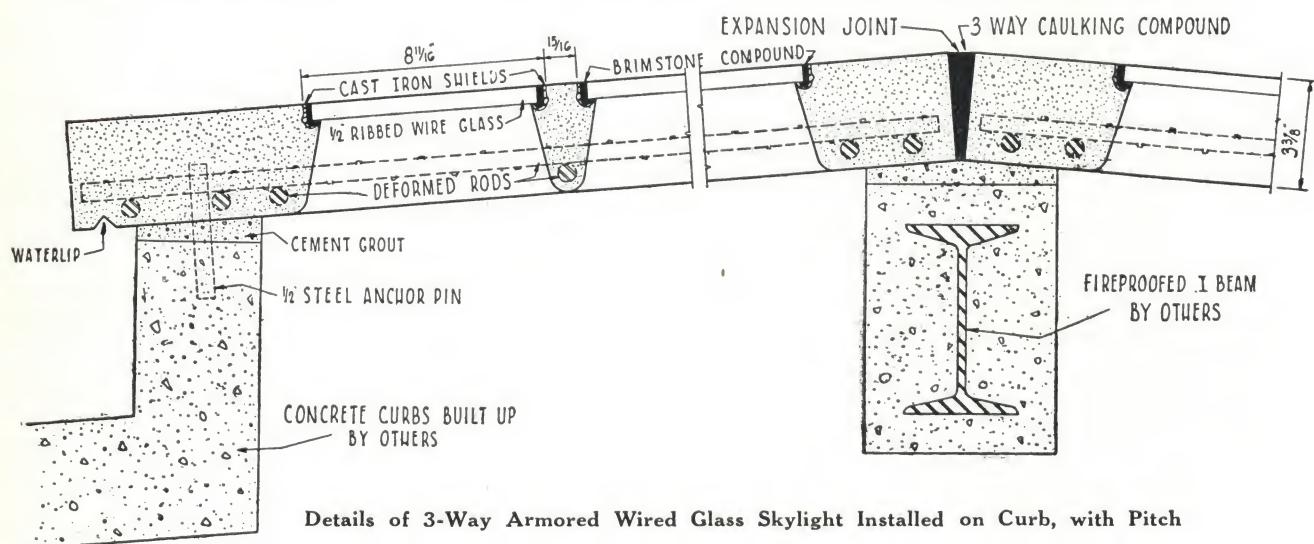
Glass for replacement to be supplied free for a period of five years.

Carrying capacity to be 150 lb. per sq. ft. on a 10-ft. clear span, with a factor of safety of 4.

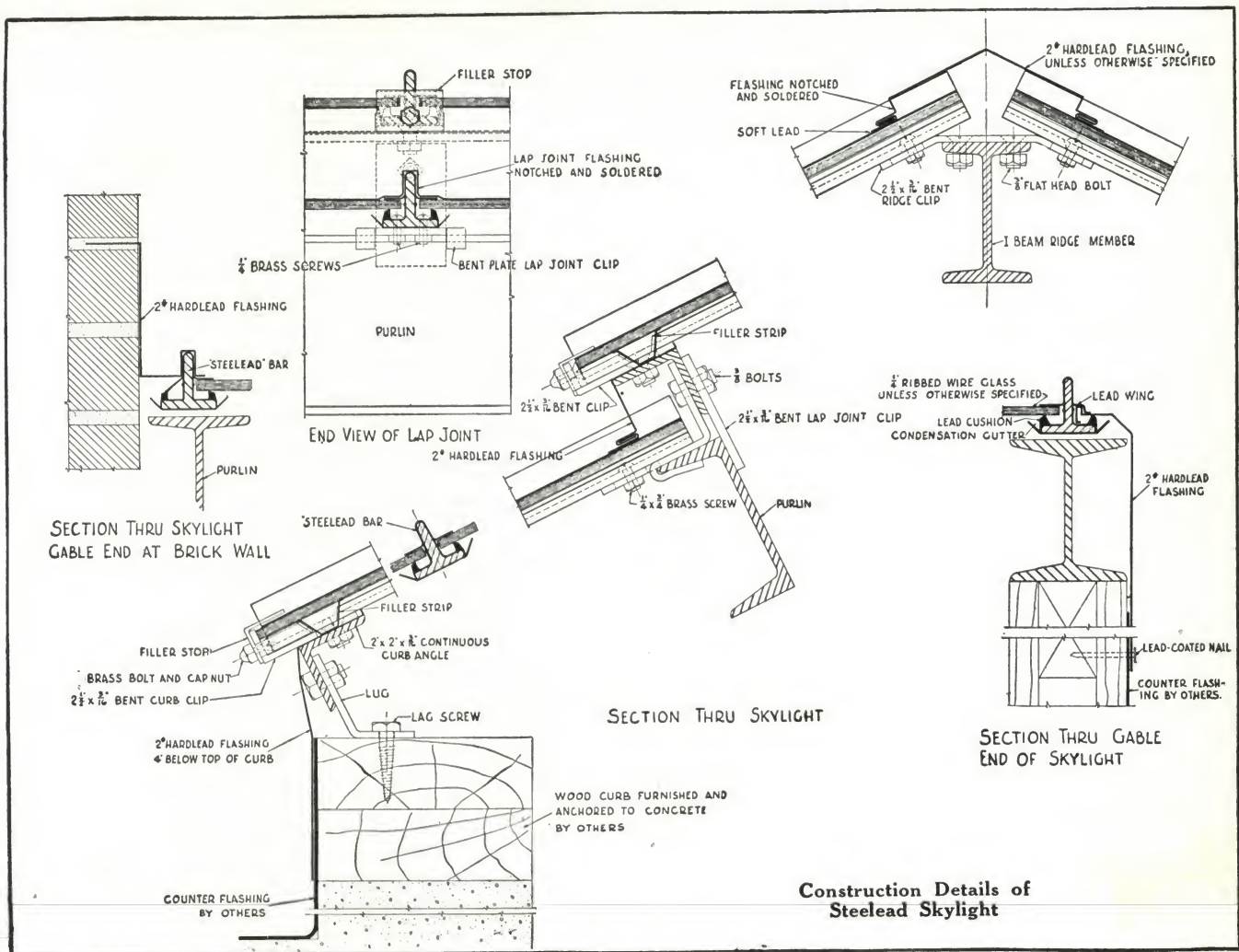
All joints between and around slabs to be caulked with 3-Way Caulking Compound.



Details 3-Way Armored Wired Glass Skylight, Flush with Roof



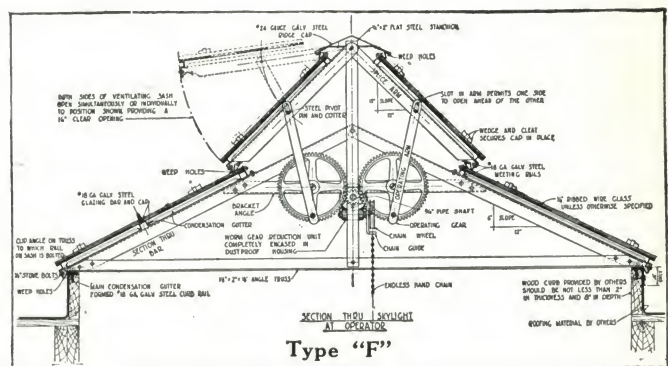
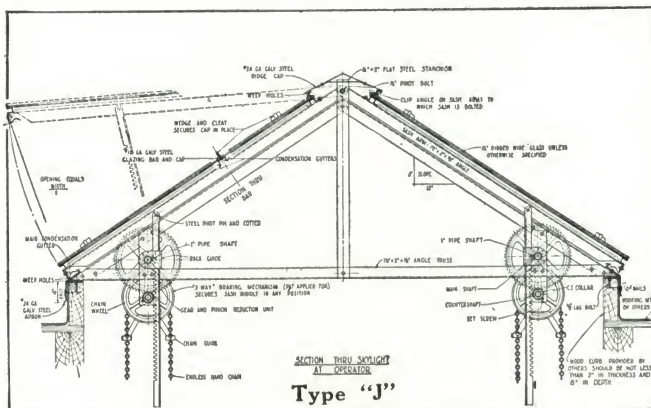
Details of 3-Way Armored Wired Glass Skylight Installed on Curb, with Pitch



Specifications for Steel Lead Skylight

Skylight shall be of Steel Lead construction as manufactured by the AMERICAN 3 WAY-LUXFER PRISM CO., Cicero, Ill. The steel tee bar shall be hermetically sealed in a seamless lead sheath, fully capable of resisting attacks by fumes, gases, etc. Glass shall have a bearing on a lead cushion and be free to

expand without coming into contact with bolts or other rigid substances. The glass shall be held securely in place by the lead wings on the bar, making a weathertight joint without the use of putty or packing. Ample provision shall be made for carrying away all condensation which may be delivered from the under side of the glass. All flashings pertaining to the skylight shall be hard lead weighing not less than 2 lb. per square foot.



Specifications for 3 Way Ventilating Skylights

Both Types "J" and "F" carried in stock, sizes from 4 to 20 in. in width, length as desired. Special sizes furnished when necessary.

Type "J"—Skylights shall be 3 Way Ventilating Type "J" construction as manufactured by the AMERICAN 3 WAY-LUXFER PRISM CO., Cicero, Ill. All glass bearing members to be formed of 18 gauge steel, designed to provide ample condensation gutter. Glazing to be 1/4-in. ribbed wire glass set in putty bed with 18 gauge galvanized steel caps over the glazing bar. All metal parts to be given one shop coat of paint.

Note: The Type "J" skylight is full ventilating, hinged at

the ridge with complete movable sash lifting from the curb and equipped with 3 Way Operating Device.

Type "F"—Skylights shall be 3 Way Ventilating Type "F" construction as manufactured by the AMERICAN 3 WAY-LUXFER PRISM CO., Cicero, Ill. All glass bearing members to be formed of 18 gauge steel, designed to provide ample condensation gutter. Glazing to be 1/4-in. ribbed wire glass set in putty bed with 18 gauge galvanized steel caps over the glazing bar. All metal parts to be given one shop coat of paint.

Note: The Type "F" skylight is composed of a fixed section and movable section at the ridge for ventilation equipped with 3 Way Operating Device.

AMERICAN BAR LOCK CO., INC.

Manufacturers of Skylight and Roof Light Construction

LONG ISLAND CITY, N. Y.

BRANCH OFFICES OR REPRESENTATIVES IN ALL LARGE CITIES

Product

"BAR LOCK" TRANSPARENT ROOFING SKYLIGHT and ROOF CONSTRUCTION.

For Sidewalk Light Construction, see page A386.

"Bar Lock" Transparent Roofing (Skylight and Roof Light) and Floor Light Construction

Built strongly of reinforced concrete ribs $3\frac{1}{2}$ in. deep, supporting the frames around the replaceable glass units, on four sides of each unit. Designed for permanency, protection of glass from breakage, leakage and maintenance expense. It is mechanically correct and is as strong and durable as the walls of the building. Can be walked on; is wear, burglar, fire and water proof. Requires no protecting screens. Will support the loads required, and withstand the action of the elements. Not affected by smoke or acid fumes.

Advantages of "Bar Lock" Transparent Roofing

Their durability makes "Bar Lock" Skylights with wired glass more economical than other types.

The surface will harbor neither water nor dirt. Quick repairs are possible by unskilled labor.

Glass units are cushioned with a specially prepared waterproof composition. Metal frames entirely surround each unit of glass for its full depth, providing perfect protection against concrete expansion.

The $\frac{1}{2}$ -in. wired glass is of the replaceable type,

and can be replaced by unskilled labor without any cutting of concrete, leaving of patch work or liability of leakage.

Expansion joints relieve pressure, and are caulked and made watertight with oakum and "Bar Lock" caulking compound. Spans, up to 8 ft. in the clear without intermediate supports, for any type of building.

Construction of "Bar Lock" Transparent Roofing

Made in completed factory finished slabs ready to drop over the openings, or we will send our own mechanics, if preferred, to install in the field anywhere in the United States.

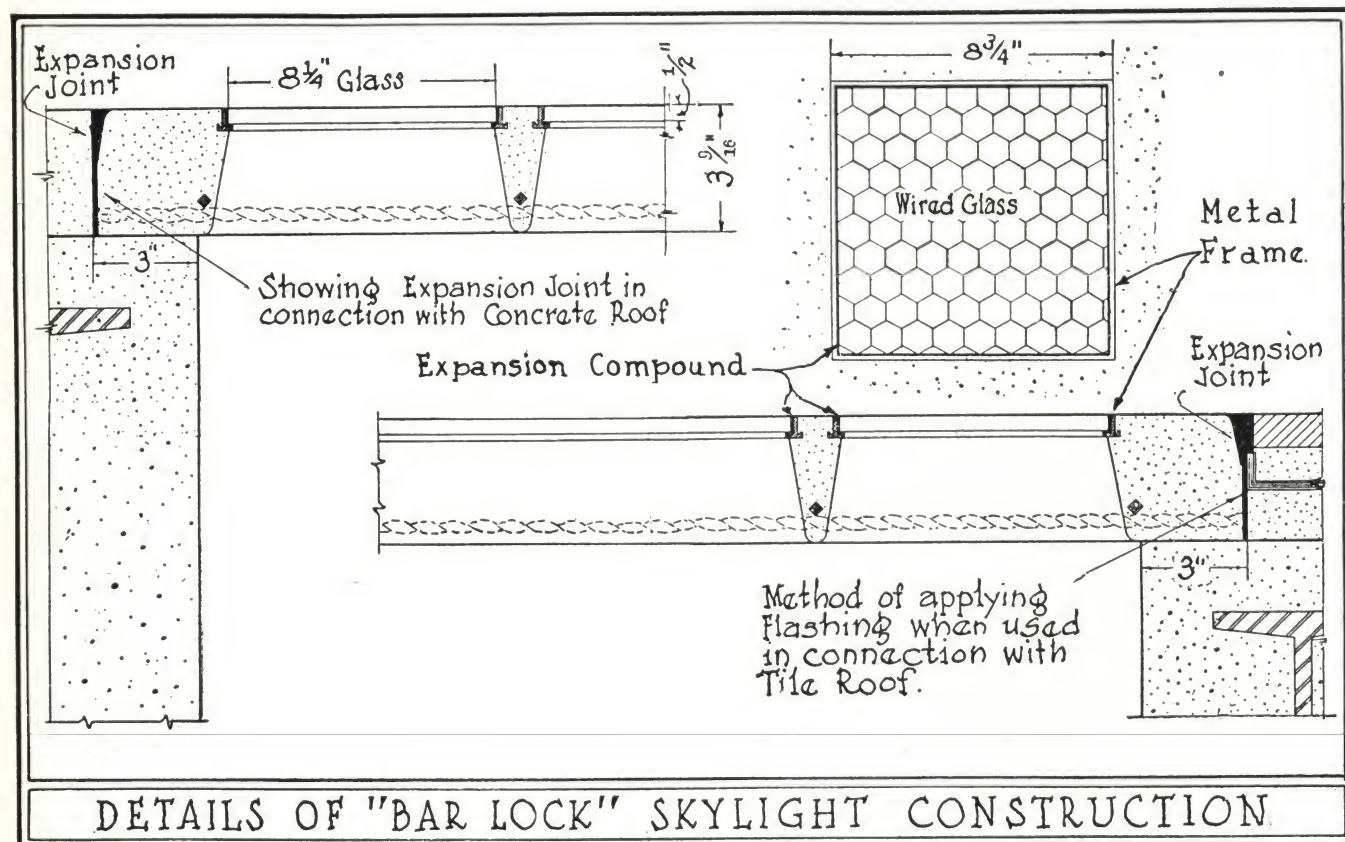
Specification

"Bar Lock" Transparent Roofing Double Reinforced Concrete Construction using $8\frac{1}{4}$ in. square, $\frac{1}{2}$ in. thick, wired glass, protected by metal shields, with a signed guarantee to furnish glass for replacement free of charge (f.o.b. factory) for a period of 5 years.

Guarantees

We guarantee to maintain all work against defective workmanship and materials, and any leakage caused thereby, for a period of one year.

The AMERICAN BAR LOCK CO., INC., further guarantees to furnish glass for replacement in the "Bar Lock" wired glass skylight construction free of charge (f.o.b. factory) for a period of 5 years.



95 Webster Avenue, LONG ISLAND CITY, N. Y.

SUPERIOR AUTOMATIC GRAVITY VENTILATOR.

For Superior Roof Leader Connections and Expansion Roof Fittings for Vent Stacks, see pages C2336-2337.

A combined ventilator and skylight. Universally approved for use over theater stages, elevator shafts, stair wells and fire-proof roofs, etc. Efficient, reliable and automatic in action in case of fire.

The operation and automatic action depend on a series of hempen cords, each of which is attached to a sash or ventilator and which are immediately released, either independently or all at once, by the melting of fusible links, such as are in common use on fire doors, sprinkler systems, etc. They will melt and release the ventilators at a temperature of 160° F.—long before the flames reach them.

The ropes connecting with the sash are brought down to the stage and attached to a triangle plate which is connected with one main rope to the stage floor. Chains are also attached to the ropes permitting the manual opening and closing of the sash from the stage floor.

The automatic ventilator is to be mounted on an ordinary curb of concrete or angle iron frame made level with the wood plate set flush with the outside of the curb. The curb should be not less than 2 ft. 6 in. high from the finished roof in order that snow drifts and other encumbrances will not prevent outward gravitation. The roof of the ventilator skylight is to be of first class hip ridge construction with heavy bars and condensation gutters, glazed with a thin glass in accordance with the New York Building Code and made perfectly watertight. A No. 12 Galvanized 1-in. Underwriters wire mesh is placed underneath this roof to gather in the glass which invariably breaks from excessive heat in case of fire.

We manufacture these ventilators to any specified dimensions using standard gauges of galvanized iron or copper, and will deliver them, ready to assemble, to any part of the United States, Canada and Europe. We will supervise their installation and guarantee that they will meet with the approval of local fire marshals, inspection bureaus, fire insurance underwriters, etc.

The only gravity stage ventilator recognized by all municipal authorities throughout the United States.

Superior standard automatic ventilators are constructed in a manner approved by the National Board of Fire Underwriters, and in accordance with "An Ordinance Regulating the Construction and Equipment of Theater Buildings, and Auditoriums as approved by the National Fire Protection Association and the Board of Standards of the City of New York."



AUGUST KUHNLA, INC.

Manufacturers of Skylights

10 to 20 Lorimer Street

BROOKLYN, N. Y.

Products

"KUPE" AUTOMATIC STAGE VENTILATORS; "KUPE" AUTOMATIC VENTILATING SKYLIGHTS.

Also "KuPe" Better Standard Non-automatic Skylights.

When Specifying

Architects in specifying should mention skylight number to avoid misunderstanding in type desired.



Patents

HE
MARK

"KuPe" Automatic Skylights and Ventilators are protected under various U.S. Letters Patents and the trade-mark "KuPe" is registered. Any infringement of patent or trademark rights, either in whole or in part will be prosecuted.

Catalogue

Supplementary descriptive sheet for complete list of Automatic and Non-automatic skylights mailed on request.

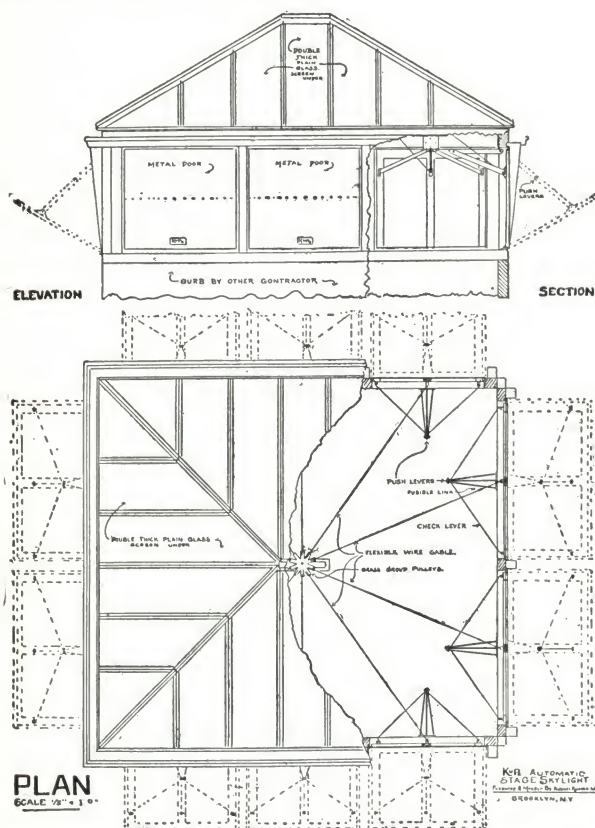
"KuPe" Automatic Stage Ventilator No. 67

A combined ventilator and weatherproof skylight. It consists of a metal frame with hipped glass roof, and sides provided with bottom hinged metal shutters. Flexible cable equipped with fusible links passes over pulleys and connects the top of each shutter to a main rope which extends down to the stage floor. This main rope is also provided with fusible links. Under ordinary conditions the shutters are hand operated, but in times of emergency the shutters may be quickly opened by cutting the rope; in case of fire the operation of the shutters is effected either individually or simultaneously by the melting of said fusible links.

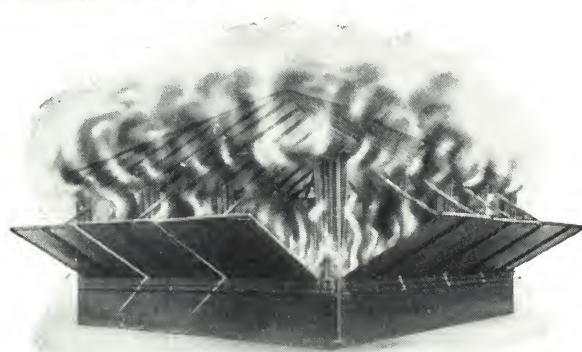
Connecting the top rail of the shutters with the head jamb is a jackknife bracket which acts as a gravity lever in thrusting the shutters outward, overcoming any possible obstruction of ice, snow, or other encumbrances. This bracket also prevents the shutters from opening beyond a certain point, and holds same rigid against wind when open.

Gutters under the roof supports conduct condensation to the exterior.

This is a scientifically constructed, efficient, self-opening ventilator, proof against obstruction by ice or snow, and positive in action under all conditions.



Details "KuPe" Automatic Stage Ventilator No. 67
(Patented)



"KuPe" Standard Automatic Stage Ventilator No. 67
(Patented)

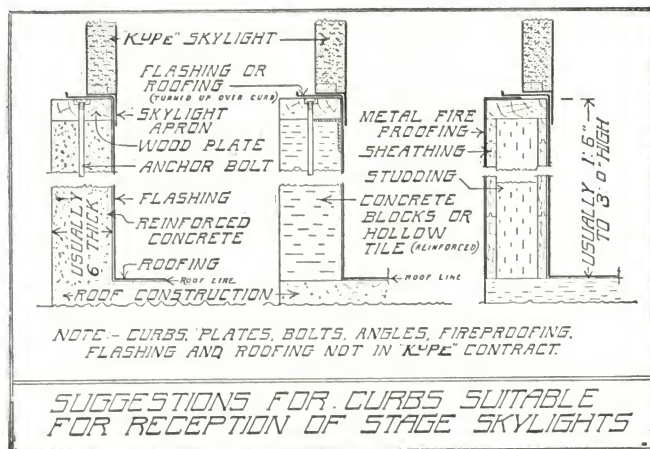
Construction and Installation—We manufacture and install these ventilators to any dimension, complete, glazed with sheet glass and equipped with woven wire screen under the glass. We use standard gauges of galvanized iron (or copper) and the shutter hinge plates and pins are of brass.

Indorsement—Approved by the Board of Fire Underwriters, city officials, architects and owners.

Other Types—In addition to the above noted "Standard" design ventilators, we also control patent rights for the sole manufacture of various other stage skylights, including those equipped with exterior or interior bracket and weight control door as well as those embracing the falling hood arrangement.

Installations—Prominent theaters, high schools, parochial schools, public auditoriums, masonic temples, etc., throughout the country, are now equipped with the "KuPe" Stage Ventilator; list of these installations will be gladly furnished on application. Limited space here prevents itemized mention.

Note: Stages having no gridiron will require a beam across center of roof opening to act as an anchorage for tackle-blocks. (This anchorage not in "KuPe" contract.)



"KuPe" Simplex Automatic Stage Ventilator No. 87

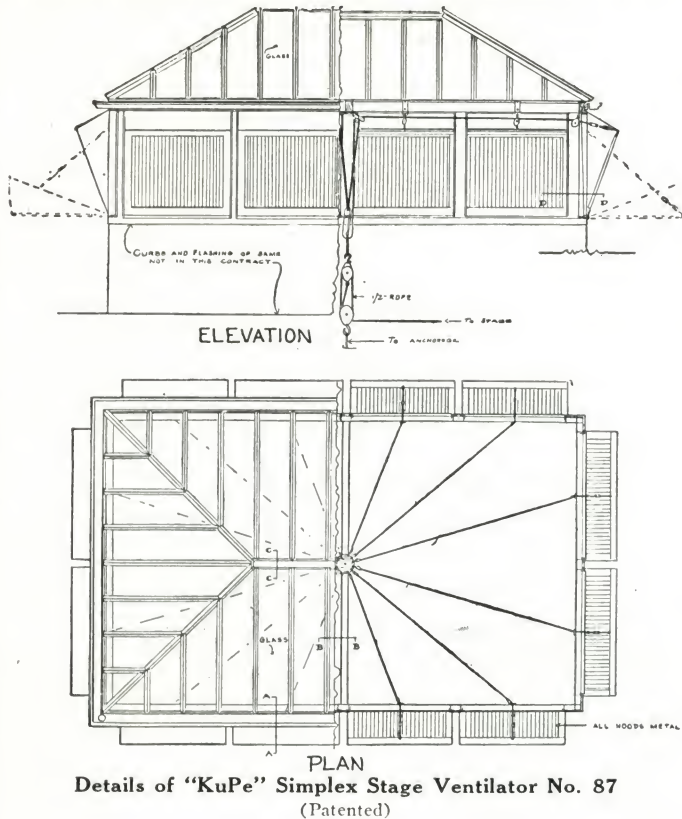
This is another type of ventilator meeting with popular favor among architects, owners and the trade in general, owing to the extreme simplicity of operation.

This ventilator, like all others of the "KuPe" manufacture, is of pleasing design and exceptionally strong construction. The sides and ends being of heavy gauge galvanized metal, while the hipped top is formed of special galvanized bars, hips and ridge glazed with $\frac{1}{2}$ -in. sheet glass and equipped with wire screen under same, according to standard requirements of New York and various other cities.

Inside gutters are, of course, provided for condensation drainage, which is allowed to pass from the interior to the exterior by way of weep holes at eaves.

The outside gutter is of liberal size, substantially made, well braced, and is provided with suitable leaders to carry water downward to roof level.

Parts, as already noted, are of galvanized metal. When copper is desired, or metal top is to be substituted



Details of "KuPe" Simplex Stage Ventilator No. 87
(Patented)

for glass (not generally recommended), special mention should be made to avoid misquotation.

As shown in illustration, the operation of "KuPe" Simplex No. 87 is entirely on the gravity principle. The manual release of main rope or the melting of fuse links causes the cover hoods to fall downward away from the various openings leaving the entire unobstructed area clear for immediate escape of smoke and fumes, a feature only possible in "KuPe" construction.

All equipment is of the best quality. The flexible cables, connecting hoods with main rope, are supplied with special locking non-corroding turnbuckles for fine individual adjustment; pulleys are of galvanized iron and hinges are furnished with brass pins.

Separate standard fuses are inserted in each cable while special fuse release makes connection at main rope. The main rope, in turn, is equipped with suitable pulley blocks for easy manipulation and extends down to tie cleat at stage floor.

"KuPe" Automatic Quick Acting Ventilating Skylight No. 66

A combined ventilator and skylight that operates instantaneously. It consists of a rectangular metal frame having a hipped roof of glass. Designed especially for immediate vent action in time of emergency.

The sides of the structure consist of vertical sash openings, fitted with side pivoted sash.

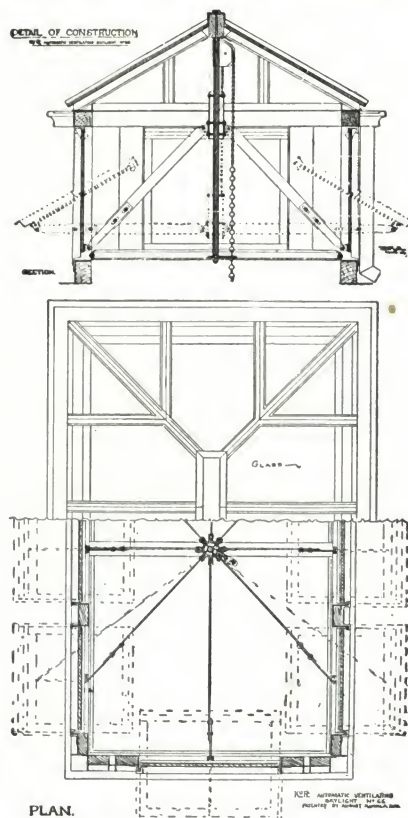
Struts from the bottom rail of these sash connect with a runner which is on a fixed vertical rod.

A chain from this runner extends to a point suitable for manual operation, where it passes through a key slot arrangement permitting the sash to be opened simultaneously and locked in any desired position.

Sash may also be opened thermally if so desired, by means of a fusible link.

The weight of the operating device effects a positive opening action on sash when the chain is released. When closed, head of the sash swings under the rain shed, flanges on the side stiles fit into grooves on the panels, the apron on the bottom rail overlaps the sill, making the sash stormproof.

Gutters under the roof support conduct condensation to exterior.



Details "KuPe" Automatic Ventilating Skylight No. 66 (Patented)

Construction and Installation—We manufacture these skylights of standard gauge galvanized iron or copper and are prepared to install them complete with glass, gutters, leaders and operating device in the following sizes:

(Outside curb measurement, ft.)

2x3	5x5	6x10	8x12	10x12
3x4	5x7	7x9	8x16	10x14
4x4	6x6	8x8	8x20	10x16
4x6	6x8	8x10	10x10	10x20

Other sizes if required.

Indorsement—"KuPe" Automatic Ventilating Skylight No. 66 is approved by architects, engineers, contractors and owners after rigid tests and inspection.

Recent Installations—Include dairies, baking plants, cabinet mills, ice cream and candy factories, markets, storage houses, automobile works, garages, schools, chemical plants, furniture warehouses, office buildings, acetylene works, laundry buildings, hospitals, doctors' and dentists' offices, residences, emporiums, hotels, clubhouses, department stores, police stations, etc.

Itemized lists of these would be impossible in the space allotted here.

ÆOLUS DICKINSON

INDUSTRIAL DIVISION PAUL DICKINSON, INCORPORATED

Ventilators

TELEPHONE

LAFAYETTE 1862, 1863

3324-3354 South Artesian Avenue
CHICAGO, ILL.

Products

DICKINSON CAST IRON FLOOR VENTS, MUSHROOM TYPE; "ÆOLUS" ROOF VENTILATORS.

For Dickinson Cast Iron Exhaust Heads and Dickinson Cast Iron Scuppers, see page A597.

Dickinson Cast Iron Floor Vents (Mushroom)

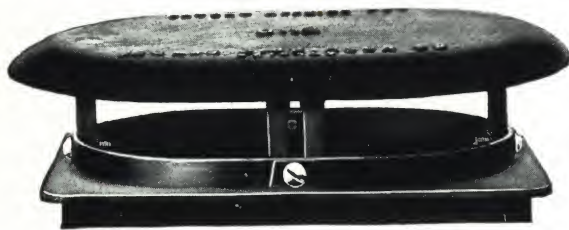
Oval Type—

Standard size—8x12 in.

Cap size—11¾x15¾ in.

Squared floor size—6, 8 and 10 in.

Maximum height—at full capacity 3½ in. from floor.



Dickinson Mushroom Floor Vent

Round Type—

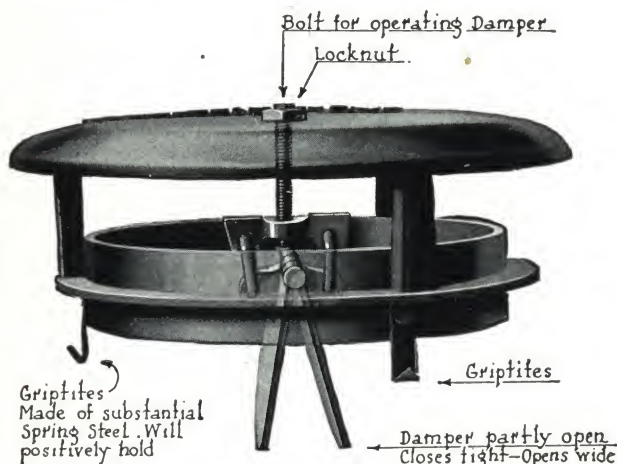
Standard sizes—6, 8, 9 and 10 in.

The floor section may be had with or without means for bolting to the floor.

The caps are easily and fully adjustable, and the only tool needed is a screwdriver, the nuts being held firmly in slots.

E-Z Damper Griptite Mushrooms

Standard sizes—6, 8, 9 and 10 in. round and also 8x12 in. square floor.



The advantages of this method of controlling air are evident, as the space between the damper and cap acts as an expansion chamber, reducing the velocity of air before leaving the mushroom instead of at the time of leaving.

Some recent installations:

Palace Theater, Gary, Ind.	Harding Theater, Chicago, Ill.
Zaring Theater, Indianapolis, Ind.	Midwest Theater, Chicago, Ill.
Colony Theater, Chicago, Ill.	Drake Theater, Chicago, Ill.
Fisher's Theater, Fond du Lac, Wis.	Milo Theater, Chicago, Ill.

Æolus Roof Ventilators

Manufacturers of ventilators since 1888. During this time we have supplied vents to many industries, under all conditions.

The knowledge thus attained should prove of unusual value in working out your ventilator requirements and is placed at your disposal to be utilized to your best advantage.

Materials employed in construction to suit any requirements.



"Æolus" Ventilator

Galvanized steel, armco iron, toncan metal, lead clad, zinc, copper, aluminum, monel metal, and light gray cast iron which is recommended for buildings where destructive gases or chemical action is prevalent. Railroads are the largest users of this type.

Recent installations include:

American Can Co.	Jos. T. Ryerson & Son
Armour & Co.	Universal Portland Cement Co.
Commonwealth Edison Co.	Western Electric Co.
Corn Products Co.	Atchison, Topeka & Santa Fe Ry.
Crane Co.	Illinois Central R. R.
Grasselli Chemical Co.	Oxweld Acetylene Co.
International Harvester Co.	



Chicago Foundry

Information

Further information, prices, etc., gladly supplied on request.

AKRAT VENTILATORS, INC.

Ventilating Engineers

1180 Builders Building

CHICAGO, ILL.

"Aktrat" (Accurate) Siphonage Roof Ventilator

All that a roof ventilator should be. Simple in design—accurate in detail—efficient in exhaust capacity. Their neat appearance insures a graceful skyline wherever they are installed.

Design

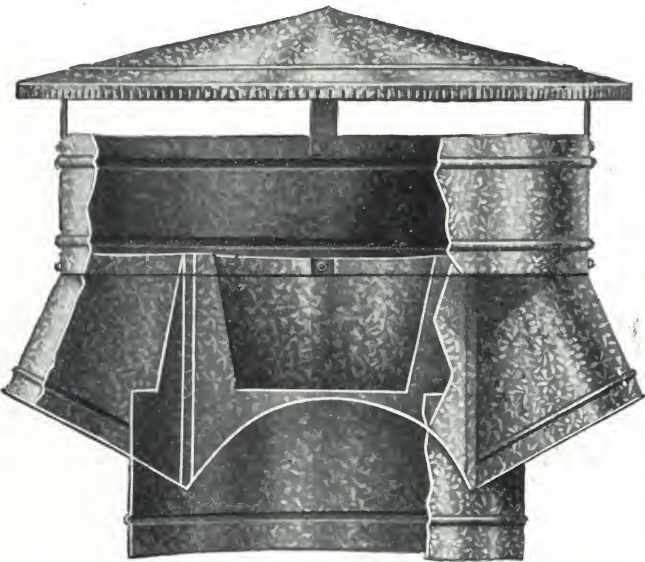
Designed after years of observation and study by our engineers, Aktrat Ventilators embrace all of the above qualities. The design is scientifically correct, as the slightest air currents coming in contact with any portion of the ventilator creates a siphonage action which greatly increases the volume of the exhaust. A glance at the interior of the ventilator reveals a large chamber, the area of which is much greater than that of the eduction pipe (see phantom view). This is of extreme importance, inasmuch as the large openings permit exhausted air to escape freely, while friction has been reduced to a minimum. Each of these large openings is an exhaust outlet which is constantly in operation.

Uses

Akrat Ventilators should be installed to exhaust foul air, smoke, dust, fumes, gases, steam, etc., from all types of buildings: also to create a constant circulation of air by gravity ventilation. When the installation has been completed, they require no further attention and their powerful exhaust capacity can be utilized twenty-four hours of each day.

Features

The table of comparative dimensions indicates that the over-all height is very low in comparison to the diameter of the various sizes. This feature was developed by our engineers at no sacrifice in exhaust capacity. Another feature is that the ventilators do not detract from the appearance of the buildings on which they are used. To facilitate the erection of the larger sizes, Aktrat Siphonage Ventilators are assembled in two sections. These two sections are fastened together with brass bolts, nuts and washers. The upper section, which consists of the top and weather-band, is securely riveted together with heavy bars of material. The lower section consists of the eduction pipe with siphons riveted solidly thereon. The top section can be removed easily by taking out the brass bolts. This is of importance when it becomes necessary to paint the ventilators after they have been installed. All joints of these ventilators are securely riveted—absolutely no solder being used in their assembly.



Patent applied for
Phantom View of Aktrat Ventilator

Material

Fabricated from prime galvanized sheets; also of Keystone copper-steel, Armco ingot iron, Toncan metal, cold rolled copper, zinc, aluminum, monel metal, or any other sheet metal. Only the best materials, assembled by skilled mechanics, are used in their construction. Our standard gauges are adequate for the various sizes. Braces and reinforcements are of galvanized material. When ventilators are made of special metal, the braces will be made of the same material from which the ventilator is fabricated.

Engineering Service

To obtain the greatest exhaust possible, many important elements, such as prevailing conditions to be remedied, temperature differences both inside and outside, humidity, location of ventilators, type of bases used, height above roof parapets or surrounding obstructions, etc., must be considered before specifying any particular size or quantity of ventilators.

Canneries, dye works, paper mills, etc., require special aprons, hoods or fixtures in conjunction with gravity ventilators.

We are prepared to furnish such equipment and our Engineering Department will gladly co-operate with architects and engineers who desire to obtain data and information regarding such installations.

Capacities

The following table shows the proportionate dimensions and exhaust capacities. The figures quoted are conservative and not a maximum that will be exhausted. They are compiled from tests that were conducted at the Armour Institute of Technology, Chicago, Ill.



DIMENSIONS AND EXHAUST CAPACITIES

Dimensions, in.			Area, sq. in.	Exhaust, cu. ft. per hr.
A	B	C		
6	9 3/4	9	28	5328
8	13	12	50	9515
10	16 1/4	15	79	15034
12	19 1/2	18	113	21504
14	22 3/4	21	154	29306
16	26	24	201	38250
18	29 1/4	27	254	48336
20	32 1/2	30	314	59754
22	35 3/4	33	380	72314
24	39	36	452	86016
30	48 3/4	45	707	134542
36	58 1/2	54	1018	193725
42	68 1/2	63	1385	263565
48	78	72	1810	344443
54	87 3/4	81	2290	435787
60	97 1/2	90	2827	537978
66	107 1/4	99	3421	651016
72	117	108	4072	774902
84	136 1/2	126	5542	1054643

Note: These figures show capacities based only on the aspiration effect of the wind, no corrections having been made for increased flow induced by temperature differences.

ALLEN AIR-TURBINE VENTILATOR CO.

Manufacturers of Allen Multi-vane Turbine Ventilators

GENERAL OFFICES AND FACTORY

Fourteenth and Lafayette Streets, DETROIT, MICH.

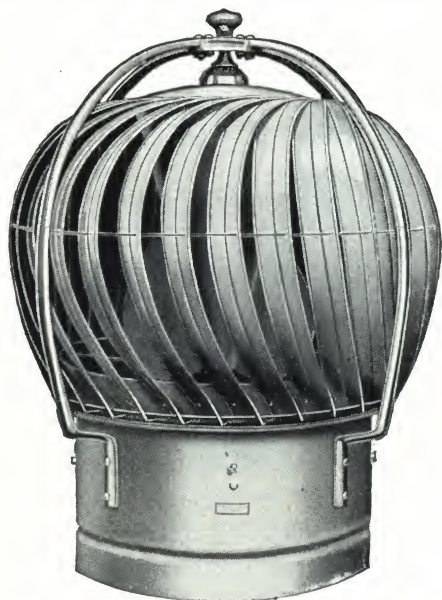
SALES ENGINEERS IN PRINCIPAL CITIES

The New Allen Multi-vane Turbine Ventilator— Patented and Patents Pending

A new sturdy, durable and automatic exhaustor embodying the turbine principle in its construction, and designed so that it operates not only continuously, efficiently and silently, but to fit into the architectural lines

of any building. It has the merits of the power driven systems without the heavy initial cost and continuous operating expense. The perfectly balanced multi-vane turbine, actuated by the air not only pulls up and ejects smoke, fumes, foul air, gas, dust and moisture, but creates an air circulation.

Alemite Lubricating System—There is also embodied in its construction a complete Alemite pressure lubricating and relubricating system.



The New Allen Multi-vane Turbine Ventilator

of any building. It has the merits of the power driven systems without the heavy initial cost and continuous operating expense. The perfectly balanced multi-vane turbine, actuated by the air not only pulls up and ejects smoke, fumes, foul air, gas, dust and moisture, but creates an air circulation.

Whenever a definite number of air changes are required in any type of building the Allen Ventilator can be used. Their constant and uniform displacement enables engineers to predetermine the air condition of any building by applying the guaranteed table of displacements as published below.

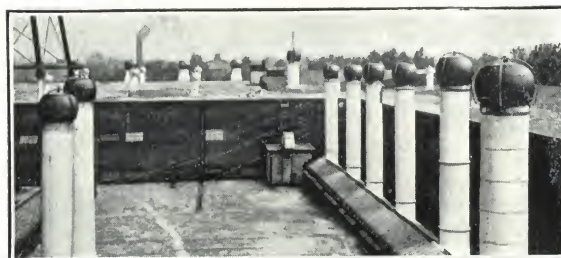
This ventilator is absolutely leakproof; its operation is not hampered by ice, sleet or rain. Constant operation under all conditions insures positive and uniform ventilation. The powerful upward suction force of the rotary multi-vane turbine makes down-drafts a mechanical impossibility. They are constantly efficient and not affected by cross air currents as in the case of types equipped with placement wings.

Lower First Cost with No Upkeep

The first cost of the Allen Multi-vane Turbine Ventilators is not only less than the cost of power-operated exhaust equipment, but all maintenance and operating expense is eliminated. Once installed it requires no attention, care or adjusting.

Construction

This ventilator is constructed of standard gauge, rust resisting galvanized metal, protected with a special



Two Typical Installations

Sizes—Made in eleven different sizes, 8, 10, 12, 15, 18, 20, 24, 30, 36, 42 and 48 in. These dimensions refer to the diameter of bases of ventilators. This range of sizes makes them adaptable to care for any ventilating problem.

Great Displacement Capacities

The displacement capacities of the respective sizes in which Allen Ventilators are shown below are con-

ALLEN MULTI-VANE TURBINE VENTILATOR DISPLACEMENTS

Diam. of throat, in.	Air displacement, cu. ft. per hr.		Diam. of throat, in.	Air displacement, cu. ft. per hr.	
	Wind velocity, 4 miles per hr.	Wind velocity, 8 miles per hr.		Wind velocity 4 miles per hr.	Wind velocity, 8 miles per hr.
8	17,300	21,600	24	149,000	185,000
10	26,500	32,500	30	225,000	272,000
12	38,600	46,200	36	281,000	330,000
15	54,000	69,000	42	324,000	414,000
18	85,200	102,100	48	360,000	473,000
20	105,100	125,600			

Continued on next page

servative, and fully guaranteed. These capacities have been substantiated by numerous actual installation tests.

Industrial Ventilation

All industries present unusually difficult problems of ventilation. Allen Ventilators, wherever installed in every line of industry, have proven to be not only the most economical in first cost and maintenance, but efficient in operation. "Ask the user—he knows."

Uses

The Allen Multi-vane Turbine Ventilator is particularly adapted and proven to be most satisfactory in actual installation in displacing vapor (steam), smoke, fumes, poisonous gases, dust, etc., from factories, mills, laundries and garages, and for displacing foul air, mois-

RECOMMENDED AIR CHANGES

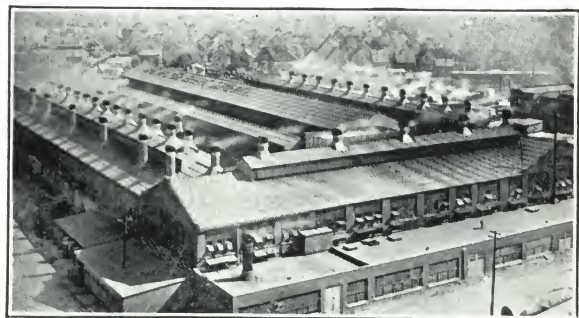
Building	Exhaust	
	Per occupant cu. ft. per min.	Minimum num- ber of air changes
Assembly and convention halls.....	30	8
Boiler rooms.....		10
Engine rooms.....		8 to 10
Factories.....	20 to 30	4
Foundries.....		4
Garages.....		12
Halls and assemblies.....	30	8
Mill buildings.....	20 to 30	4
Offices.....	20 to 30	6
Laundries.....		10
Churches.....	20	8
Schools.....	30	8
Theaters.....	30	8

Typical Installation

Bases should be constructed of a heavy gauge of galvanized iron, which should be square to round and long tapered as indicated above. This type of base construction not only lends itself well to adaptation on any type of roof but has decided advantages; it increases the area or broadens the scope of exhaust and lessens friction, thereby increasing the displacement. Bases of this type further make for rigidity and long life.

Guarantee

The displacement capacities of Allen Multi-vane Turbine Ventilators, as published and tabulated here, are guaranteed if installed in accordance with the instruction tag attached to each ventilator.



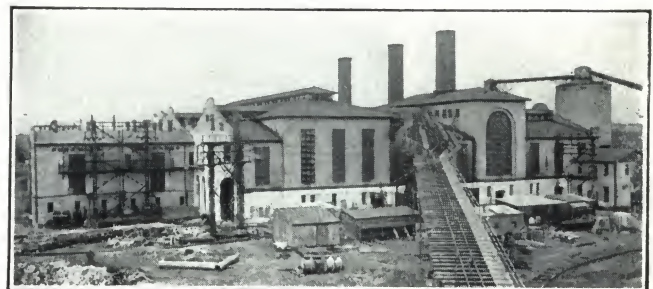
This Plant Completely Equipped with Allen Ventilators

Engineering Service

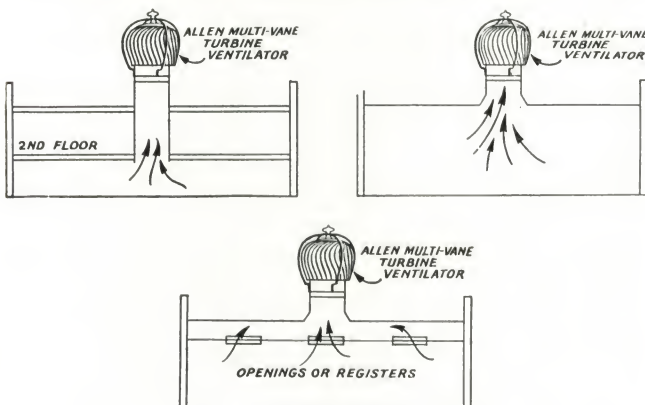
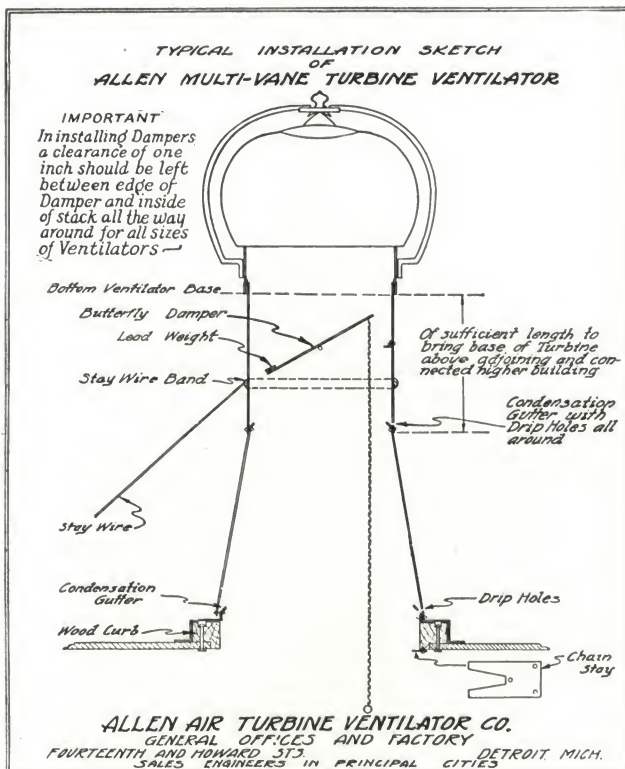
The ALLEN AIR-TURBINE VENTILATOR Co. maintains an Engineering Department, the service of which is extended to council without cost or obligation.

Our engineering staff have had a most diversified experience in handling all kinds of ventilating problems in connection with various types of buildings and the broadest experience in eliminating not only smoke, excessive heat units, vapor, etc., but heavier-than-air bodies, such as gases, fumes, dust and foul air.

Our sales engineers in the principal cities supplement this service and make practical and definite recommendations for the adaptability of Allen Exhausters.



Cos Cob Power House of New York, New Haven & Hartford R. R.



Types of Installation

ture, odors and dust from barns, stables, etc. It is preeminently designed and adapted for removing excessive heat units and vitiated air from factories, theatres, schools, etc.

AMERICAN-LARSON VENTILATING COMPANY

MAIN OFFICE

Keystone Bank Building

PITTSBURGH, PA.

Product

AMERICAN-LARSON SUCTION VENTILATORS (Patented 1927).

The Principles of Static Ventilation

Two distinct sets of forces produce natural air currents in ventilators. These forces are stack action, and wind action.

Stack action occurs when air in a stack is heated above the temperature of the surrounding atmosphere. This action is independent of wind velocity, and ceases when the temperatures inside and outside of the stack are equalized.

Wind action is not so simple, and its effects follow different laws at different wind velocities.

In the flow of fluids in pipes, ducts, etc., it is found that there are two critical velocities. Below the lower critical velocity, the fluid moves in parallel lines, and pressure drop is due to viscosity only. Above the upper critical velocity, the fluid moves in a turbulent manner, and pressure drop grows as the square of the velocity. Between the upper and the lower critical velocities, the motion of the fluid is unstable, and vacillates between one or the other states of motion, depending upon small irregularities and accidental happenings.

Requirements for Ventilating Action

Unless a ventilator can produce good results at extremely low wind velocities it is actually worse than useless, as reverse currents are likely to occur, carrying accumulations of foul air into the spaces for which adequate ventilation was intended.

It is extremely easy to build a ventilator which will exert a suction or ventilating effect at high wind velocities, but it is quite difficult to produce a ventilator which will exert a suction of reasonable strength with very low wind velocities.

The American-Larson Ventilator possesses features which make it possible to produce good ventilating effects even at wind velocities which are much too low to have any effect whatsoever in the majority of ventilators now on the market. These facts may readily be confirmed by reference to extremely careful tests conducted by Professor Trink of the Carnegie Institute of Technology, Pittsburgh, Pa. It was by these tests, in fact, that true effects of wind action in this class of ventilator were first studied and properly analysed.

In many cases, it is essential that the ventilator should produce a positive pressure difference by a very slight wind action, entirely independently of the temperature difference. Such cases are those in which the ventilator is connected to basements or lower floors. Ventilation can not start of itself, because the air in the duct to the ventilator is either at the same temperature or is cooler than the air in the upper parts of the

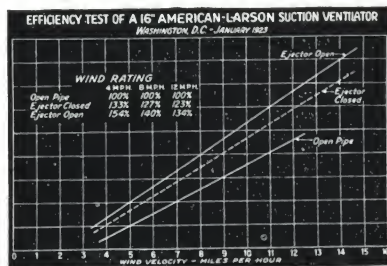


building, and no force due to temperature difference is available for discharging the air through the ventilator; reverse flow might even occur. If, however, an ever so slight but yet positive draft is available from wind action, sufficient to start air moving through the ventilator and duct, the latter becomes filled with warm air, which by its own buoyancy produces a much greater difference than was at first available.

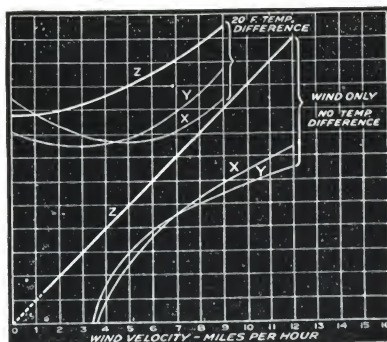
The Practical Design of Ventilators

The practical designer of ventilators endeavors to combine the greatest possible draft, with the least possible resistance to air flow. He must accomplish this at extremely low wind velocities. The action at low wind velocities must be quite independent of temperature differences. Under no conditions must the design be subject to interference by back drafts.

Unless proper provisions are incorporated in the design these features are very hard to combine. In the American-Larson Ventilator however, the patented ejector tube effects air movement in direct ratio to wind velocities and temperature differences. When there is no temperature difference many ventilators do not function at all unless wind velocity is greater than 3½ miles per hour; furthermore under temperature differences as great as 20° F., the efficiency of such ventilators actually decreases in gentle breeze up to 4 or 5 miles per hour velocity.

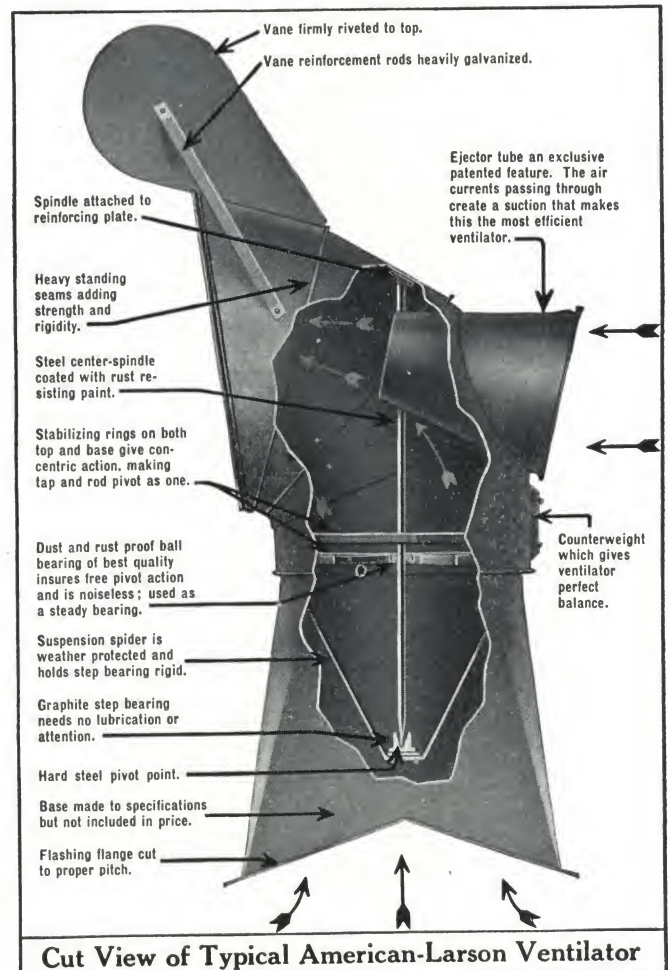


Wind Rating Curves of American-Larson Ventilator



Graphic Record of Comparative Tests by Professor Trink

X = 18-in. stationary siphon ventilator
Y = 18-in. rotary siphon ventilator
Z = 18-in. American-Larson suction ventilator



Cut View of Typical American-Larson Ventilator

In the American-Larson the kinetic energy of the wind is used to the maximum possible extent, by creating suction, due to the viscous drag both inside and outside the cowl.

On account of the easy or gradual turn of the air current and the unobstructed discharge area, the discharge for a given pressure drop in the American-Larson is unusually high—about 75% of that through a rounded opening of the same area.

In the stationary type of ventilator the great number of turns of direction of the air causes excessive resistance or pressure drop. To avoid this the proportions of the passage have in some designs been made excessively large in order to reduce air velocities, but these large passages mean that the ventilator is not properly shielded and that down-draft is an ever present source of trouble in high winds, so one or the other feature (freedom from downdraft or low pressure drop) which ever is considered of least importance must be sacrificed. This condition is particularly unsatisfactory when snow is falling with relative humidities around 96 to 98%.

Static Draft Produced by the American-Larson Ventilator

Static draft can be computed from the equation given below, where C = wind velocity in miles per hour.

$C^2 \div 4800$ = Static draft, in inches of water.

This draft produces an upward velocity in the throat of the ventilator, when the flow of air to and through it is unrestricted, of a little less than 70% of the wind velocity.

With ejector tube closed, the static draft is just one-half as great as with the tube open.

The draft given above is the pressure difference produced by the ventilator alone, independent of the building to which it is attached. In addition, a slight pressure is usually produced in the building by the action of the wind on the openings on the windward side. The total air moving force is then the sum of this pressure difference plus the draft produced by the ventilator. The amount of the pressure obviously varies with the proportion and location of the openings, so that no definite values can be given. It is usually of the same order of magnitude as the ventilator draft given by the formula.

It should be noted that the American-Larson Ventilator is absolutely free from back or down-draft at any wind velocity.

Solution of a Typical Ventilation Problem

A given building is 44x110x28 ft. average height and will be used to house equipment and appliances which will throw off approximately 416 lb. of steam per hour.

The ventilator capacity to be figured on the following conditions: 10 changes of air per hour; temperature difference, 20° F.; wind velocity, 5 miles per hour; ventilators 36 ft. above the floor level. The heating system will be adequate.

In summer the proper ventilating requirements will be a question of providing sufficiently rapid flow of air into the building to (a) absorb a large part of the water vapor, and (b) produce sufficient upward velocity of air flow to carry upward the minute globules of water which compose visible steam. The temperature difference between air inside and outside the building in summer is usually small, but the building is wide open. Under these conditions the problem is simply that of providing sufficient ventilator capacity.

In winter, while the same requirements are to be met as in (a) and (b) above, the temperature difference is great and the wind velocity usually high; since the building must be kept at a reasonable temperature, the air inflow will naturally be restricted by closing doors and windows. It is evident that the ventilation conditions in winter do not depend entirely upon the number or size of ventilators installed, but on the capacity of the heating system and the amount of heat given off by the equipment and appliances in the building.

Another item which must be considered is that of condensation and dripping of water from the roof. This is rather a question of roof construction than one of ventilation. If the roof is unprotected sheet iron, and if the building is kept at a rather high temperature in winter, with very restricted air inflow, condensation on the under surface of the roof will inevitably occur. On the other hand, with a roof laid on wood or protected with insulation, if a reasonably large air inflow is permitted, condensation will not occur.

Considering all of these features it would appear proper to install the ventilator capacity required under summer conditions.

Calculation of Capacity—The volume of air moved per hour by a ventilator or set of ventilators can be derived from the following American-Larson ventilator capacity formula,

$$Q = A \left[\frac{36\sqrt{H}(t_1 - t_0)}{6 + v} + 20 \times v \right]$$

where Q = cu. ft. of air exhausted per hour; A = throat area of ventilators in sq. in.; H = center of ventilator outlet to floor; v = (wind velocity) miles per hour; t_1 = inside, and to outside average temperatures.

In solving; $Q = 10 (44 \times 110 \times 28) = 1,357,000$ cu. ft. per hour ventilating capacity, whence, from the formula, $A = 7200$ sq. in.

Seven 36-in. American-Larson Ventilators have an area of 7150 sq. in. Six 40-in. American-Larson Ventilators have an area of 7540 sq. in. Four 48-in. American-Larson Ventilators have an area of 7220 sq. in.

Actually, the results given by the formula are very conservative and the last term of the equation should be multiplied by the factor of 140% which would, with any of the three combinations figured on, give a capacity of 12 changes per hour instead of 10. The lower figure has been used, however, to allow a greater "factor of safety." And since the average wind velocity for the vicinity in which the building is located is shown by the U. S. Weather Bureau reports to be about 12 miles per hour, the ventilating capacity at most times would be considerably greater. It is best, however, to provide for the least favorable conditions.

Moisture Absorption—(A) Moisture content of air 70° F., 75% relative humidity = .00086 lb. cu. ft.

If raised to 90° F. and saturated, moisture content = .00213.

Moisture absorbed per cu. ft. = .00213 - .00086 = .00127.

Moisture absorbed by 10 changes of air per hour = .00127 \times 1,357,000 = 1720 lb. per hour.

Steam given off by the equipment and appliances = 416 lb. per hour, or only 24% of what could be absorbed.

(B) If air is not heated at all, but absorbs all of the steam given off by the equipment and appliances, $416 \div .00030$ lb. per cu. ft. = increase in moisture.

1,357,000

This corresponds to a relative humidity of 100%—that is to say, the air at 70° F. could absorb all of the steam without becoming over saturated.

Recommendations—The combined throat area of all ventilators should be approximately 7000 sq. in. This is equivalent to seven 36-in. ventilators, or six 40-in., or four 48-in. of the American-Larson type.

The location of the ventilators or the best number to use, will depend largely upon the number of bays of the building, since it is generally preferable, although not essential, to locate each ventilator at the center of a bay (i.e., midway between the roof trusses).

Suggested Form of Specification

(1) All ventilators shall be American-Larson Suction Ventilators, as manufactured by the AMERICAN-LARSON VENTILATING COMPANY, of Pittsburgh, Pa., and shall [shall not] be equipped with dampers.

(2) The ventilators shall be made of (see Note 1) and shall be of the following gauges:

Below 18-in. diam., No. 24 gauge; 20 to 24-in. diam., No. 22 gauge; 30 to 48-in. diam., No. 20 gauge; 54-in. diam., No. 18 gauge.

(3) Where so indicated, the ventilators shall be mounted on extension piping of sufficient height to raise ventilators above surrounding obstruction.

(4) The ventilators shall be erected plumb and in a substantial manner. Where extension pipes are used they shall be anchored to four points with heavy gauge guy wires.

(5) Ventilators for _____ shall be equipped with fusible links to close dampers automatically in case of fire.

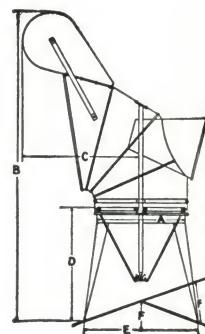
Note 1:

Material of ventilator	Uses of ventilator
Galvanized iron.....	1. All purposes for which no acid or corrosive fumes pass; standard practice.
Copper.....	2. All purposes for which long life is desired, provided that no strong acid or alkaline fumes pass.
Choice of metal.....	3. For ventilating buildings or rooms from which acid or other corrosive fumes rise.
Monel metal.....	4. Same as No. 3; has longer life, but is more expensive.
Zinc.....	5. Similar to copper, but a little cheaper.

DIMENSIONS, GAUGES, WEIGHTS, PRICES AND CAPACITIES

Size (throat diam.), A in.	B in.	C in.	D in.	E in.	Iron gauge No.	List price, damper	List price, ventilators only	Net weight, lb.	Crated weight, lb.	Conservative average discharge 5 miles velocity, cu. ft. per hour
8	27	10	10	10	24	\$1.50	\$20.00	12	26	14,438
10	34	13	12	12	24	2.15	20.00	18	35	22,273
12	41	16	13	13	24	2.90	30.00	26	46	31,000
14	48	18	17	17	24	3.30	35.00	32	57	43,725
16	55	21	20	20	24	3.80	40.00	39	70	57,750
18	62	24	21	21	24	4.30	45.00	49	85	73,013
20	69	26	25	25	22	4.80	50.00	68	115	89,925
24	83	32	30	30	22	5.80	60.00	92	145	129,525
30	104	40	38	38	20	7.15	75.00	146	206	202,125
36	125	48	46	46	20	9.30	110.00	225	325	291,113
40	139	53	51	51	20	11.50	140.00	282	412	359,700
48	167	64	61	61	20	17.00	170.00	390	560	515,625
54	187	72	63	63	18	20.00	220.00	620	820	655,875
60	208	80	76	76	18	25.00	300.00	790	1025	808,500
66	229	88	84	84	18	35.00	375.00	930	1215	977,625

Prices subject to change without notice. Discounts furnished on request.



AREX COMPANY

ESTABLISHED 1906

Industrial Ventilating Engineers

TELEPHONE
STATE 27721577 Conway Building
CHICAGO, ILL.FACTORY AND WAREHOUSE
GARY, IND.

BRANCH OFFICES IN PRINCIPAL CITIES

EASTERN OFFICE: 132 Nassau Street, NEW YORK, N. Y.—Telephone, Beekman 7980

Products

AREX-AUSTOR (Air Exhauster), the Original Siphonage Roof Ventilator—"The Power Fan's Only Rival."

ECONOMY ROOF VENTILATOR (Plain Type).

UTILITY VENTILATORS.

"ARIN" ADJUSTABLE LOUVERS.

"ARIN" ANTI-DRAFT WINDOW VENTILATORS. (Installed in Sash.)



view on following page) a powerful vacuum is created, drawing out air at a tremendous speed.

Foul air, warm air, fumes, gases, vapors, steam and smoke are quickly and completely removed. Passing wind plays upon the siphons so as to accelerate the outflow of foul air from interior of building, but it permits none of the outside wind to enter the ventilator. Every opening is an outlet.

Arex-Austor

Scientific Design—This ventilator, designed on the original siphonage principle, assures by natural means constant, positive and uniform ventilation.

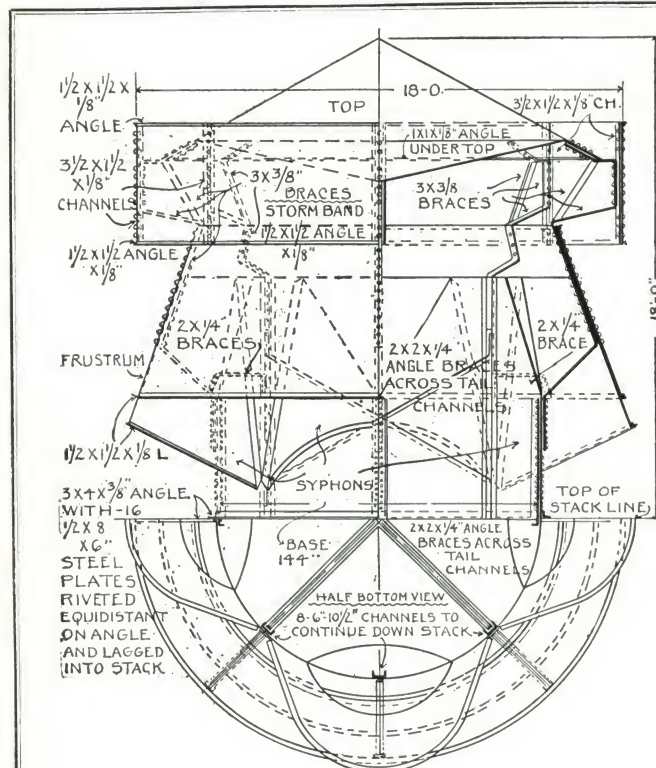
The siphon or vacuo chambers are so placed as to concentrate all wind currents into a steady pulling force; by means of deflections opposite each siphon (see sectional



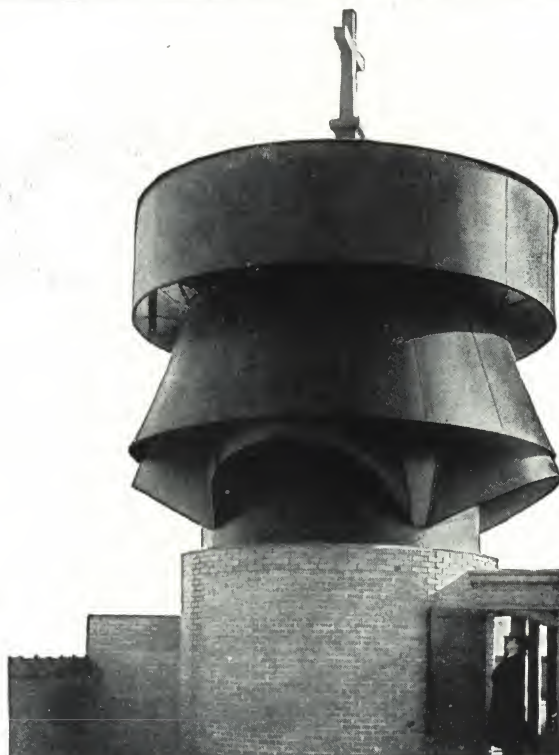
120 Arex-Austors on This Forge Shop

Under ordinary conditions Arex-Austor will remove 300 cu. ft. of foul air per square inch per hour on a 9-mile wind velocity.

Upper part consists of a conical deflector top surrounded by a scientifically adjusted broad storm-guard, making the Arex-Austor absolutely storm-proof.



Working Drawings and Dimensions



Arex-Austor Installed and in Operation on Roof

Details of Installation of World's Largest Ventilator, St. Francis Hospital, Peoria, Ill.

A. J. MORATZ, Architect, Bloomington, Ill.

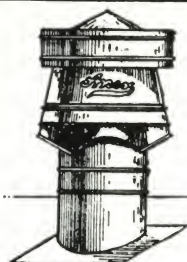
This Arex-Austor alone ventilates this 7-story hospital through a carefully engineered duct system. Capacity more than 125,000,000 cu. ft. of air daily. Base diameter, 12 ft.; spread from siphon to siphon, 18 ft.; height, 18 ft.; weight about six tons



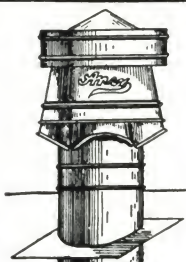
No. 1
Round Base for Flat Roof



No. 2
Round Base for Flat Roof with Extension



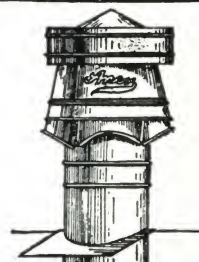
No. 3
Round Base for Slant Roof



No. 4
Round Base for Slant Roof with Extension



No. 5
Round Base for Gable Roof



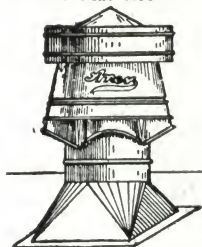
No. 6
Round Base for Gable Roof with Extension

How to Order Arex Ventilators

Simply multiply cubical contents of room by number of air changes required per hour. The exhaust capacity table below will indicate the exact size of Arex-Austor required.



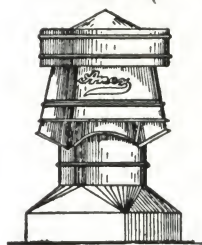
No. 7
Square to Round Base for Flat Roof



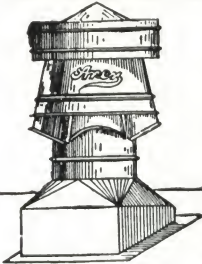
No. 8
Square to Round Base for Slant Roof



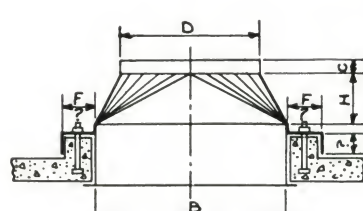
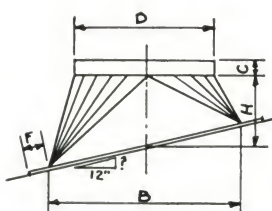
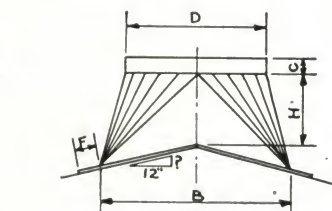
No. 9
Square to Round Base for Gable Roof



No. 10
Square to Round Base with Shoulder for Flat Roof



No. 11
Square to Round Base with Shoulder for Slant Roof



DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) VENTILATORS

Principal dimensions, in.	D	O.W.	O.H.	Exhaust per hour, cu. ft.	Gauge of ventilators		*Ship. wt., lb.
					Galv. iron	Copper, oz.	
12	18	24	37.699	24	16	28	
14	21	28	51.313	24	18	38	
16	24	32	67.021	24	18	54	
18	27	36	84.823	24	18	68	
20	30	40	104.720	22	18	93	
24	36	48	140.796	22	20	130	
30	45	60	235.619	22	20	225	
36	54	72	339.293	20	24	405	
42	63	84	461.813	20	24	475	
48	72	96	603.187	20	28	620	
54	81	108	763.407	20	32	800	
60	90	120	942.477	18-20	36	910	
66	99	132	1,140.397	18	36	1170	
72	108	144	1,357.167	16-18	44	1450	
84	126	168	1,847.256	16	48	2225	

*Weights given are for ventilators only.

Arex-Austor Construction

Arex-Austors are made of Galv. Iron, Ingot or Toncan Metal, Cold-rolled Copper or any other special metal, in any size or gauge. The installations shown on this page are standard; special bases and pipe connections made to order—submit sketch.

Arex-Austors, 24-in. and upwards are provided with brass bolts connecting the frustum to the siphons. This permits installation in two halves and facilitates painting inside and outside at any time after they have been installed.



Sectional View of Arex-Austor

DATA, AREX-AUSTOR (ORIGINAL SIPHONAGE) BASES

Dimensions of bases, in.				Gauge of bases	
B	H	F	C	Galv. iron	Copper oz.
15 x 15	12	4	3	24	16
17 1/2 x 17 1/2	13	4	3	24	18
20 x 20	14	4	3	24	18
22 1/2 x 22 1/2	15	4	3	24	18
25 x 25	16	4	3	22	18
30 x 30	18	4	3	22	20
37 1/2 x 37 1/2	21	4	3	20	20
45 x 45	24	4	3	20	24
52 1/2 x 52 1/2	27	5	4	20	24
60 x 60	30	5	4	18	28
67 1/2 x 67 1/2	33	5	4	18	32
75 x 75	36	5	4	18	36
82 1/2 x 82 1/2	39	6	5	16	36
90 x 90	42	6	5	16	44
105 x 105	48	6	5	16	48

Shipping weight of bases is approximately one-third of that given for ventilators.

Condensation arrestors furnished at nominal cost when requested.

Unequaled facilities for turning out any quantity of ventilators on short notice. Prompt shipments from large stock always on hand.

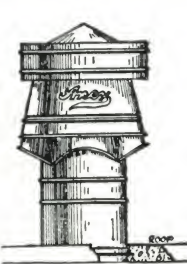
Our engineering department will solve your ventilating problems.

Expert advice without obligation. It will pay you to investigate.

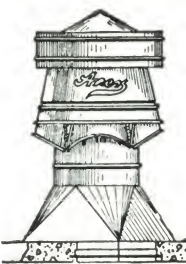
Thousands of installations without a single complaint.



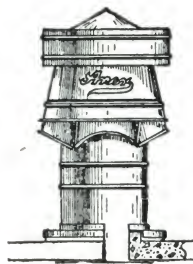
No. 12
Square to Round Base with Shoulder for Gable Roof



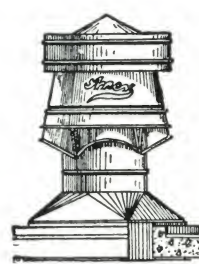
No. 13
Round Base for Flat Concrete Roof with Angle Iron Ring at Bottom



No. 14
Square to Round Base for Flat Concrete Roof with Angle Iron at Bottom



No. 15
Round Base for Flat Concrete Roof with Curb



No. 16
Square to Round Base for Flat Concrete Roof with Curb

Details and Data, Arex-Austor Ventilators and Bases

First Class Construction—Fabricated in one solid unit, no solder used, every joint rigidly riveted. Has no movable parts, no shutters or louvers to break off, no ball bearings to clog, no meaningless fancy trimmings to impede ventilating action, nothing to get out of order.

In short, a ventilator, simple in principle, durable in construction and sure to give year-in and year-out service without attention or repair.

Made of galvanized iron, Ingot or Toncan metal, cold rolled copper; or in any special metal in size or gage.

Prompt shipments from large factory stock.

Wide Adaptability

—Thousands of installations have proven the Arex-Austor to be the ideal ventilator for mills, factories, foundries, warehouses, power plants, train sheds, railway cars, ships, theaters, hospitals, schools, etc.

Can be installed on flat roofs, sawtooth roofs, slant roofs or on skylights and monitors.

Caution: The phenomenal success of Arex ventilators has provoked petty imitations by name, design or principle. Beware of such infringements.

Arex is the only trade-name under which our ventilator is sold.



Bottom View

Actual photograph. Note the extraordinary outlet for escape of air—greater than in any other ventilator. Observe the immense ventilating area—the deep, penetrating siphons—the triangular channels between the siphons.

Well-balanced and mechanically perfect throughout

Standard Specifications for Arex Ventilators

All roof ventilators to be Arex original siphonage ventilators as patented and manufactured by the AREX COMPANY, 1598 Conway Building, Chicago, Ill.

Engineering Service

The first and foremost requirement is air exhaust capacity. Every factor that makes for or against results is of vital importance. The mere purchase of ventilating units does not in itself always solve a problem. That is why we, with 20 years' experience and the record of 200,000 successful installations, recognizing our position and responsibility as the world's largest exclusive manufacturers in this field, surround our product with an engineering service aimed to assure maximum Arex efficiency. This service consists of analyzing a problem, preparing sketch or blue print, making correct recommendation and giving valuable information and expert advice on this all-important subject of ventilation.

Manufacturing Facilities

Our own modern plant and warehouse at South Gary, Ind., afford us unequalled advantages for manufacturing and shipping standardized ventilators in large quantities on short notice.

Special bases and pipe connections made to order from submitted sketches.



Arex-Austor (Original Siphonage)

Economy Roof Ventilator

This ventilator is designed to meet the demand for a ventilator at lowest possible cost, yet capable of solving any ordinary ventilating problem.

Manufactured in attractive proportional design of solid sturdy construction. Absolutely guaranteed storm-proof.



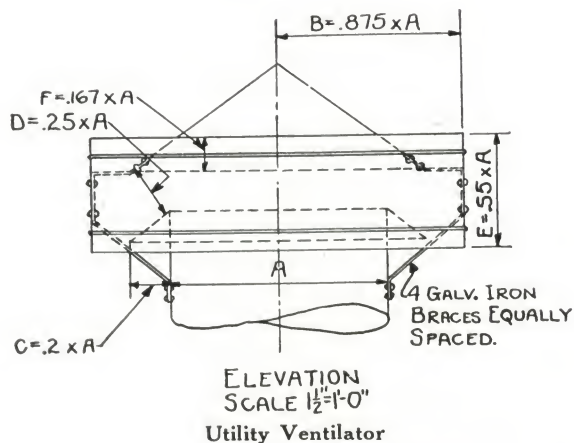
Economy Roof Ventilator

Made in same sizes and gages as Arex-Austors. Workmanship and materials are of the same high quality. Furnished with or without damper or base. Prompt shipment from large stock always on hand.

Utility Ventilators

This ventilator is designed especially for use on school buildings. They are made with a storm band larger in circumference and width than those on the Economy Ventilators, but are lower in proportion to width to conform to certain architectural roof lines.

They are made in a full range of sizes and in all metals.



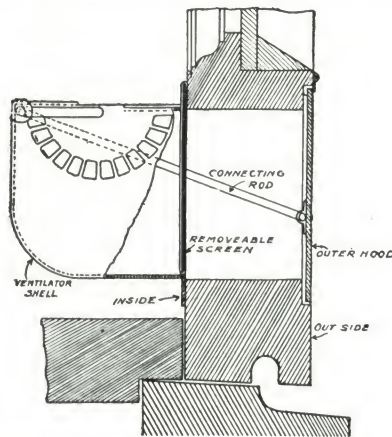
"Arin" Anti-draft Window Ventilator

An adjustable sash ventilator, especially adapted to windows in schools, hospitals, shops, offices, hotels, apartment houses and residences for providing fresh air without creating a draft.

The "Arin" Window Ventilator bears the endorsement of architects, health commissioners, school committees, etc., and complies with every requirement of states and municipalities.

Construction—"Arin" is constructed throughout of hard brass, making it absolutely rustproof and durable. All connections are rigidly reinforced, there being no parts to be damaged through misplacement or careless handling. The workmanship is of the highest class and the entire ventilator is beautifully finished in statuary bronze. Being small, neat and part of the window, it represents a practical, permanent installation of ornamental appearance.

Adjustable Deflector—The sectional details and perspective view herewith illustrates the adjustable deflector plate that permits control of the volume of air admitted to the room and its distribution within the room as well.



Installation Details, "Arin" Ventilator When Closed



Method of Removing or Replacing the "Arin" Removable Screen

Installation—Some architects and engineers when installing "Arin" Window Ventilators in new buildings prefer them placed in the top window rail as well as in the bottom rail.

When desired in buildings already erected, the most practical method of installation is to place them on a 4 or 6-in. panel which will set under the window and may be removed entirely when desired.

Preparation of Rail—Rabbit outside surface of rail around opening $\frac{1}{8}$ in. deep and $\frac{5}{16}$ in. wide. This gives outer hood flush fit and allows $\frac{1}{8}$ in. margin to prevent binding.

Air Filter—Every atom of air entering the "Arin" Ventilator filters through a fine screen mesh which keeps out dirt, soot and insects.

Thus, "Arin" provides a double service—positive protection against draft and dirt.

Standard Specification for "Arin" Ventilators—All window ventilators to be "Arin" Anti-draft ventilators as patented and manufactured by the AREX COMPANY, 1577 Conway Building, Chicago, Ill.

DIMENSIONS AND CAPACITIES OF "ARIN" WINDOW VENTILATORS

Style	No.	Projection inside, in.	Outside dimensions including flange, in.	Outer hood, in.	Minimum depth, in.	Opening in rail, in.	Size, in.	Rail depth, in.	Free area, sq. in.	Capacity, cu. ft. air per hour
A-1	1	2x12	2 $\frac{1}{2}$ x12 $\frac{1}{2}$	2 $\frac{1}{2}$ x12 $\frac{1}{2}$	4	2x12	2x2x12	3	17.4	5,660
A-2	2	2x18	2 $\frac{1}{2}$ x18 $\frac{1}{2}$	2 $\frac{1}{2}$ x18 $\frac{1}{2}$	4	2x18	2x2x18	3	26.5	8,620
A-3	3	2x24	2 $\frac{1}{2}$ x24 $\frac{1}{2}$	2 $\frac{1}{2}$ x24 $\frac{1}{2}$	4	2x24	2x2x24	3	35.4	11,515
A-4	4	2 $\frac{1}{2}$ x12	3x12 $\frac{1}{2}$	3x12	4 $\frac{1}{2}$	2 $\frac{1}{2}$ x12	2 $\frac{1}{2}$ x2 $\frac{1}{2}$ x12	3 $\frac{1}{2}$	23.25	7,563
A-5	5	2 $\frac{1}{2}$ x18	3x18 $\frac{1}{2}$	3x18	4 $\frac{1}{2}$	2 $\frac{1}{2}$ x18	2 $\frac{1}{2}$ x2 $\frac{1}{2}$ x18	3 $\frac{1}{2}$	35.25	10,572
A-6	6	2 $\frac{1}{2}$ x24	3x24 $\frac{1}{2}$	3x24	4 $\frac{1}{2}$	2 $\frac{1}{2}$ x24	2 $\frac{1}{2}$ x2 $\frac{1}{2}$ x24	3 $\frac{1}{2}$	47.25	15,270

Note: The rail depth is the clearance required in the lower rail above stool when window is closed. The free area is the sum of the openings for the flow of air. When ordering, be sure and state thickness of window rail which is usually about $1\frac{3}{4}$ or 2 in. Prices on application.

"Arin" Adjustable Louvers

Adaptability—These high grade louvers are installed to insure adequate fresh air supply in connection with any heating and ventilating system, in schools, factories, power plants, transformer vaults, etc.

Advantages—(1) Easy to operate—no sticking. (2) Absolutely foolproof. Practically indestructible.

(3) Absolutely stormproof and weatherproof.

(4) Blades do not protrude when louver is open.

(5) Can be installed in series of two or more units to fit any size opening.

(6) Blades can be removed entirely in case of emergency.

(7) Furnished with birdscreen if required.

(8) Reasonably priced, considering the high grade material and workmanship.

(9) Also made of cold rolled copper or any other special material.

Construction Features

—(1) Frame and blades made of No. 16 gauge galvanized steel.

(2) Bronze bearings in frame.

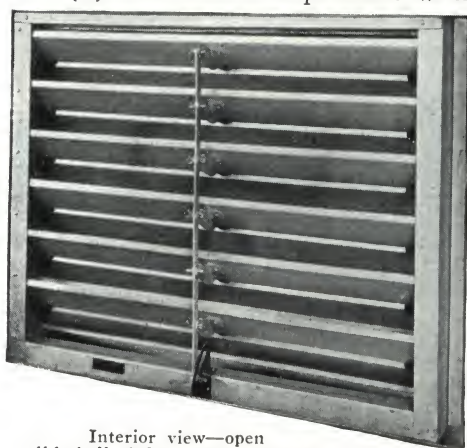
(3) Bronze pivots in blades.

(4) Bronze setscrew and slide.

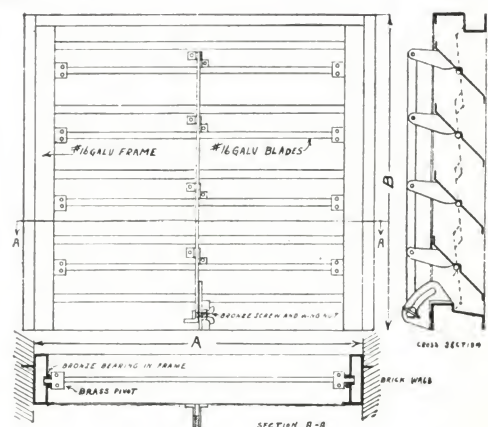
(5) Adjustable device to lock in any position.

(6) Standard depth 4 in. for any brick or concrete wall.

(7) Perfectly balanced.



Interior view—open
"Arin" Adjustable Louver



Construction Features

THE BURT MANUFACTURING COMPANY

Manufacturers of Roof Ventilators

600 Main Street, AKRON, OHIO

BRANCH OFFICES

BOSTON, MASS., F. M. MILLS, 10 High Street
CHICAGO, ILL., C. A. PIPENHAGEN, 169 West Chicago Avenue
DENVER, COLO., GEORGE P. HEINZ & Co., 1740 Champa Street
NEW YORK, N. Y., E. A. FRASER, MGR., 7 West 42nd Street
KANSAS CITY, MO., NATKIN ENGINEERING Co.
LOUISVILLE, KY., SHEET METAL SUPPLY Co.
WASHINGTON, D. C., FRIES, BEALL & SHARPE
PITTSBURGH, PA., DRAGO EQUIPMENT Co., Dravo Building

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BUFFALO, N. Y., R. J. RODMAN
ATLANTA, GA., THE STEEL SPECIALTIES Co.
DETROIT, MICH., B. E. ENGLANDER, Hoffman Building
ST. LOUIS, MO., F. A. CAMMANN BUILDERS SERVICE Co.
NEW ORLEANS, LA., WOODWARD-WIGHT & COMPANY
PHILADELPHIA, PA., POWER ECONOMY SPECIALTY COMPANY
PORT WAYNE, IND., DOMESTIC SALES Co., 2016½ Fairfield Avenue
CHARLOTTE, N. C., METAL WINDOW PRODUCTS Co., P. O. Box 94

Roof Ventilators for All Requirements

Our 26 years' experience in the roof ventilator business has proven beyond doubt that *no one type* of ventilator will adequately meet all conditions.

We have designed *various* types and are prepared to tell exactly which of these types of the proper size will handle any particular requirement. Some installations require revolving type ventilators, others require metal top sliding sleeve damper ventilators, still another will need a fire retarding type, and weave sheds will best be served by our double damper ventilator.

Conclusive tests have proven that under certain conditions one of these ventilators will exhaust its maximum per cubic foot while another type will hardly pull anything.

At Akron, we maintain an engineering department which will expeditiously co-operate with architects, engineers, contractors and others in selecting the proper types and sizes of ventilators to suit particular conditions and requirements.

Blue prints of our various types will be furnished on application. Send your specifications, rough pencil sketch or blue print to our engineers, and they will, without cost or obligation, send a detailed analysis of your situation, together with recommendations and quotations.

Materials Used in Burt Ventilators

Burt Ventilators are made of prime open hearth galvanized steel. They can be made of zinc, copper, lead clad sheets, toncan metal, armco iron, aluminium or monel metal at slight additional cost.

Burt Patented and Exclusive Features

Among the many features that account for the popularity of Burt Ventilators are the sliding sleeve damper, the spring clip, the notch rim, the condensation gutter and heavy construction.

The sliding sleeve damper efficiently regulates the flow of the air. The spring clip holds the damper rope in place after changing adjustment. The notch rim holds the glass in place on top of ventilator. The condensation gutter gathers the condensation and carries it off to the roof. Burt Ventilators are from 4 to 6 gages heavier throughout than is customary in many makes of ventilators.

The above are more fully described under the various ventilators of which they are a part.

Uses

No single type of building, classified either as to use or construction has been missed by Burt engineers in their surveys. Their experience includes ventilation of buildings from capitol buildings to chicken houses, from power plants and weave sheds to public auditoriums.

Residence Ventilation—Ventilation is also necessary in a residence. It is almost the only way many houses can get fresh air without causing a draft. The top floors in summer months are usually uninhabitable because of the sweltering heat. A Burt Stationary Ventilator in the roof will allow this air to escape. The line of Burt ventilators have been so simplified that they can be made to harmonize with the general design and construction of the house.

Garage Ventilation—A ventilator placed on roof of a small garage will carry off the carbon monoxide fumes fast enough to make conditions comfortable and safe.

Farm Building Ventilation—Burt Rotary or Stationary Ventilators on barns, assures keeping the animals in a healthy condition. Ventilation of poultry sheds is necessary to obtain the maximum production of eggs and the maximum increase

in weight. The smallest of Burt Ventilators will be ample to assure the best ventilation.

Ventilator Capacities

We are very much opposed to publishing ventilator capacities because as a general proposition they simply confuse the person desirous of securing information. We have reliable tests, and will furnish copies with comprehensive explanations to any one interested.

We believe, however, that our guarantee in proposing to place any of our ventilators of any type side by side with any other ventilator, allowing the engineers of the companies interested to be the sole judges of the merit of our product, is the best proposition that we can offer.

We give this in lieu of capacities, because the Bureau of Standards, at Washington, a reliable authority, has given reports which indicate that Burt Ventilators of all types are the equal or superior of any ventilator on the market.

Again, there are so many variables entering into a problem of this kind that a published table is very confusing. We are, therefore, prepared and willing to give you data as to why we take this stand along with information which will enable you to arrive at the number and size of ventilators that might be required. As a matter of fact, the best way to handle this, provided your engineers are not familiar with the situation, is to submit a rough proof of your building and let us place the ventilators for you.

The Liberal Burt Guarantee

We guarantee Burt Ventilators to be free from defects in workmanship and material and will replace at any time free of charge, f.o.b. factory, any Burt Ventilator proven defective.

Burt Sliding Sleeve Damper Ventilator

Marketed for over twenty years, this ventilator is not an experiment—it is used by many of the largest industrial plants in the United States.

These ventilators may be had with either metal tops or glass tops. The metal top ventilator serves as a ventilator only, while the glass top serves as a *combination skylight and ventilator*.

Exclusive Features—(1) The patented damper in this ventilator consists of a sliding (telescopic) sleeve, which is operated from below by means of a cord or chain running over a rust resisting pulley. Each ventilator is equipped with a patented clip so that it can be set in any position and held



Sectional View of Glass Top Sliding Sleeve Damper Ventilator Showing Some Burt Patented and Exclusive Features

Sectional View of Burt Sliding Sleeve Damper Ventilator

there without fastening the cord to a nail, hook or post. As the sliding sleeve damper is not affected by air currents, it maintains its position and requires no attention. This construction is a marked improvement over the flat damper type.

(2) The sliding sleeve damper has no flat surface, therefore, it does not collect dust or refuse to be shaken off into the building.

(3) The air shaft is open and unobstructed at all times. Air currents are not deflected downward, and it is possible to adequately ventilate with a smaller number of Burt Ventilators than most competing types.

(4) The sliding sleeve damper makes our glass top ventilator an ideal skylight, as the light is never obstructed.

(5) The glass top ventilator is equipped with heavy ribbed wire glass held in place by a patented notched rim, and made absolutely watertight by means of waterproof cement. Glass can be replaced quickly by merely removing the notched rim, without removing ventilator from the roof.

(6) Our patented trough or lip is placed below the glass top, into which runs any condensation which may gather on the glass. A similar trough on the lower part of the base collects all condensation forming on the air shaft.

How to Specify—See specifications on the following page.

BURT SLIDING SLEEVE DAMPER VENTILATORS

Diameters, in.	Neck	Outer rim or band	Gauge of steel	Height without base, in.		Length air shaft from bottom of wind-shield, in.	Net weight without crating, lb.		Area of neck sq. in.	Price
				Glass top	Metal top		Metal top	Glass top		
12	22	22	22	14	17	4 1/4	17	20	113.10	\$ 8.00
14	24	22	22	15	17 1/2	4 1/4	20	24	153.94	12.00
16	26	22	22	15 1/2	19	5	24	30	201.06	15.00
18	29	20	16	21	5 1/2	5 1/2	28	34	254.47	19.00
20	32	20	18	23	5 1/2	5 1/2	33	42	314.16	23.00
24	38	20	22	26	6	6	45	56	452.39	27.00
30	46	20	24	30	6	90	105	706.85	575.00	38.00
36	54	18	27	36	8	130	155	1017.88	57.00	45.00
40	64	18	33	40	10	175	200	1256.00	81.00	55.00
42	68	18	34	42	10	190	225	1386.00	90.00	60.00
48	78	18	36	46	11	300	320	2390.00	105.00	70.00
54	86	18	40	51	14	350	400	2827.00	120.00	80.00
60	94	16	43	54	12 1/2	430	480	3456.00	135.00	90.00
66	102	16	46	55	15 1/2	500	550	4071.00	150.00	100.00
72	110	16	51	66	15 1/2	560	610			

Prices f.o.b. Akron, Ohio, and include sliding sleeve damper. Ventilator bases are charged for extra, for which prices will be quoted on receipt of specifications. Operating rope or chain not furnished. Discounts on application.

New Burt Fire Retarding Cone Damper Ventilator

In this type of ventilator, an inverted cone is used as a damper, which is operated from the floor (moved up and down) by a copper chain running over a rust resisting pulley as shown.

The damper of this ventilator is furnished with fusible link which insures it automatically closing in case of fire. When the damper is thus equipped this ventilator passes the approval of the Underwriters' Laboratories, Inc.

The elongated slot in the damper can be used as a clip when the fusible link is placed above the damper. When it is desired to place the fusible link below the damper, the elongated slot is omitted and the chain simply falls through a round hole in the damper. The patented clip furnished then can be placed anywhere within reach of the operator.

The elongated slot and fusible link, of course, obviate the necessity of tying the chain to a post, nail or hook in the building itself.

The construction of this ventilator embodies all the essential features of construction recommended by the American Society of Heating and Ventilating Engineers.

The patented raising and lowering device is simple and positive in action, and is guaranteed not to stick or bind. The air shaft is open and unobstructed at all times—there are no braces of any kind in the air shaft or neck. The inverted cone damper permits easy flow of air outward—there are no sharp turns or obstructions, and no air pockets.

The extra wide wind band makes this ventilator absolutely storm-proof and creates a larger low pressure area,

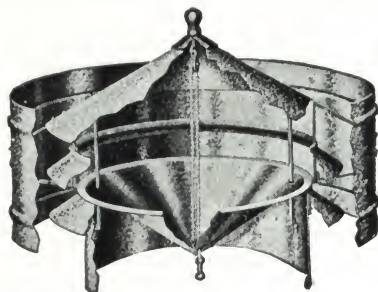


Fig. 500-X
Sectional View, Burt Sliding
Cone Damper Ventilator
With cone damper closed

and a better exhaust. The location of the louvers, top and wind band have been scientifically worked out so that regardless of the direction of the wind, it can not pass through the ventilator head and get into the building—guaranteed against back-drafts.

Exhaust area is larger than cross-sectional area of pipe, which assures guaranteed exhaust capacity.

How to Specify—See specifications on the following page.

BURT SLIDING CONE DAMPER VENTILATORS

Diam. neck, in.	Width wind band, in.	Gauge of steel	Diam. outside rim, in.	Height without base, in.	Weight, lb.		Price
					Net	Crated	
10	6	22	18	15 1/2	18	22	\$ 7.00
12	6	22	22	16	27	34	8.00
14	7	22	24	17	30	40	12.00
16	7	22	26	19	37	49	15.00
18	8 1/2	20	29	21	43	54	19.00
20	9	20	32	22	50	65	23.00
24	10	20	38	27	60	78	29.00
30	12	20	46	33 1/4	112	152	38.00
36	15	18	54	39	164	235	57.00
40	16	18	64	43 1/2	215	285	75.00
42	16	18	68	43 3/4	240	320	81.00
48	18	18	78	48 1/4	337	398	90.00
54	22	18	86	56 1/4	400	492	105.00
60	22	16	94	58	448	560	120.00
66	24	16	102	62 1/4	500	635	135.00
72	26	16	110	68 1/2	555	895	150.00

Prices f.o.b. Akron, Ohio. (Discounts on application.) Bases extra. Bird screens furnished at slight additional cost.

Burt Ball Bearing Revolving Ventilator

A neat and well constructed ventilator of the revolving type that has been perfected to the highest point of efficiency.

Its design and open back construction causes the air currents to pass not only over the top and sides, but directly through it, thus creating a partial vacuum in front of the air shaft, which greatly increases its capacity or pulling power. This construction also holds the ventilator steady with the wind.

Each Burt Ventilator is erected and tested in our factory before shipment, insuring perfect balance.

This ventilator is equipped with two sets of high grade steel ball bearings—it is positively guaranteed not to stick or bind.

There are no louvers in the revolving head, consequently maximum efficiency is obtained. If bases are furnished by us, we will install flat dampers without charge (see illustration). When specified, we furnish dampers of the fire retarding type which close automatically in case of fire.

This ventilator has proven a success under a wide range of conditions and thousands are now in use.

How to Specify—See specifications on the following page.

BURT BALL BEARING REVOLVING VENTILATORS

Diam. neck in.	Gauge of steel	Weight, lb.		Price without damper
		Net	Crated	
8	22	18	30	\$12
10	22	20	35	14
12	22	30	50	16
14	22	35	65	24
16	22	42	75	30
18	20	50	100	38
20	20	60	125	46
24	20	90	160	54
30	18	140	220	76
36	18	190	310	114
40	18	250	350	150
42	18	280	470	162
48	18	390	650	180
54	18	575	750	210
60	16	650	980	250

F.o.b. Akron, Ohio. Discounts on application. Quotations on larger sizes on application. Bases extra.

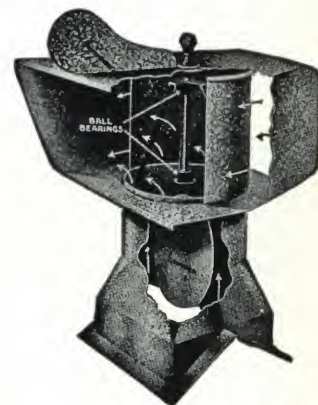


Fig. 800-Z
Burt Ball Bearing Revolving Ventilator

Burt Fan Ventilator

This ventilator effectively and quickly removes excessive fumes, smoke, odors, etc., from theaters, schools, churches, laundries, blacksmith shops, dyehouses, foundries, and other buildings.

Being power driven, it will exhaust, approximately, ten times more vitiated air than a stationary or revolving ventilator.

Other features are quietness of operation, inverted cone damper, fire retarding, low power consumption, and with power off, normal ventilation continues.

There are three distinct types of Burt Fan Ventilators their grouping depending only upon the way in which they are driven.

Continued on next page

Direct Connected Fan Ventilators—Group One— Small sizes from 14 to 20 in. The one illustrated is 20-in. size. This size delivers 1750 cu. ft. of air per minute alternating or direct-current motor. Four-blade fan.

Group Two— Larger sizes 24 to 48 in. Motors available are of five models. Alternating or direct-current motors, 670 to 700 r.p.m. The 24-in. ventilator will remove 4500 cu. ft. of air per minute, the 30-in. 8500, the 36-in. 11500, the 42-in. 13200, and 48-in. 14275 cu. ft. Cost of operating 36-in. size at 8c per kilowatt hour is 22c for 10 hours.

Belt Driven Fan Ventilators—Group Three— Made in four types, classified entirely as to method of handling belt drive. Can be driven from line shafting or from individual motors. The two types operating from a line shaft drive are arranged so the idlers can be placed outside the ventilator shaft to operate on a line shafting installed outside on the roof, or with the idlers in the ventilator shaft directly under the fan so as to be driven from a line shafting in the building under the ventilators.

Type 1 has the outside drive.

Type 2 has the inside drive.

Type 3 employs separate motor to drive belt with motor housing outside of building.

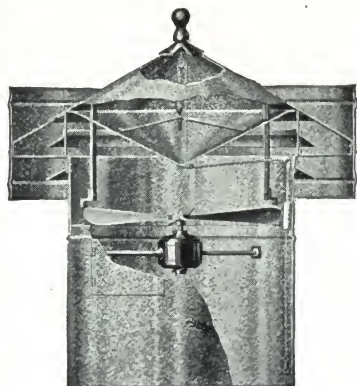


Fig. 260-Z
Burt Direct Connected Fan Ventilator

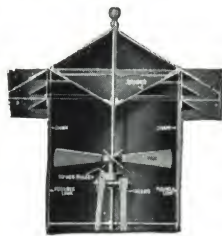


Fig. 265-Z
Burt Double Damper Ventilator

Type 4 also has separate motor, but motor is placed inside of the building.

Fans have 6 blades. Motors are standard, 1750 r.p.m. with fans made to be driven between 500 and 650 r.p.m.

Burt Double Damper Ventilator

Designed for weave sheds and places where the condensation forming on the air shaft and the cowl must be prevented from entering the building.

Adopted by many of the largest textile mills in the United States.

The condensation trough in the air shaft of the Burt Double Damper Ventilator collects most of the moisture and passes it out on the roof through the condensation drain. When condensation is severe, the trough-shaped lower damper acts as a drip pan and collects the moisture, the latter being quickly evaporated.

The lower drip pan (below bottom damper) is a safety device that collects any overflow from the bottom damper. It can be piped to pass water out on the roof.

The two dampers are operated simultaneously by means of a cord from below. The cord is held firmly by a patented clip fastened to the roof. Made in all sizes.

How to Specify—See specifications below.

Burt Rectangular Ventilators

Made in all sizes, of any metal desired, with either metal or glass tops, and equipped with our patented sliding sleeve damper described on preceding page.

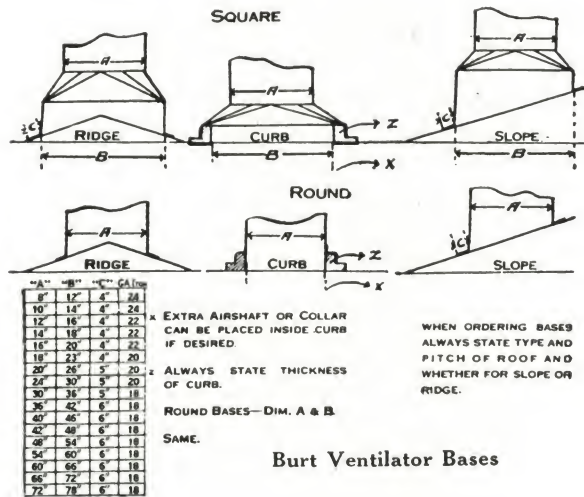
Suitable for public buildings, foundries, schoolhouses, etc. Can be adapted to any size or shape of roof opening.

How to Specify—See specifications below.

Ventilator Bases

Ventilator bases are made to conform to the pitch of the roof, either round or square. Square bases are recommended for maximum efficiency, capacity and rigidity. Extra heavy (of the same gauge metal as the ventilator itself).

Burt Bases have the following features: condensation trough in every base, 4-in. flashing or more on every base to insure stormproofness, four different types, a type for every condition, and every base made separately for each particular job.



Burt Ventilator Bases

How to Specify Burt Ventilators

Metal Top Ventilator—(1) Furnish and install on roof, where shown on drawings, Burt Metal Top Ventilators, as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio.

(2) Ventilators shall be of diameters shown and shall be constructed of prime open hearth galvanized steel sheets of THE BURT MANUFACTURING COMPANY'S standard gauge, strongly braced with galvanized steel bands and properly riveted.

(3) Ventilators shall be provided with sliding sleeve dampers, operating by chains or cords over rust resisting pulleys and equipped with clips so that they can be set in any position and held permanently. When sleeve is at its highest point it shall completely close ventilator.

(4) Ventilators shall be guaranteed against defects in workmanship and material by the manufacturer, who shall agree to replace or repair without charge, f.o.b. factory, any ventilator proving so defective.

(5) Ventilators shall be thoroughly flashed to the roof and be made absolutely watertight.

Glass Top Ventilator—(6) Furnish and install on roof, where shown on drawings, Burt Glass Top Ventilators, as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio.

(Insert paragraph 2 here.)

(7) Ventilators shall be provided with notched rims as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio, for holding glass in place so that same can be replaced if necessary without removing ventilators from roof.

(8) Ventilators shall have troughs or lips placed below glass so as to conduct any condensation or moisture that may form to the roof.

(Insert paragraphs 3, 4 and 5 here.)

Double Damper Ventilator for Weaving Rooms—(9) Furnish ventilators for weaving rooms, as shown on drawings, to be provided with double dampers as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio.

(Insert paragraphs 2, 4 and 5 here.)

Fan Ventilators—(10) Ventilators in, as shown on drawings, shall be Burt Fan Ventilators, provided with 6-blade fan mechanism which can be operated by belt from line shafting, belt from motor or 4-blade fan mechanism operated by direct-connected motor.

Note: 24-in. fan to have 1/4 hp. motor; 30 and 36-in., 1/2 hp. motor;

above 36-in., 1/2 hp. motor; to be standard as furnished by THE BURT MANUFACTURING COMPANY, Akron, Ohio, unless otherwise specified.

(11) Fan ventilators shall be provided with cone dampers, operated by cord or chain and rust resisting pulleys with fusible links which will cause dampers to drop and completely close in case of fire.

(Insert paragraphs 2, 4 and 5 here.)

Sliding Cone Damper Ventilators—(12) Furnish and install on roof, where shown on drawings, Burt Fire Retarding Sliding Cone Damper Ventilators as shown on drawings, and manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio.

(13) These ventilators shall pass the approval of the Underwriters Association of America.

(13a) Ventilator is to have an extra wide wind band as per THE BURT MANUFACTURING COMPANY'S standard for this type. Wind band to be located so as to prevent any entrance of outside wind into the ventilator head, whether up from a sloping roof or any other angle.

(Insert paragraph No. 11, but substitute "cone damper regulators" in place of fan. Follow with paragraphs 2, 4 and 5.)

Ball Bearing Revolving Ventilators—(14) Furnish and install on roof, where shown on drawings, Burt Ball Bearing Revolving Ventilators as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio.

(15) Ventilators shall be equipped with two sets of hardened steel ball bearings, and shall have open back construction so as to hold ventilators steady with the wind.

(Insert paragraphs 2, 4 and 5 here.)

Note: In order to satisfy people who are not convinced as to our type of bearing, we are prepared to install at no additional charge bronze ball bearings in place of the hardened steel bearings. We do not recommend nor guarantee this type, but will furnish them if specified.

Square and Rectangular Ventilators—(16) Furnish and install on roof where shown on drawings, Burt Square or Rectangular Ventilators as manufactured by THE BURT MANUFACTURING COMPANY, Akron, Ohio. These ventilators shall be equipped with sliding sleeve dampers or common flat dampers, and with glass or metal top.

(Insert paragraphs 2, 4 and 5 here.)

Note: If ventilators are to be constructed from copper, zinc, lead clad sheets or any other metal, insert these words in proper space above.

THE JOHN CALL COMPANY

Ventilating Specialists

TELEPHONE

MARKET 4969 (Bell) 122-128 No. Franklin Street, PHILADELPHIA, PA.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

Liberty Roof Ventilator

The most scientific roof ventilator made and the highest expression of modern ventilating engineering. So ingeniously does it harness and utilize outside air currents that their ventilating action is positive, constant and unfailing, regardless of their direction, angle or velocity.

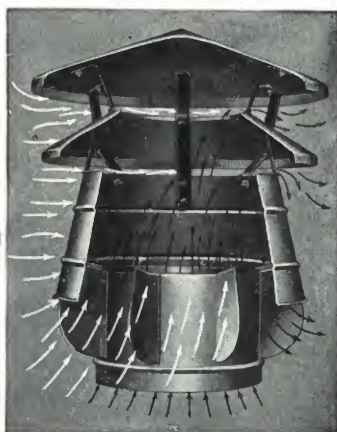
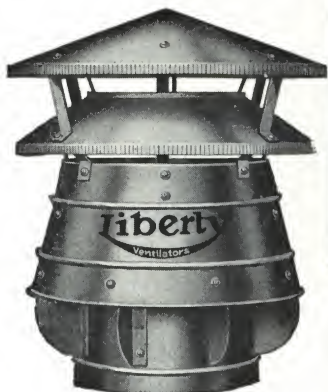
Upward, downward, horizontal or swirling air currents are all brought under control and made to perform the task in hand—that of drawing heat, vitiated air, fumes, steam, smoke or floating dust up and out of the building.

Positive and Constant Ventilation—The Liberty ventilator is the result of many years of experimentation and tests. It has no moving parts—there is no rattle or wear, and no oiling or other attention is necessary. It requires no mechanical power and does not depend on certain wind direction or velocities—it is always "pointed" for action.

It functions in the slightest zephyr. The poor ventilator stops functioning in low wind velocities—the Liberty continues to function under such conditions long after ordinary ventilators cease.



TRADE-MARK
Reg. 197990



Liberty Ventilator

Black arrows indicate foul air coming from building. White arrows indicate trend of outside air, which causes impingement on ventilator, creating a vacuum, sucking air from main exhaust or eduction tube

Size	Area, sq. in.	Exhaust per hr., cu. ft. in 5-mi. wind*	Approx. shipping wt., lb.	Gauge of metal	Weight, copper, oz.	
					Light	Medium
6	28	6,364	6	26	12	16
7	38	8,661	11	26	12	16
8	50	11,331	14	26	12	16
9	64	14,315	16	26	12	16
10	79	17,671	19	24	14	18
12	113	25,446	26	24	14	18
14	154	34,638	36	24	16	20
16	201	45,234	51	24	16	20
18	254	57,252	65	24	16	20
20	314	70,697	90	22	16	20
22	380	85,536	103	22	16	20
24	452	101,802	125	22	16	20
26	531	119,459	150	22	18	22
28	616	138,542	180	22	18	22
30	707	159,054	220	20	20	24
36	1,018	229,038	395	20	20	24
42	1,385	311,721	460	20	20	24
48	1,810	405,360	600	20	24	28
54	2,290	515,160	850	20	32	36
60	2,827	636,000	900	18-20	36	40
66	3,421	769,800	990	18-20	36	40
72	4,072	915,948	1,400	16-18	40	48
84	5,542	1,246,752	2,150	14-16	42	48
96	7,238	1,628,748	3,300	14	48	60
108	9,161	2,061,612	5,600	12-14	48	60
120	11,310	2,544,600	7,300	12-14	60	72
132	13,685	3,359,232	10,200	12	72	84
144	16,286	3,664,440	11,400	12	72	84

*Tests by Massachusetts Institute of Technology and Carnegie Institute of Technology.

Scientifically Designed—The Liberty ventilator utilizes four principles of physical science: (1) air impingement; (2) positive and negative air action, both pressure and vacuum; (3) siphonage; (4) stack action.

Eight vertical blades or fins are attached to the eduction pipe and covered by a frustrum-shaped skirt, forming eight narrowing chambers or tubes. Those on the positive side (facing the wind) act as air catchers; those on the opposite or negative side become siphons. Horizontal and upward air currents are mainly guided, compressed and accelerated through the funnellike chambers, deflected across the pipe opening, and further drawn along by the partial vacuum created in the negative chambers. Downward air currents, cleverly controlled, create a partial vacuum and suction no less effectual. *Back drafts are impossible.*

In this manner and under every conceivable wind condition is developed a continuous, powerful pulling force that assures positive and constant ventilation.

Does Not Depend on Stack Action—The Liberty ventilator is unique in that it utilizes stack action, yet is not in the slightest degree dependent upon it in order to function properly. When stack action (warm air rising) does occur, it simply accelerates this ventilator's pulling power.

In tests made by the Carnegie Institute of Technology, the Liberty ventilator was shown to pull tremendously where the temperature inside the building was actually ten degrees lower than the temperature outside of the building.

The Liberty ventilator has free areas for unobstructed stack action equal to more than 200% of the area of the pipe opening, thus a "no resistant constant" is guaranteed.

Built Right—The Liberty ventilator is staunchly built, weatherproof, and well designed. It is the most practical, efficient, dependable and in the end the most economical roof ventilator for factories, foundries, train sheds, etc. It is also an invaluable auxiliary for mechanical ventilating systems and for correcting faulty drafts in chimney flue stacks.

Sizes—Made in any size desired, of galvanized iron, copper, aluminum or any special metal. Large stocks carried.

More Than 1000 Prominent Users—Write for list.

Pul-Air Roof Ventilator

A mushroom type ventilator that is correctly and substantially built to serve conditions where the use of the Liberty ventilator is unwarranted. Tested by unbiased engineers in competitive tests and declared superior to the common type of ventilator.

Made of any metal desired.

Large stocks for immediate shipment.



Pul-Air Ventilator

Rotary Ventilators—"Air-Pul"

We are prepared to furnish a highly efficient rotary ventilator guaranteed to meet any condition where rotary ventilators are specified.

Call Protected Metal—"Callmet"

Acid, wear and weather resisting metal. A scientifically prepared steel sheet coated so that it is impervious to corrosion, rust, wear and acid. Also soundproof.

Particularly useful for dyehouses, smoke conditions, railroad use, smoke jacks, etc.

Call Protected Metal may be specified in Liberty or Pul-Air ventilators, making a ventilating product to meet severest corrosion conditions and have extreme long life.

WALTER B. GILBERT & CO.

Manufacturers of "Pullman Ventilators"

YORK, PA.

REPRESENTATIVES

NEW YORK, N. Y., 101 West 31st Street

ST. LOUIS, MO., HERBERT GOLTERMAN

HELENA, MONT., RAYMOND C. GRANT

ST. PAUL, MINN., O'CONNELL SUPPLY Co.

TORONTO, ONT., A. & F. FISHER

Products

PULLMAN VENTILATING ROOF COWLS;
PULLMAN SASH VENTILATORS.

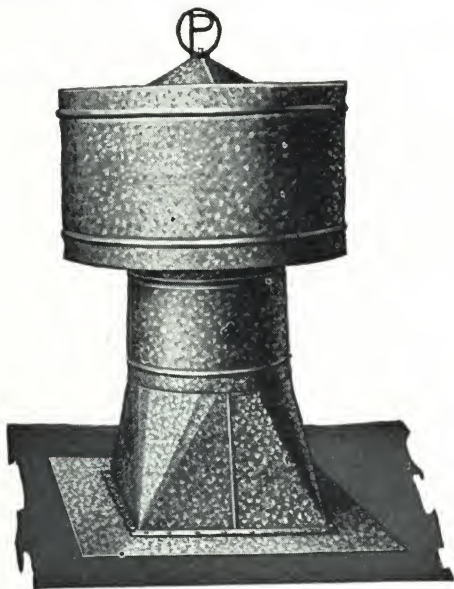
Also, Pullman Window Ventilators; Automatic Fire Retarding Dampers and Bases.

Improved Pullman Ventilating Roof Cowls

Operation—These consist of three cones of the same diameter and arranged one above the other with large storm band surrounding same.

The ventilator is proportioned correctly to take advantage of the area of low pressure produced by the outside wind back of the ventilator and will not intake under any weather conditions and is absolutely storm-proof.

Pullman Cowls are always in position to work.



(Patented)

Improved Pullman Ventilating Roof Cowl Fitted with Automatic Fire Retarding Damper and Base

Specification Data—Improved Pullman Cowls are regularly made of prime galvanized steel sheets of proper gauges and with galvanized iron braces. Can be furnished made of galvanized armco, toncan or cold rolled copper as specified.

Cowls fitted with Pullman Automatic Fire Retarding Dampers and Bases with condensation troughs to carry the water of condensation from the inside of the ventilator to the roof outside.



Reg. U. S.
Pat. Off.

Pullman Sash Ventilators

Description—These consist of two parts, i. e. an inside diffusion box and an outside hood.

The outside hoods are made in two styles which are called "Standard" and "Louvre." The inside box is the same in both cases.

The opening required is cut in the bottom sash rail at the mill where the sash are made, and the ventilators are screwed fast to the sash after the same are in place.

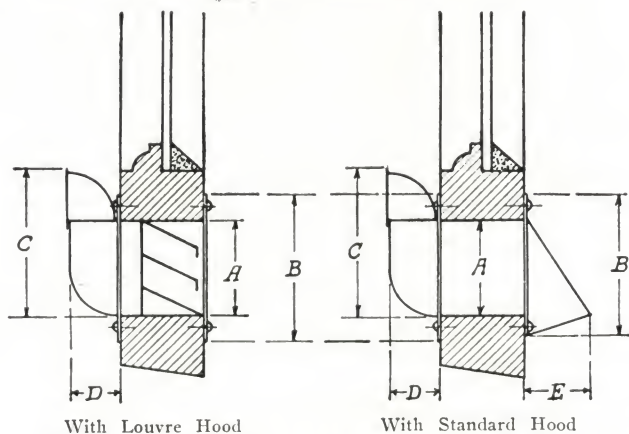
Ventilators are furnished complete with wood screws for mounting.

Specification Data—Standard Pullman Sash Ventilators are regularly made with inside diffusion boxes made of sheet brass with brushed brass finish and lacquered all over.

Fitted with hinged shutters to stay in any position from full open to closed.

Outside hoods, "Standard" and "Louvre," are made of sheet steel and finished in rubber finish black lacquer.

Fitted with 14-mesh copper screen cloth.



Cross Sections of Bottom Sash Rail Fitted with Pullman Sash Ventilators

STANDARD SIZES OF PULLMAN SASH VENTILATORS

Nominal sizes	A	B	C	D	E	Sash openings
Height and width, in.						Height and width, in.
2 x 12	2	3 1/8	3 1/8	1	1 3/8	2 1/8 x 12 1/8
2 1/2 x 16	2 1/2	3 3/4	4 1/4	1 5/8	1 7/8	2 5/8 x 16 1/8
3 x 15	3	4 1/8	5	1 7/8	2 1/4	3 1/8 x 15 1/8
4 x 18	4	5 1/4	6	2 1/8	2 5/8	4 1/4 x 18 1/4

Special sizes to order.

GLOBE VENTILATOR COMPANY

Manufacturers of Roof Ventilators

TROY, N. Y.

Products

"GLOBE" VENTILATING DEVICES:

Roof Ventilators.
Barn Ventilators.
Chimney Caps.
Car Ventilators.
Lamp Jacks.

Metal Top Ventilator

The "Globe" ventilator is made of heavy rust resisting galvanized open hearth copper-bearing steel, cold rolled copper, Armco Iron, or Toncan Metal and it is strongly and rigidly braced with extra heavy steel bars.

In sizes 18 inches and above, the tops and bottoms are made in sections which overlap and are riveted, making them double at each of these points and exceptionally strong ventilators.

Uses—The "Globe" ventilator has been in operation for many years on practically every known type and class of building.

It is removing smoke, steam, fumes, gases, dust, etc., from factories, foundries, steel mills and other



Metal Top "Globe" Ventilator

industrial buildings, and providing for fresh air in school buildings, churches, theaters, barns, etc. It has back of it years of *proved efficiency*.

Information and Estimates—Prices, blue prints, capacities, working model and complete information will be furnished on request.

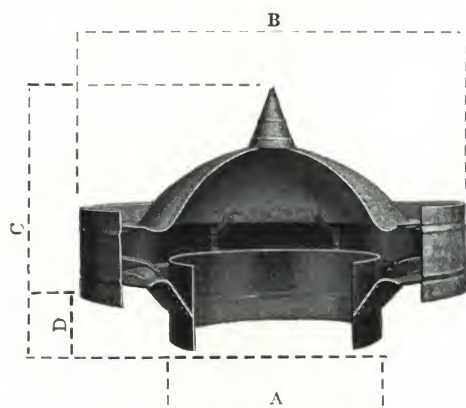
Shipment—"Globe" ventilators are carried in stock in the leading cities, and immediate shipment can be made from our factory.

Glass Top Ventilator

The "Globe" glass top ventilator possesses all the qualities of the metal top ventilator and is designed to secure the greatest degree of ventilation and the largest area of light.



Glass Top "Globe" Ventilator



Section of "Globe" Ventilator

A—Diameter of pipe
B—Diameter of band
C—Height of ventilator
D—Distance from bottom of band to bottom of ventilator

DIMENSIONS, GAUGES OF MATERIAL, AND LIST PRICES OF "GLOBE" VENTILATORS

Principal dimensions in inches				Gauge of iron	Wt. of copper, ounces	Area, sq. in.	*Price list subject to liberal discount
A	B	C	D				
6	11	9	1 1/2	26	18	28.27	\$ 3.40
8	14	11	1 3/4	26	18	50.26	4.65
10	17	13	2	24	18	78.54	5.75
12	19	14	2	24	18	113.10	6.75
14	25	18	3	20 & 24	18	153.94	13.00
16	28	20	3	20 & 24	18	201.06	20.00
18	32	23	4	20 & 24	18	254.47	27.00
20	36	25	4 1/2	20 & 24	20 & 18	314.16	33.00
24	43	30	6	20 & 22	24 & 20	452.39	40.00
30	52	35	6	18 & 22	24	706.8	65.00
36	66	50	8	18 & 20	24	1017.9	120.00
40	74	57	9	18 & 20	24	1256.6	180.00
48	84	64	10	18 & 20	24 & 28	1809.6	240.00
54	92	67	10	18 & 20	28	2290.2	300.00
60	99	70	10	18 & 20	28	2827.4	360.00
72	111	80	12	18 & 20	28	4071.5	480.00

The heavier weights of material are placed in bands and collars of ventilators.

Fire-retardant dampers furnished when desired.

*Galvanized iron ventilators only. Prices of copper ventilators on request.



"Globe" Ventilator with Square Base

Ventilator Bases and Dampers

The "Globe" ventilator is furnished with either round or square base when desired, to fit any type of roof construction.

The bases are made of extra heavy rust resisting steel. We would recommend square bases for maximum strength and efficiency.

We furnish the regulation damper or fire retardant damper at a small additional cost.

Chimney Caps

"Globe" chimney caps prevent downward currents in chimneys and increase drafts in sluggish flues.

W. F. HIRSCHMAN CO., INC.

Manufacturers of Rotary Ball Bearing Roof Ventilators

LE ROY, N. Y.

NEW YORK, N. Y., 525 Sixth Avenue
BOSTON, MASS., 37 Pearl Street

DETROIT, MICH., Builders-Traders Exchange
CLEVELAND, OHIO, Builders Exchange

Products

EFFICO FAN EQUIPPED ROTARY BALL BEARING ROOF VENTILATOR HEAD.

EFFICO INTERNAL LOUVER UNIT ROOF VENTILATORS.

LE ROY INTERNAL LOUVER UNIT ROOF VENTILATORS.

EFFICO WIND ELECTRIC FULL AUTOMATIC VENTILATORS.

EFFICO SKYLIGHT VENTILATOR UNIT (Puttyless).

EFFICO STANDARDIZED ROOF VENTILATOR BASES.

"There is no better through-the-roof ventilating apparatus than EFFICO.

Effico Fan Equipped Rotary Ball Bearing Roof Ventilators

Construction and Principle of Operation—The Effico rotating cowl exterior is covered by wind propelled blades; interior by suction blades. There are no moving parts. Effico shaft rotates on ball bearings, fitted with clock precision in solidly enclosed dusttight and oil-tight housings, and is flooded in inches of non-freezing oil (furnished by us); no oiling required for years (proven), and the Effico is absolutely noiseless.

Great Air Volume Exhaust at Low Wind—All Efficos will draw considerable air at a 1-mile breeze (an apparent calm) without stack or heat assistance. The 30-in. size will rotate (standing start) at .7-oz. pressure, 1/2-mile breeze. Cowl outlet is over 50% larger than its stack area, which is ample, as no wind enters ventilator to gain the so-called siphonage effect. Suction fan is same size as rotating cowl (note dimension chart). Thus each Effico is equipped with fan over 50% greater in diameter than its stack area. Fan pulls air up stack at even the slowest turning movement and wind blowing across the outlet adds to its efficiency.

Symmetry—The Effico has artistic lines and pleasing appearance. Lowest in height of rotary ventilators by over 50% average. Note dimension chart.

Weatherproofness—The Effico Rotary Ball Bearing Ventilator operates during all kinds of weather—rain, ice, snow or sleet does not affect or hamper its exhausting. No drip pans or bird screens are needed.

Suggested Specifications—The roof ventilators to be of the sizes as shown in plans and are to be constructed of [galvanized steel] [Armco iron] [copper]. They shall be the Effico Rotary Ball Bearing Ventilators as manufactured by the W. F. HIRSCHMAN Co., Inc., Le Roy, N. Y. The bases to be

[square type] [round type] of same gauge metal as the ventilator neck. The ventilator stack to be sufficiently high to elevate the ventilator propelling blades above coping.



Effico Rotary Ball Bearing Ventilator Installation

EFFICO STANDARDIZED VENTILATORS

Dimensions in inches					Galvanized steel		Copper, oz.	Code
A	B	C	D	E	Gauge	Net weight, lb.		
					Cowl	Neck and base		
6	9	5	13	.....	26	26	10	sheck
10	9	5	16	.....	26	26	18	sachem
12	11	8	21 3/4	23	24	24	25	scene
18	11 1/2	10	28 1/2	24	24	24	38	saturn
24	16	14	42	32	24	22	95	shake
30	22	14	52	38	22	20	140	sank
36	24	18	62	40	22	18	180	sergeant
42	33	22	68	51	22	18	300	serpent
48	34	24	74	51	22	18	370	serve
54	35	24	86	52	22	18	525	sham
60	37	24	98	55	20	18	650	shawl
66	43	30	103 1/2	61	20	18	700	sunk
72	50	30	114	68	20	18	750	shop
84	54	36	130	72	18	16	900	slave
96	54	45	153	72	18	16	1025	shekel

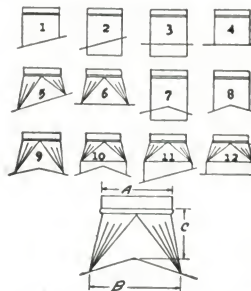
CAPACITIES OF EFFICO ROTARY BALL BEARING VENTILATORS

All Types
Cubic Feet of Air Exhausted Per Minute

Wind velocity, miles per hour	Temperature difference in degrees Fahrenheit in building and outside											
	0 10 20 30				0 10 20 30				0 10 20 30			
	12-in. Ventilator				18-in. Ventilator				24-in. Ventilator			
5	350	440	515	560	600	850	950	1040	1020	1600	1780	1900
10	430	525	600	625	910	1050	1200	1300	1490	1900	2100	2300
14	480	600	635	700	1050	1200	1300	1400	1800	2230	2460	2590
	30-in. Ventilator				36-in. Ventilator				42-in. Ventilator			
5	1560	2300	2690	2900	2300	3400	3810	4100	3150	4500	5010	5500
10	2300	3210	3490	3600	3250	4200	4720	5050	4390	5700	6300	6800
14	2900	3650	3850	4020	4040	4800	5300	5600	5600	6700	7400	7800
	48-in. Ventilator				54-in. Ventilator				60-in. Ventilator			
5	4000	5900	6700	7400	5100	7300	8450	9500	6500	9300	10600	11900
10	5900	7900	8900	9050	7850	9900	11000	11500	9200	12500	14000	14500
14	7000	9000	10000	10500	9500	11800	12500	12800	11400	14000	15000	16000
	72-in. Ventilator				84-in. Ventilator				96-in. Ventilator			
5	9800	13500	14600	16000	12500	18000	21000	23000	16000	22500	27000	29000
10	13000	17000	19000	20000	18000	24000	27000	28000	22800	30000	33500	35500
14	16500	20000	21600	22800	22000	28500	30600	32000	27500	36000	37000	41000

Effico Standardized Roof Bases

The square bases are maximum size required, of proper gauge and well made.

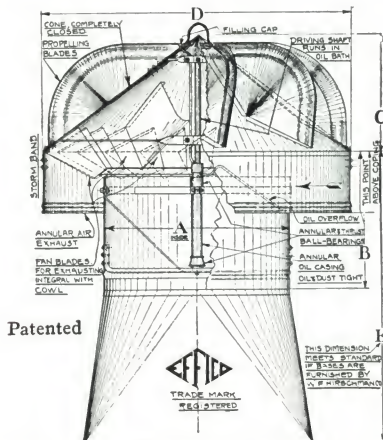


Effico Standardized Roof Bases

Furnished with or without dampers. All flat flanges are 5 in. wide.
Give style, number and pitch of roof when ordering

EFFICO STANDARDIZED ROOF BASES

Dimensions, inches			Galvanized steel		Wt. copper, oz.
A	B	C	Gauge	Net weight, lb.	
10	14x14	12	22	16	14
12	16x16	12	22	20	14
14	18x18	12	22	24	14
18	20x20	12	22	34	16
20	24x24	12	20	48	16
24	30x30	16	20	55	20
30	36x36	16	18	75	20
36	42x42	16	18	95	24
42	48x48	16	18	105	24
48	54x54	18	18	125	24
54	60x60	18	18	140	24
60	66x66	18	18	150	24
66	72x72	18	18	165	24
72	80x80	18	18	180	24
84	92x92	18	18	245	24
96	116x116	18	16	300	24



Detail of Effico Patented Rotary Ball Bearing Ventilator

Effico Internal Louver Unit Ventilators

The Effico internal louver unit comprises the Effico rotary ball bearing ventilator head constructed with a specially short base, or neck. In this base is built a circular multiple blade louver damper. The damper is carefully balanced and heavily constructed. The blades lap and are fitted in a circular frame. It is adaptable for manual control, but is intended for a thermostatic control system. The roof base is very low, is part of this unit and is supplied with either the square or round base.

The roof base and the ventilator head are connected by means of angle iron companion rings, which give solidity and facilitate the taking down of the ventilator when required. Each ventilator neck has also a tight fitting door to give free access to the louvers and to the operating motor. The operating motor is suspended underneath the damper to a cross brace. The object of the specially low base and the low roof base is to make the entire unit as low to the roof as possible.

Effico Louver Dampers—Made of stretcher leveled sheet steel. The pneumatic damper motor is supplied and installed with these units unless not desired. (Note specifications below.)

Effico Louver Unit—Low height. The Effico louver unit sets very low (note dimensions at right).

Height above Coping—Louver Unit "C" dimension should be above coping.

Effico Rotary Ball Bearing Ventilator Head—The Effico rotary ball bearing ventilator head is already lower in height by 50% than other rotary types of ventilator. By using the construction as outlined above, the entire unit is brought as low to the roof as is permissible to still allow the air free exhausting, and to maintain the outlets above the snowline. By adopting the circular multiple louvers, of which we are the inventors, we can standardize on sizes and build the round louver for considerably less than the square or rectangular styles, many of which we have built in the past years.

By installing same in the neck of the ventilator at our shop, we not only give a perfect fit, but also eliminate all indefiniteness as to the correct location and size of the damper and cut the installing cost to one-quarter. It is also easier to install the operating motor and makes it more accessible. The size of the damper is the full size of the stack, and yet is about 40% smaller in area than those heretofore used in the square or rectangular louver, again reducing the cost considerably. By supplying the contractor with the complete unit the builder is assured of a well designed, uniform and complete apparatus.

Heretofore, the contractor purchased the ventilator from one manufacturer, probably built the roof base himself, and purchased the dampers elsewhere, or even the dampers were supplied and installed by another contractor. This added materially to the cost.

Suggested Specifications—The roof ventilators shall be of the sizes as shown in plans, [square base] [round base] style. Shall be made of [galvanized steel] [Armco iron] [Toncan metal] [copper]. [The pneumatic damper motor to be supplied with these units]. [The pneumatic damper motor to be supplied by the heating and ventilating Contractor]. They shall be the Effico Internal Louver Unit Ventilators as manufactured by the W. F. HIRSCHMAN Co., INC., LeRoy, N. Y.

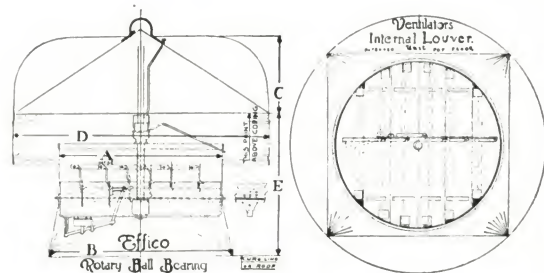


Typical Effico Louver Unit Installation

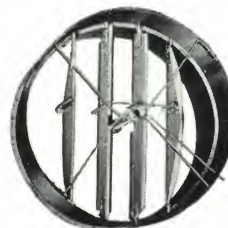
EFFICO LOUVER UNIT SIZES AND DIMENSIONS

Dimensions, inches					Galvanized steel			Copper, oz.	Code for telegraphy
A	B	C	D	E	Gauge		Net weight, lb.		
					Cowl	Base			
18	20	10	28½	23	24	24	90	16	vale
24	30	14	40	30	22	22	140	18	valet
30	36	14	50	32	22	20	190	20	vive
36	42	18	60	32	22	18	225	24	varve
42	48	22	68	43	22	18	350	24	vetch
48	54	24	76	43	22	18	400	24	vax
54	60	24	86	43	22	18	600	24	vaid
60	66	24	98	43	20	18	710	24	valor
66	72	30	103½	49	20	18	800	24	vamp
72	80	30	114	54	20	18	880	24	vane
84	92	36	130	54	18	16	1050	24	vang
96	116	45	153	54	18	16	1200	24	van

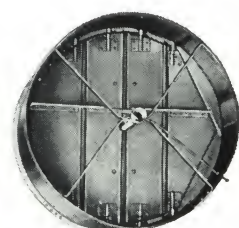
For round bases, "E" dimension remains the same.
For capacities note preceding page.



Patented
Effico Rotary Ball Bearing Ventilator—Internal Louver

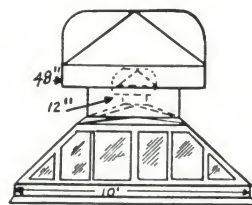


Open



Closed

The Multiple Circular Louver Damper in Neck of Ventilator



Effico Ventilator Puttyless Skylight Unit
Patented

Effico Ventilator Puttyless Skylight Unit

Serves the dual purpose of giving real ventilation and allowing daylight into building, with one roof opening. *Weatherproof* at all times. Standard sizes from 3x3 to 6x12 ft. Write for further information.

Design and Construction

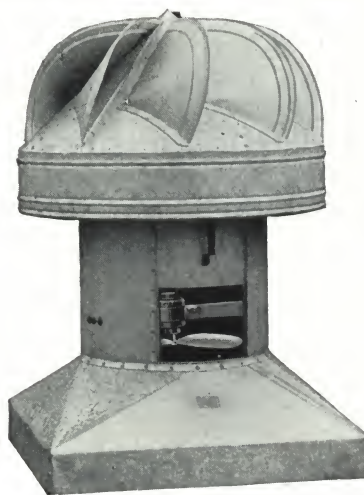
Effico products are carefully designed, all parts carefully tested, and manufactured on a production basis—in the most modern ventilator plant in the United States.

Effico Wind Electric Ventilator

Principle of Operation—When the wind is blowing sufficiently to remove the desired amount of air from the building being ventilated, the electric motor is still. Instantly, when the wind turbine moves below a previously determined number of revolutions, the electric motor starts automatically and carries the load. The entire apparatus is noiseless, the motor is of fully enclosed type, will run for six months without oiling, will not heat under constant running, and is designed for normal operating conditions.

Self-contained Unit Construction—The Effico Wind Electric Ventilator comprises the wind turbine, the same type head as described on previous pages, electric motor, fan, and roof base which form a complete exhaust unit. The motor is furnished and installed by us in the ventilator. The Effico Wind Electric Ventilator, like all Effico products, has been fully tested and is guaranteed by us.

When to Use—The Effico Wind Electric Ventilator is the very best roof ventilating apparatus of the W. F. HIRSCHMAN Co., Inc., line. It will successfully ventilate any type of building and is especially desirable for exceedingly difficult installations. For requirements where Effico ventilator heads (wind driven), due to location, are not practical, use the Effico Wind Electric.



Patented
Effico Wind Electric Ventilator

Power Consumption—Efficos of 12 to 24-in. sizes are equipped with 1/30 hp. motor. All Efficos utilize fully all stack assistance (temperature difference between air in room being ventilated and outer air), thus requiring very little power.

Exhaust Capacity—Same as that of Effico Rotary Ball Bearing Ventilators. Note capacity on second preceding pages. This apparatus is adjustable to exhaust various quantities of air within the limits of given sizes and is regularly supplied at capacities of 5 miles per hour wind and 10° temperature difference rating.

Any other capacity can be supplied as the ventilator is adjustable to any constant capacity after installation.

Special Advantages — Besides the regular automatic operation, the motor may also be so connected as to give a maximum exhaust capacity (running full speed) by manual control, thus allowing a great volume of air to be exhausted at will.

Finish—Handsomely painted in red or any desired color and is made of galvanized sheets. Also furnished in copper, monel metal, lead clad, aluminum, Armco iron, or Toncan metal.

Specifications—The roof ventilators to exhaust from—to be the Effico Wind Electric Ventilators as made by the W. F. HIRSCHMAN Co., Inc., Le Roy, N. Y., the sizes to be as shown on the prints. The current for motors is: current—, voltage—, cycle—.

Effico Reliability

Your installation bearing the Effico trade-mark means that you have the highest grade apparatus of its kind installed and that there is no necessity for worry as to expenditure for inspection and maintenance.

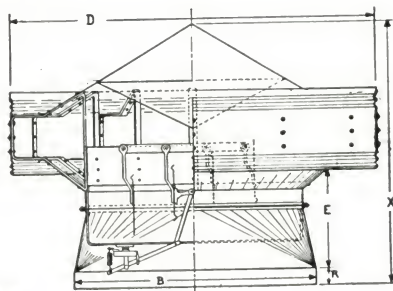
EFFICO WIND ELECTRIC VENTILATOR

Dimensions in inches				Thickness of metal		
Size of neck	Base	Height to propeller blades	Height of blades	Gauge G. I.		Copper, oz.
				Cowl	Base	
14	20	32	8	24	22	16
19	26	32	10	24	22	18
25	38	40	14	24	20	18
31	40	42	14	24	20	20
37	44	45	18	22	18	24
43	50	51	22	22	18	24
49	54	51	24	22	18	24
55	60	51	24	22	18	24
61	66	55	24	22	18	24

Le Roy Internal Louver Unit Ventilator with Inverted Cone

Like the Effico louver unit, the Le Roy Ventilator includes a multiple circular damper, short base with access door, and pneumatic motor. The head and base are connected by means of companion angle rings. The inverted cone assists very much in the free exhausting of air. Its exhaust area through the head is 50% greater than its stack area. The Le Roy Unit is especially desirable for installations where a pressure is maintained in the building.

Capacity and Construction—Le Roy Louver Unit



Ventilators will exhaust as much air via the siphonage principle as any stationary ventilator made. This unit is especially designed to set low on the roof. It is exceedingly substantially built of very heavy sheets.

Cost—For buildings where very low price ventilator is desired and heavy ventilating supply apparatus is required, we highly recommend this unit as there is no expense for installing the air control damper. The damper itself, being circular, is produced at a minimum cost.

LE ROY INTERNAL LOUVER UNIT VENTILATOR

Throat size, in.	Dimensions in inches				
	B	X	E	R	D
12	16	27	16	4	21
16	22	31	16	4	30
18	22	31	16	4	30
24	30	41	22	4	40
30	36	43	22	4	52
36	42	48	22	4	60
42	48	56	24	4	72
48	54	56	24	4	82
54	60	56	26	4	82
60	66	56	26	4	102
66	80	78	26	4	102
72	80	78	26	4	120

ESTABLISHED 1866

MERCHANT & EVANS CO.

Manufacturers of Roof Ventilators

PHILADELPHIA, PA.

OFFICES AND WAREHOUSES

PHILADELPHIA, PA. NEW YORK, N. Y. CHICAGO, ILL. WHEELING, W. VA. KANSAS CITY, MO. CLEVELAND, OHIO

WORKS: PHILADELPHIA, PA.; LANCASTER, PA.; WHEELING, WEST VA.

Also Sold by: GLOBE AUTOMATIC SPRINKLER COMPANY (General Agents)

OFFICES IN PRINCIPAL CITIES

Products

"Star" Ventilators: Standard, Fire Retarding, and Glass Top Types.

For "Almetl" Doors and Shutters, see page A878.

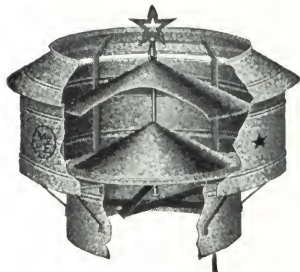
Standard "Star" Ventilators

A scientific combination of the injector and siphon principles applied to stationary roof ventilators, which in conjunction with large exhaust outlets protected to defy the elements, gives a maximum of efficiency at a minimum of investment cost.

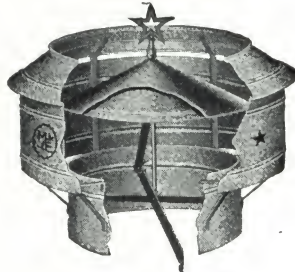
Furnished with flat glass top when desired by replacing the conical metal top with wire glass. In no way are the exhaust and stormproof qualities affected.

Fire Retarding "Star" Ventilators

Of the same appearance and construction details as the Standard with the addition of a patented gravity damper. A chain connected by a fusible link holds the damper in any position between open and closed; and is arranged to auto-



Closed



Open

Fire Retarding "Star" Ventilator with Automatic Gravity Damper (Patented)



matically drop the damper to a closed position when exposed to a high temperature. This style is particularly recommended for factories, warehouses and buildings where control of heat losses during winter months is desired.

Fire Retarding Skylight "Star" Ventilators

This device is a combination skylight and dampered ventilator. It is provided with annular damper connected to a chain with fusible link. The outstanding feature of this ventilator is the admission of light even though the damper may be in closed position. This type differs somewhat in appearance and construction details from the standard type, is weather-proof and has ample exhaust capacity.

Bases

Bases are regularly made of the same weight material as the ventilator proper. Regulation bases are made square at the bottom, and gradually taper to cylindrical shape at the top. Straight pipe bases furnished when requested. All bases have roof flanges of suitable width. All seams and joints riveted and thoroughly soldered to prevent leakage.

Flat disc counterbalanced dampers, strongly reinforced for rigidity, operated by either cord or chain, also furnished when required. These flat dampers are held on specially designed pivots, made of brass to prevent corrosion.

Exhaust Capacity

Recent comparative tests based on wind action only of roof ventilators conducted at Engineering Experiment Station, Kansas State Agricultural College, developed the "Star" to have a greater average exhaust capacity than any in the following groups of types tested: open pipe, plain stationary, siphoning stationary, and plain rotary, with wind velocities at 4, 6, 8 and 10 miles per hour.

PRICE LIST, EXHAUST CAPACITIES AND SHIPPING WEIGHTS OF "STAR" VENTILATORS AND ACCESSORIES

Size, in.	Gauge steel	Weight C. R. copper, oz.	Exhaust* capacity in cu. ft. per hour based on wind action only at 10 miles per hour; no temperature difference	Exhaust capacity in cu. ft. per hour based on wind velocity at 10 miles per hour; temperature difference 20° F. and height above intake 20 ft.	Standard Type Star Ventilator		Fire Retarding Type Star Ventilator		Regulation Square to Round Bases				Disc Dampers	
					List price	Shipping weight, lb.	List price	Shipping weight, lb.	List price	Opening in roof, in.	Height of base, in.	Shipping weight, lb.	List price	Shipping weight, lb.
3	26	16	1,260	1,880	\$3.50	1 1/2								
4	26	16	2,230	3,380	3.75	2								
5	26	16	3,490	5,280	4.00	3								
6	26	16	5,020	7,600	5.25	4	\$11.00	5						
7	26	16	6,830	10,340	6.50	5	13.00	7						
8	26	16	8,930	13,510	7.00	8	15.00	9	\$9.25	10x10	15	9	\$3.00	2
9	26	16	11,300	17,100	7.75	9	15.50	10	9.75	12x12	15	12	3.25	2 1/4
10	26	16	13,950	21,110	8.00	12	16.00	15	10.75	12x12	24	14	3.50	3
12	24	16	19,930	30,160	9.75	19	17.50	21	11.50	14x14	24	17	3.75	4
14	24	16	27,350	41,380	11.25	23	22.75	28	13.25	16x16	24	24	4.00	6
15	24	18	31,400	47,500	13.75	32	24.00	38	13.75	18x18	30	30	4.50	7
16	24	18	35,720	54,040	14.50	33	25.50	39	14.00	18x18	30	31	5.00	8
18	22	18	45,200	68,400	17.50	40	27.50	48	16.50	22x22	30	36	5.50	9
20	22	20	55,800	84,440	21.50	47	31.50	57	19.00	24x24	30	47	7.50	11
22	22	20	67,530	102,170	23.50	50	36.00	62	20.50	28x28	30	50	8.00	13
24	22	20	79,740	120,645	26.50	59	38.50	71	21.00	30x30	30	51	8.50	15
26	22	20	93,580	141,580	39.50	68	43.00	84	23.00	32x32	30	57	9.00	18
28	20	20	108,520	164,200	40.00	96	54.00	118	27.00	34x34	36	68	9.50	20
30	20	20	124,570	188,470	45.50	113	62.00	134	30.00	36x36	36	83	10.00	22
32	20	20	141,750	214,460	59.00	142	66.00	167	34.00	38x38	36	91	13.50	25
34	20	20	160,020	242,120	60.00	152	75.00	190	36.00	40x40	40	95	14.50	28
36	20	20	179,400	271,440	61.00	170	85.00	195	38.00	42x42	40	104	15.00	31
40	20	24	221,490	335,110	76.00	200	117.00	225	62.50	48x48	48	150	25.00	63
42	20	24	244,190	369,450	78.00	210	122.00	250	70.00	50x50	48	205	28.00	68
44	20	24	267,990	405,470	95.00	258	133.00	290	76.50	50x50	48	215	30.50	72
46	20	24	292,730	442,910	98.00	275	150.00	330	87.00	52x52	48	220	32.50	75
48	20	24	318,930	482,530	104.00	303	157.00	365	93.00	56x56	48	226	34.00	78
54	18	24	403,640	610,710	167.00	468	233.00	540	145.00	64x64	48	300	45.00	90
60	18	24	498,340	753,984	207.00	590	274.00	725	177.00	72x72	60	388	55.00	105
64	18	24	566,810	857,590	241.00	650								
66	18	24	602,980	912,310	266.00	700								
72	18	24	717,600	1,085,720	323.00	952								
84	18	24	976,740	1,477,810	495.00	1395								
96	18	24	1,275,750	1,930,200	515.00	1600								

*According to comparative tests made by engineering experiment station, Kansas State Agricultural College.

Prices on copper and other metals will be furnished on application.

Prices on glass top ventilators on application.

Ventilators larger than 50-in. diameter shipped in sections. Discounts on request.

THE IONA VENTILATOR COMPANY, INC.

OFFICE AND WORKS

2821-29 West Dauphin Street, PHILADELPHIA, PA.

BRANCH OFFICE: 709 Sixth Avenue, SAN FRANCISCO, CALIF.

Products

IONA VENTILATORS, Round or Rectangle, with metal or glass tops.

XIT VENTILATORS, Round or Rectangle, metal tops.

XIT AUTOMATIC TEMPERATURE-CONTROLLED DAMPERS.

XIT Ventilators

The super XIT is designed to meet perfectly those cases where the highest possible efficiency is demanded. Its unusually substantial construction is indicated in the illustration below. It is warranted storm proof, and its exceptional efficiency has been repeatedly demonstrated in actual comparative tests with the best ventilators previously available. We believe the XIT to be the most efficient ventilator ever built because it has larger area of vertical exits and a greater total exit area.

Basic Principles of Design—(1) Head 80% greater in diameter than shaft of ventilator. (2) Width of storm band 80% of diameter of shaft and so placed as to exclude external air from ventilator head. (3) Area for air leaving ventilator head (not including bottom opening at head) 75% greater than cross-sectional area of shaft. (4) Principle of action or suction is that of chimney or stack, which is doubled by a second or internal band, thereby making two points of suction which are always to the lee side of ventilator, resulting in greater increased movement of air therefrom.



XIT Ventilator

SIZES AND STANDARD PRICE LIST XIT VENTILATOR

Vent size, in.	Outside diam., in.	Height, in.	Gauge iron or metal	Approx. finished weights, lb.	Gauge copper, oz.	List price
6	10 ³ / ₄	8 ³ / ₄	26	5	16	\$ 12.00
7	12 ¹ / ₂	10 ¹ / ₄	26	6	16	14.00
8	14 ¹ / ₄	11	26	8	16	16.00
9	16 ³ / ₄	12	26	10	16	18.00
10	18	13 ¹ / ₂	26	12	16	20.00
12	21 ¹ / ₂	15 ¹ / ₂	24	16	16	24.00
14	25	16 ³ / ₄	24	28	16	28.00
15	26 ¹ / ₂	17	24	31	18	30.00
16	28 ³ / ₄	18 ¹ / ₂	22	34	18	32.00
18	30	19 ¹ / ₂	22	43	18	36.00
20	34	22 ¹ / ₂	22	55	18	40.00
22	38 ¹ / ₂	24	22	61	18	44.00
24	43	26	22	84	20	48.00
26	46	28	22	105	20	52.00
28	50	30	22	131	20	56.00
30	54	32	22	146	20	65.00
32	57	34	22	160	20	80.00
34	60	36	22	178	20	100.00
36	64	38 ¹ / ₂	22	238	20	120.00
40	71 ³ / ₄	42	20	275	20	180.00
42	77	45	20	305	20	190.00
44	79	48	20	350	20	200.00
48	86	51	20	615	24	240.00
54	97	57	18	757	24	300.00
60	107	63	18	880	24	360.00
66	118	69	18	980	24	420.00
72	129	75	18		24	480.00

EXHAUST DATA CARD XIT VENTILATORS

Temp inside and outside °F	Wind veloc., m.p.h.	Cubic feet of air through ventilator per hour									
		12	14	16	18	20	24	30	36	40	48
70°	3	20,546	27,783	36,352	45,960	50,804	81,811	127,008	193,287	225,792	326,044
70°	5	24,460	33,075	43,276	54,714	60,480	97,036	151,200	218,198	268,800	388,147
70°	10	34,244	46,305	60,536	79,599	84,672	125,850	211,680	305,477	376,320	543,405
70°	15	47,941	64,827	84,750	111,438	118,540	176,190	296,352	427,667	526,848	760,767
70°	20	67,117	90,757	118,650	156,013	165,956	246,666	414,892	598,733	737,587	1,065,073

Increase in velocity of wind over five miles, increases exhaust 8% per mile. Higher inside temperature increases exhaust 1¹/₂% per degree. In elevation over 25 feet, exhaust increase varies as square root of height.

Dampers—Flat, butterfly, skylight, fire retarding or temperature controlled types, with felt edge when desired to be airtight.

Guarantee XIT Ventilators—Our guarantee is of the most substantial character, providing not only against defective materials, but backing our claims for this unusual ventilator to the extent of offering to take back within 60 days of date of purchase at our expense, refund any payments made and bear transportation costs both ways, any XIT ventilator that fails to fulfill what we specify for it at the time of sale. And we make only the simple provision that we have opportunity to be present at a comparative test.

The Iona Ventilator

A standard and successful ventilator for 20 years.

Fire Retarding Damper—Damper used exclusively in this ventilator automatically opens or closes, as desired, in case of fire. It requires no attachment inside of building to hold it in any desired position.



Iona Ventilator

SIZES AND STANDARD PRICE LIST IONA VENTILATOR

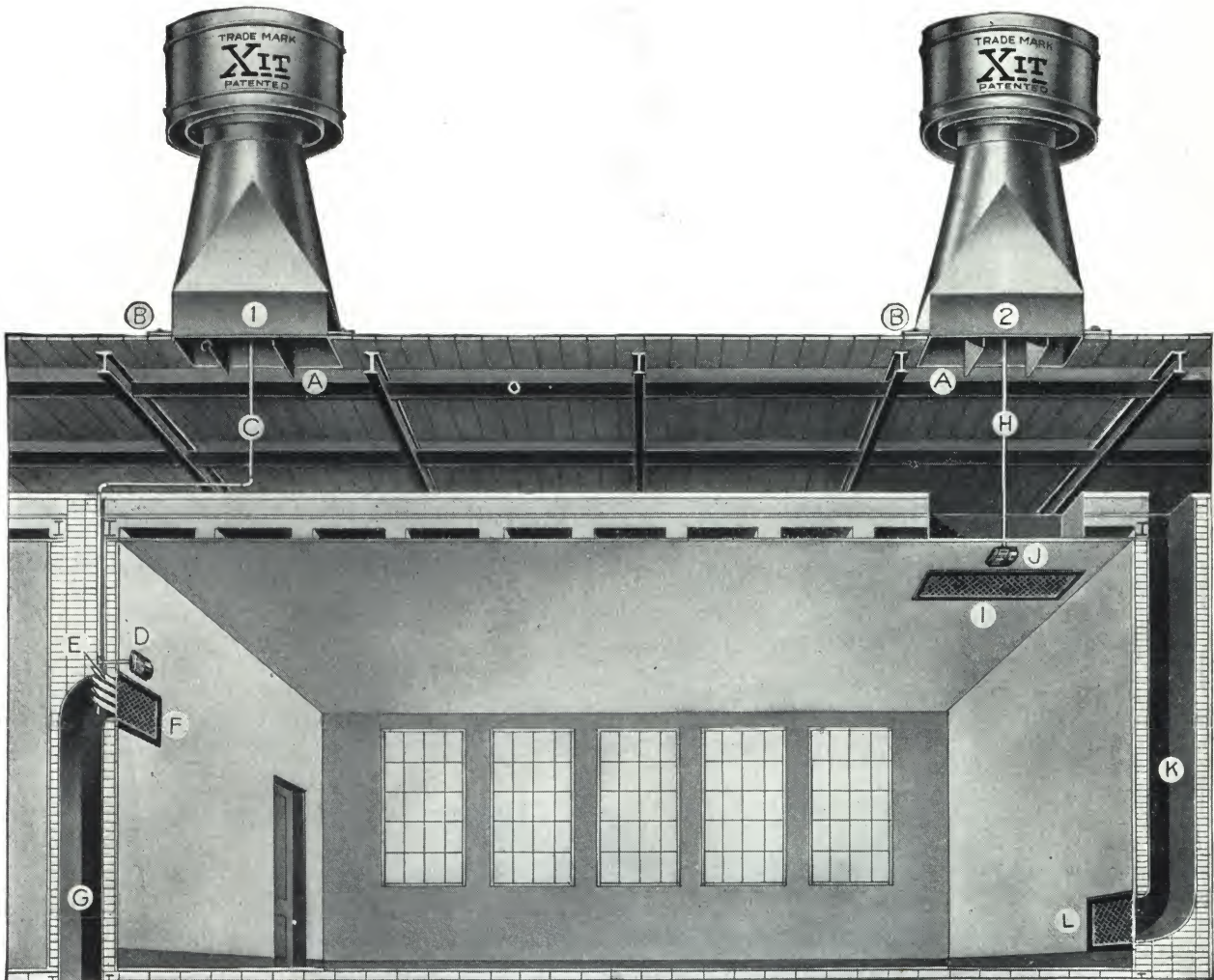
Vent size, in.	Outside diam., in.	Height, in.	Gauge iron or metal	Approx. finished weights, lb.	Gauge copper, oz.	List price
6	10	6	26	3	16	\$ 3.40
8	14 ¹ / ₂	7	26	4	16	4.65
10	18	9	24	6	16	5.75
12	21	10	24	8	16	6.75
14	24	12	22	14	18	13.00
16	27	13	22	20	18	20.00
18	31	14	22	26	18	27.00
20	34	15	22	30	18	33.00
24	42	18	22	42	18	40.00
30	51	23	20	75	20	65.00
36	62	27	20	118	20	120.00
42	72	31	18	182	20	190.00
48	82	35	18	275	20	240.00
54	94	38	18	300	24	300.00
60	104	43	18	335	24	360.00
72	130	60	18	630	24	480.00

The prices of bases and dampers are always extra, regulated according to the number and size required.

Xit Automatic Temperature-Controlled Dampers

Operation—Xit Automatic Temperature-Controlled Dampers are operated through The Fulton Company's Sylphon Regitherms (which, as used on this damper with patented operating connections, are complete operating units, regulating the temperature at a set point) or they may be locked in open or closed position. It is

obvious that even temperature is desirable in all rooms with varying exposures without loss of heat through improper operation of ventilating controls. This may be accomplished through the use of Xit Automatic Temperature-Controlled Dampers.



Two Systems of Installing Xit Automatic Temperature-Controlled Damper

Explanation—Figure (1) represents joint unit operation from temperature of room, by Xit Automatic Temperature-Controlled Damper (A) with heat flue damper (E) which is operated by sylphon regitherm (D) through connecting rod (C). Air enters room from heat flue (G) and register (F) and is drawn from room through register (L) and duct (K) to loft, and out of building by Xit ventilator (1). Figure (2) represents connection to room through loft flue and ceiling register (I) Xit Automatic Temperature-Controlled Damper (A) connected to sylphon regitherm (J) by operating rod (H) which operates damper from temperature of room, or flue (K) may be used. (B) flange for connecting to roof.

Specifications—Furnish and install Xit Automatic Temperature-Controlled Dampers as made by the IONA VENTILATOR CO., INC., Philadelphia, Pa., and sylphon regitherm with necessary registers and connections.

(2) All damper blades to be made of aluminum with brass connections and ball bearings.

(3) The regitherm shall operate ventilator damper to which it is attached at a variation not to exceed 2° above or below any given point.

Heat Register—The regitherm shall operate ventilator damper and heat regulating damper to which it is attached at a temperature variation not to exceed 4° above or below a given point.

Bases—All bases to be of the box to transformer type and of material not lighter than that of which ventilator is made, with flange of sufficient width to guarantee a watertight connection at roof.

Further Information and Prices—Furnished on request.

KERNCHEN COMPANY

Ventilating Engineers

113 West Washington Street, CHICAGO, ILL.

EASTERN OFFICE—15 Beekman Street, NEW YORK, N. Y.
AGENCIES IN PRINCIPAL CITIES

FACTORY
SOUTH GARY, IND.

Product

"K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS).

"K-S-V's" Are Correct Siphons

The correct siphon is the most powerful pulling force known to this field of ventilation. It not only exhausts, but it pulls terrifically. The siphons harness the lightest air currents, compressing and compelling them to co-act in mightily increasing the suction of air out through the ventilator.

Construction

Simplicity of construction and complete absence of the friction inevitably involved in old-style rotary mechanisms make the "K-S-V" a troubleproof, lasting investment. Free area of outlet over 200% of pipe area. Nothing to choke or hinder. Friction at minimum, exhaust at maximum.

The eduction pipe is cylindrical with V-shaped notches or openings at the top, each covered by a siphon tapered inwardly toward the top, the total of four siphons being covered by a jacket of conical shape, whereby other siphons (four) are formed, greatly increasing the terrific pulling power. In addition, a top construction of two specially designed hoods is used, augmenting considerably the pulling force and making the unit storm proof.

The absence of friction, no revolving mechanism being present, means silent performance, nothing to wear out, nothing flopping around, no maintenance cost. A rotary requires a certain wind energy to swing it around *before it gets ready to ventilate*. The "K-S-V" *uses this wind energy to ventilate*.

Furnished in any size and made of any metal desired such as galvanized steel, Keystone copper steel,



Armco iron, Toncan metal, cold rolled copper, aluminum zinc, monel metal, etc.

Furnished with or without base (see opposite page) damper or condensation arrestor.

Special Ventilation Service

The KERNCHEN COMPANY specializes in ventilation and its engineers are always available, gratis.

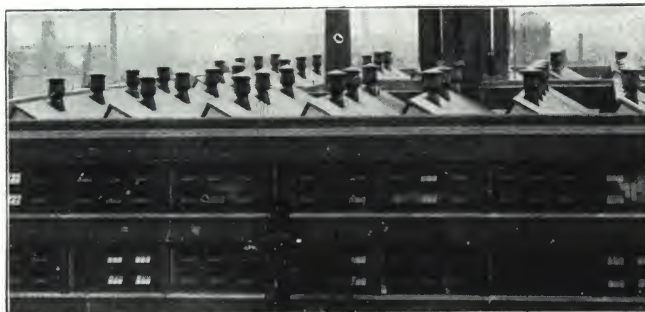
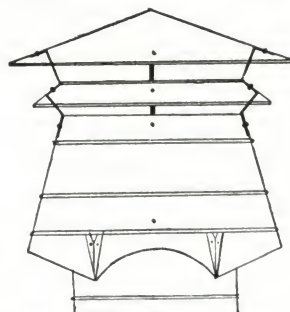
Particular attention given to difficult or unusual problems involving great heat as well as temperatures below the freezing point; steam conditions; elimination of condensation, moisture, fumes, gases or smudge, foul or vitiated air, in every type of building or room.

Specifications

Roof ventilators to be "K-S-V's" as manufactured by the KERNCHEN COMPANY, 113 West Washington Street, Chicago, Illinois, in the following sizes (specify sizes by neck diameter and quantity of each size).

Bases are to be "K-S-V's" as manufactured by the KERNCHEN COMPANY, 113 West Washington Street, Chicago, Illinois, and furnished in following types to fit ventilators (specify by type number; see opposite page and give pitch of roof in inches per foot).

Caution—Beware of imitations and infringements; protect yourself by specifying "K-S-V's."



52 "K-S-V's" Installed on This Sawtooth Roof with Pivoted Sash

Where Used

For all buildings and all bad air conditions. A "K-S-V" does the work of three others. Save this cost!

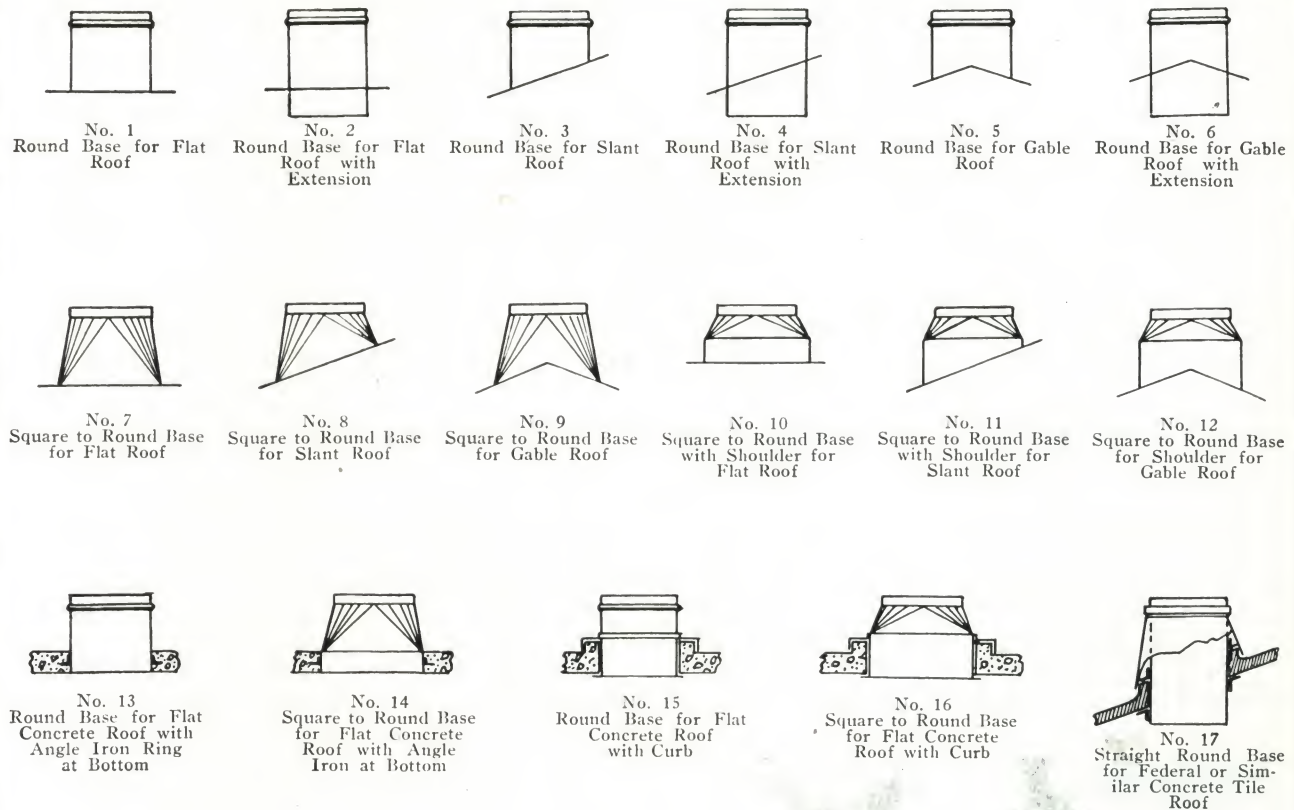
Booklet—"It Pulls"

A postal will bring our latest illustrated booklet, "It Pulls," containing complete information concerning "K-S-V's" (Kernchen Siphonage Ventilators).



Five 42-in. Ordinary Ventilators Replaced by Five 36-in. "K-S-V's"

This is one of hundreds of instances where ordinary ventilators have had to be torn out and replaced by "K-S-V's." But there is *not one* instance we know or ever heard of where "K-S-V's" were replaced by any other kind of ventilator



Official Tests

Nothing is more deceptive than irresponsible, theoretical tests.

Exaggerated performance figures will appear to be justified at times by laboratory tests conducted under conditions which are more favorable than those found in actual service.

It is only when laboratory and *field* tests agree, that the results can be taken as conclusive.

Note particularly the consistent figures in the two accompanying tests by national authorities, one conducted in the laboratory, the other on the Leader Building installation in Cleveland, Ohio.

OFFICIAL TEST OF "K-S-V's" (KERNCHEN SIPHONAGE VENTILATORS) CONDUCTED BY ARMOUR INSTITUTE OF TECHNOLOGY, CHICAGO

SHOWING EXHAUST UNDER DIFFERENT WIND VELOCITIES, AND WHICH SCIENTIFICALLY PROVES THE TERRIFIC PULLING POWER AND 100% TO 300% MORE EFFICIENCY THAN THAT OF OTHER VENTILATORS

Wind velocity miles per hour	Air pulled through ventilator, lineal ft. per min.	Cubic feet air pulled through ventilator										
		Size of ventilator, in.	12	14	16	18	20	24	30	36	42	48
5	460	Per min.	364.0	492.2	644.0	814.2	1,003	1,444	2,250	3,247	4,485	5,776
		Per hr.	21,840	29,532	38,640	48,852	60,180	86,640	135,000	194,820	269,100	346,560
10	670	Per min.	525.0	717.0	938.0	1,186	1,460	2,103	3,280	4,730	6,533	8,412
		Per hr.	31,500	43,020	56,280	71,160	87,600	126,180	196,800	283,800	391,980	504,720
15	960	Per min.	754.0	1,027	1,344	1,699	2,100	3,014	4,700	6,777	9,310	12,056
		Per hr.	45,240	61,620	80,640	101,940	126,000	180,840	282,000	406,620	561,600	723,360
20	1,220	Per min.	957.0	1,305	1,708	2,159	2,660	3,830	5,980	8,613	11,892	15,320
		Per hr.	57,420	78,300	102,480	129,540	159,600	229,800	358,800	516,780	713,700	919,200
25	1,480	Per min.	1,161	1,584	2,072	2,619	3,230	4,647	7,250	10,448	14,430	18,588
		Per hr.	69,660	95,040	124,320	157,140	193,800	278,820	435,000	626,880	866,800	1,115,280

(Signed) G. F. GEBHARDT, A. H. ANDERSON, Mechanical Engineers, Armour Institute of Technology

Case School of Applied Science—Test Nov. 6, 1913
on Roof of Leader Building, Cleveland, Ohio

Armour Institute of Technology—Test April 17, 1911, in Laboratory

15 inches	Diameter of ventilator	15 inches
5.32 miles per hour, or 6% % stronger than Armour's	Velocity of outside wind	5 miles per hour
497	Velocity of air pulled through ventilator per min., lineal ft.	460
610	Exhaust of ventilator per min., cubic ft.	564
Outside temperature, 67° Fahr.	Inside temperature, 85.8° Fahr.	

(Signed) *E. H. Moore*
Head of Mech. Eng. Dept.,
Case School of Applied Science

(Signed) *T. F. Gebhardt*
A. H. Anderson
Mech. Engrs., Armour Institute of Technology

Note: We challenge all to furnish such authentic unbiased and official tests as conducted and signed by three institute of technology professors.

Details of "K-S-V" Ventilator Bases and "K-S-V" Test Data

KLAUER MANUFACTURING CO.

MANUFACTURERS AND FOUNDERS

Sheet Metal Products, Cast Goods, Road Machinery
DUBUQUE, IOWA

Products

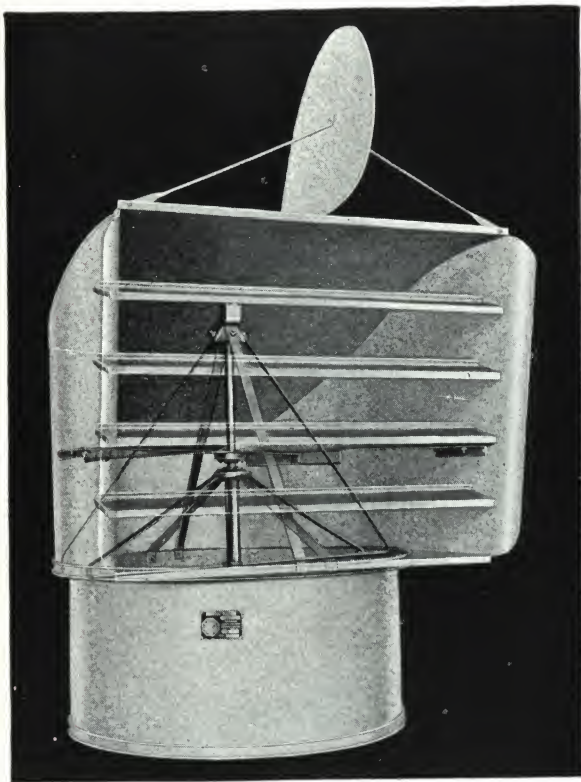
MONITOR SUCTION VENTILATORS.
MONITOR VENTILATING SKYLIGHTS.
KLAUER'S "DOUBLE LOCK SEAM" CONDUCTOR PIPE.

KLAUER'S "HEMD-EDGE" EAVES TROUGH.
KLAUER'S CONDUCTOR FASTENER.

Also Faultless Stationary Ventilators, Spouting Trimmings, "Perfection" Metal Ceilings, Underground Garbage Receivers, Corrugated Culverts, Metal Shingles and Roofing, Sewer Castings, Fireplace Grates, Andirons, Dome Dampers, Portable Electric Welders, Refrigerator Car Heaters, Road Drags, Maintainers, Scarifiers, Highway Snow Removers.

Monitor Suction Ventilators

Highly efficient in design, construction and operating principle. The planar, curvilinear top (a patented feature), increases low pressure area. The top design also adds strength to construction and enhances the appearance. Suitable for either a high or low pressure, gravity or forced exhaust, permitting a free flow of air at all times.



Phantom View of Monitor Suction Ventilator

The storm louvers are stationary; therefore positive, always in the proper position and add to rigidity of construction. Dampers furnished when ordered. Damper operates easily—fits tight when closed—and is not affected by weather elements.

Revolving Device and Bearings—Monitor pivot bearings are designed to meet the demands of ventilator users. The spindle rests on one large tempered steel ball and is guided in an upright position by the cold drawn tubing housing fitted with bronze bushings at upper and lower ends.

The head is counterweighted so that it rests with perfect equilibrium on the tempered steel ball thus reducing friction to a minimum. Years of continuous service do not produce



"Makers of
Good Goods
Since 1870"

excessive wear and increased friction in this pivot device. The bronze bushings and steel shaft will not corrode together. It will function without question, with no attention, adjustment or care of any kind. It is

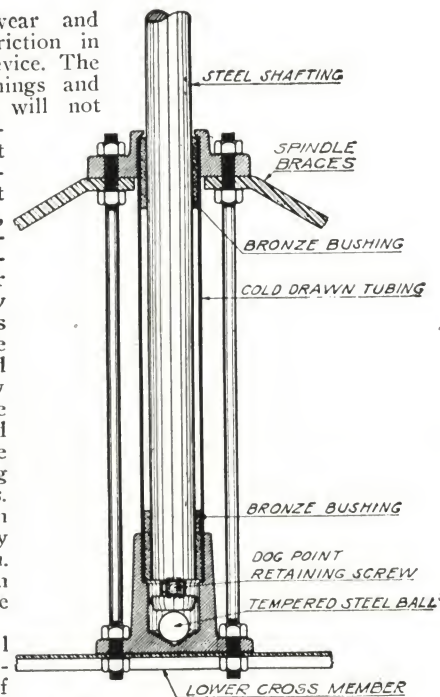
of importance to the engineer, architect and contractor to know that the ventilator he installs is equipped with a pivot device that will last as long as the ventilator lasts.

Bases—Bases can be furnished to any desired specification. Square bases to set on built-up curbing are recommended.

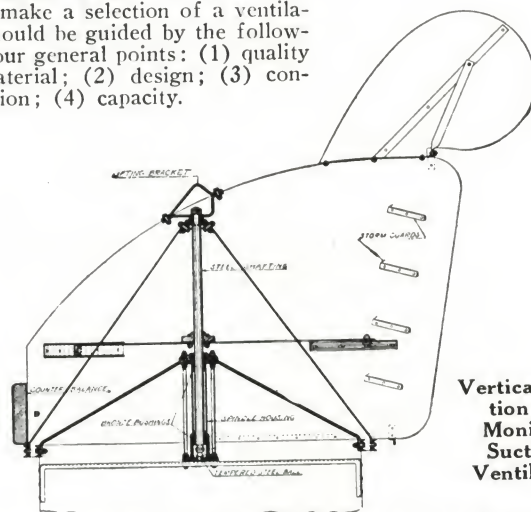
Materials—All Monitor Suction Ventilators are made of the best materials; all braces are oversize and galvanized. Sheet metal is Keystone copper-bearing steel galvanized.

Workmanship—Each and every Monitor Suction Ventilator is made up complete in our plant and is tested and approved by our engineer and labeled with a serial number.

Salient Points—Those who must make a selection of a ventilator should be guided by the following four general points: (1) quality of material; (2) design; (3) construction; (4) capacity.



Revolving Device and Bearing of Monitor Suction Ventilator



Vertical Section of Monitor Suction Ventilator

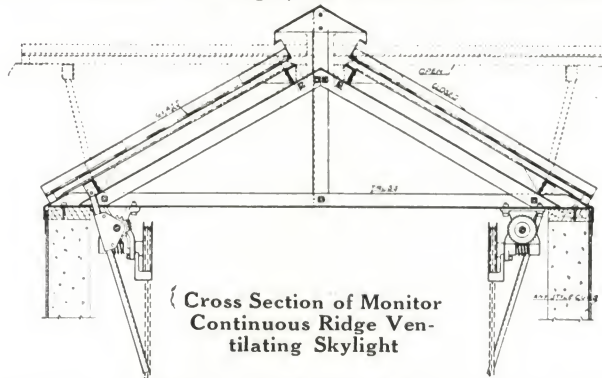
SIZES, EXHAUST CAPACITIES, ETC., MONITOR SUCTION VENTILATORS

Size, in.	Exhaust capacity, cu. ft.	Steel, gauge	Copper, ounce	Size, in.	Exhaust capacity, cu. ft.	Steel, gauge	Copper, ounce
8	155	26	18	30	2198	22	20
10	243	26	18	36	3165	22	24
12	351	26	18	42	4306	22	24
14	479	26	18	48	5628	20	32
16	625	24	18	54	7120	20	32
18	790	24	18	60	8790	20	32
20	976	24	18	66	10637	20	32
24	1405	24	18	72	12661	20	32

Exhaust capacity given is the number of cubic feet of air exhausted per minute with wind velocity of 5 miles per hour 20° F. temperature difference, and ventilator head 35 ft. above floor.

Monitor Ventilating Skylights

The Monitor Continuous Ridge Ventilating Skylight is built in the following sizes: 6x24 ft., 7x20 ft., 8x16 ft., 9x14 ft. and 10x12 ft., or multiples (in length) of these sizes. Each section is



Cross Section of Monitor Continuous Ridge Ventilating Skylight

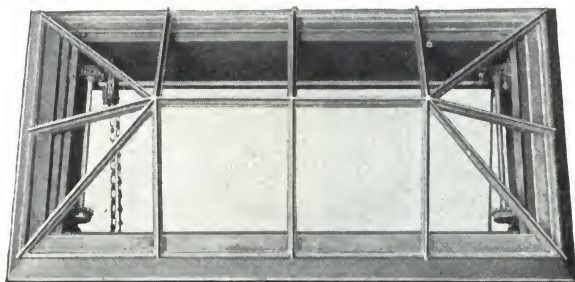
operated separately by rack bars and worm gearing. Skylight is substantially constructed and truss reinforced where necessary.

The illustrations below show the Monitor single unit type of ventilating skylight. These are made in any size not exceeding 6 ft. in width or 10 ft. in length.

Value of Ventilating Skylights—Ventilating skylights perform a service which cannot be equalled with any other type of apparatus. When open for ventilating purposes they set up a circulation of air within a building, allowing large amounts of fresh air to enter and foul and heated air to escape. Top floors of buildings are turned into useful workrooms where production had previously been impossible in hot weather.

The use of this type of skylight is very desirable for packing plants, paper mills, foundries, garages or any building in which maximum light and ventilation are paramount.

Gearing—The gearing in both the single unit and continuous type ventilating skylights is composed of cut semisteel worm wheels and steel worms and semisteel rack bar pinions. The rack bars are of rolled steel, accurately punched and all castings are designed extra heavy. The gearing is easy operating, strong and durable, and easy to install.



Monitor Ventilating Skylight—from above



Monitor Ventilating Skylight—open

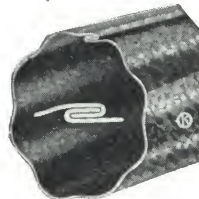


Monitor Ventilating Skylight—closed

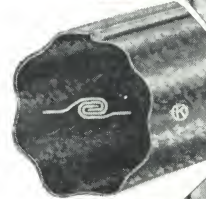
Klauer's "Double Lock Seam" Conductor Pipe

Eliminates open seam trouble on spouting jobs.

Made in plain and corrugated, round. Illustration shows the ordinary single lock seam and Klauer's "Double Lock Seam" construction.



Single Lock



Double Lock

Ordinary Single Lock Compared with Klauer's "Double Lock" Construction

Klauer's "Hem-Edge" Eaves Trough

Klauer's "Hem-Edge" Eaves Trough is manufactured so as to provide rigidity and consequent strength at the outer edge. The one-piece miter construction is an additional feature.

In the strictly one-piece miter, the bead is unbroken and requires no extra reinforcing clip at corner of bead. This means that there is no loosening due to expansion and contraction. Miter is made of heavy terne plate and then dipped in molten zinc after miter is completely formed, thus giving double protection. One of the strongest and greatest capacity miters made.

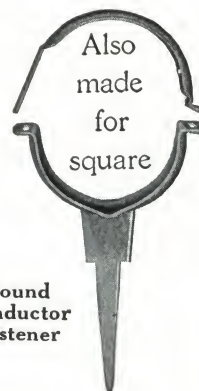


A Strictly One-piece Miter

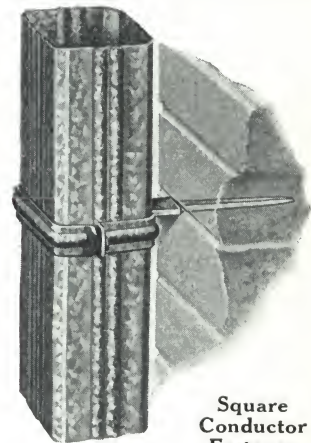
Galvanized by hand dipping in molten zinc after miter is completely formed

Klauer's Conductor Fastener

Made for plain round, corrugated round and square conductor pipe. Wood or brick drives with offset on shank which holds pipe 1 in. from wall. Strong, rigid and neat in appearance. Manufactured of copper, also steel hot galvanized after forming.



Round Conductor Fastener



Square Conductor Fastener

Spouting Materials

We manufacture a complete line of rain carrying equipment, including all trimmings or accessories. This insures uniformity and best quality and warrants the particular builder or architect specifying Klauer for these materials. Line made complete in copper—Horsehead brand zinc—Keystone copper-bearing steel, and commercial galvanized.

H. H. ROBERTSON COMPANY

Manufacturers of Ventilators

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

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BALTIMORE, MD. BIRMINGHAM, ALA. BUFFALO, N. Y. CHICAGO, ILL. CLEVELAND, OHIO HOUSTON, TEX.
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CANADA AND NEWFOUNDLAND: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

ROBERTSON VENTILATORS.

ROBERTSON PROTECTED METAL.

For Robertson Skylights, see pages A510-511.

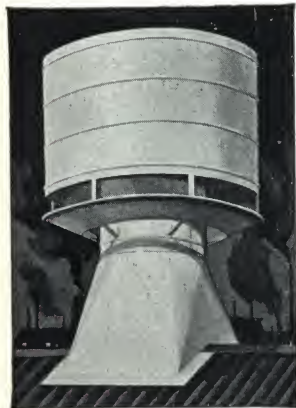
Robertson Ventilator

The successful ventilation of industrial and commercial buildings depends directly on the achievement of correct answers to these fundamental questions:

How many roof ventilators will be needed to ventilate the building effectively and economically?
What should be the *size* of these ventilators?
Just *how* and *where* should the ventilators be installed for best results?

Equipped with an installation of Robertson Ventilators, a building will be ventilated with *maximum* efficiency and at the lowest cost obtainable with such efficiency. For every Robertson Ventilator installation is based on *facts*. Guesswork and rough estimates of ventilator requirements have no place in Robertson Ventilation Engineering.

The services of the Robertson Ventilation Engineering Department are available without cost or obligation to architects, engineers and plant officials. Robertson Ventilation Engineers make a thorough and comprehensive study of each ventilation problem. They get at the facts underlying every particular requirement. They bring to bear

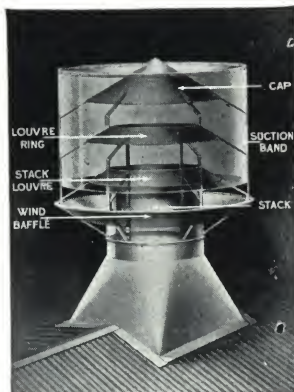


Robertson Ventilator

on each specific problem the *facts* which they have accumulated through years of experience in the ventilation of buildings of almost every type.

Then, after having determined the building's ventilation requirements with scientific accuracy, our engineers specify an installation of Robertson Ventilators that meets each specific need in every respect. A Robertson proposal will call for exactly the size and number of ventilators required for the efficient and economical ventilation of the building. Robertson Engineers specify no more ventilators than are needed and no less.

These are the reasons why a Robertson Ventilator installation—based on facts throughout—can be depended upon to maintain proper air conditions in industrial and commercial buildings at all times, and assures *most ventilation per dollar*.



Structural Features of the Robertson Ventilator

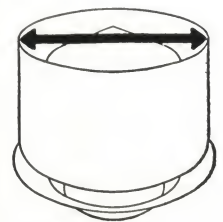


Robertson Ventilator Construction and Advantages

The Robertson Ventilator has an exceptionally powerful exhaust capacity—a superiority which is due primarily to the Robertson *suction band*. This band, scientifically designed as to size, proportions and position, multiplies the displacement or air pulling area of the ventilator more than six times.

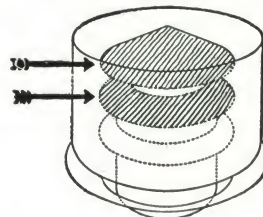
Passing winds blowing across the top and bottom of the *suction band* create a partial vacuum in the *ventilator pipe*—a strong, continuous suction which literally pulls foul air, fumes, smoke, steam, etc., out of the building.

The condensed table of capacities below shows the exhaust capacity of Robertson Ventilators of various sizes under the following conditions: wind velocity—8 miles per hour; difference in temperatures of indoor and outdoor air—20° F.; height of ventilators above air intake—50 ft. These figures are dependable. They represent *actual* discharge capacities, not the so-called “rated” capacities which are widely used in connection with roof ventilators and which are, as a rule, merely a matter of estimate.



Enlarged Air Displacement Area

Gives powerful exhaust capacity

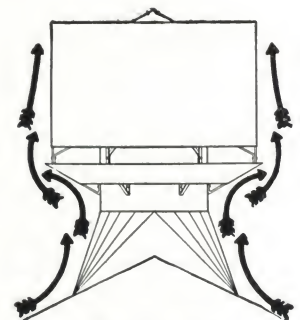


Cap and the Louvre Ring

Make the ventilator positively stormproof

Advantages of the Robertson Ventilator lies in the fact that the *cap* and the *louvre ring* render it positively stormproof and make it impossible for downward air currents to enter the ventilator and interfere with its natural discharge.

The *wind baffle* of the Robertson Ventilator is the invention of Robertson Engineers and is to be found on no other ventilators. This feature has solved one of the most difficult problems in roof ventilator design. It positively overcomes the adverse effect of wind currents deflected upward from pitched roofs. Upward air currents entering a ventilator from below seriously interfere with the discharge of air. The Robertson *wind baffle* deflects such air currents, as shown in the illustration, and thus prevents them from entering the ventilator. This is the reason why no other ventilator on the market today can compare with the Robertson Ventilator in efficiency on pitched roofs.

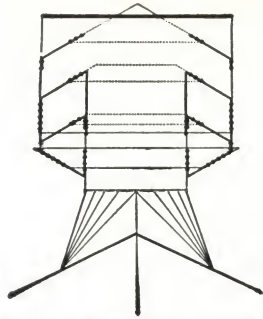


Wind Baffle

(A patented feature)
Produces remarkable efficiency on pitched roofs

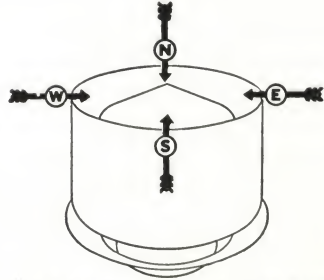
CAPACITIES OF ROBERTSON VENTILATORS

Size, in.	Discharge cap. per min., cu. ft.	Size, in.	Discharge cap. per min., cu. ft.
12	462	42	5658
16	898	48	7398
18	1041	54	9341
20	1499	60	11560
24	1848	66	13872
30	2882	72	16646
36	4160	84	22472



**Braces Efficiently Designed,
Placed and Secured Provide
Exceptional Rigidity
and Strength**

The modern tendency is distinctly towards ventilators of the *stationary* type—ventilators with no moving parts that require a perfectly level setting for efficient operation. The Robertson Ventilator is of the *stationary* type. Once erected, it requires no further attention, no adjustments of any kind, no repairs.



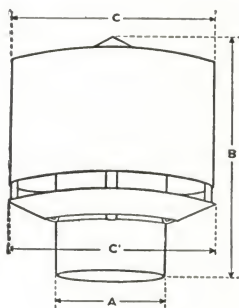
**Robertson Ventilator Operates
Efficiently Regardless of
Wind Direction**

Robertson Ventilators are made of Robertson Protected Metal (RPM), copper, galvanized steel, or any other material that may be specified. In cases where ventilators will be exposed to severe corrosive conditions, Robertson Protected Metal is the ideal material.

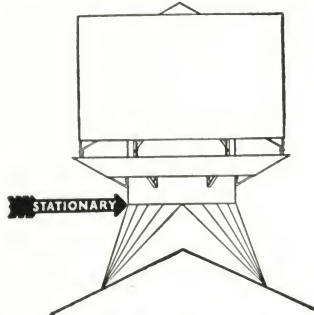
For ventilators made of Robertson Protected Metal are rust and corrosion proof and never require painting.

Dimensions, Gauges and Weights—As can be seen from the table below, Robertson Ventilators are made in all sizes used in standard practice. You will note, too, that the Robertson Protected Metal or galvanized iron used in each size is of a gauge which assures rigidity, strength and endurance.

Complete erection instructions are forwarded with each ventilator.

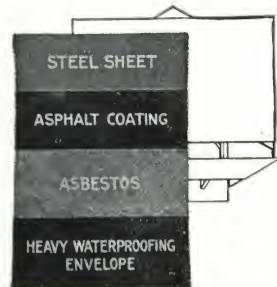


The various component parts of the Robertson Ventilator are joined together into a strong, rigidly constructed unit by an efficient system of bracing (as shown in the accompanying illustration and also in the phantom view on opposite page). The ventilator parts are bolted to the braces and held permanently tight by lock washers. The result is a ventilator of exceptional structural strength and rigidity.



**A Ventilator of the Stationary
Type**
No moving parts

Because it is of the *stationary* type—with no moving apparatus to be caught and operated by the wind—and because it presents a uniform surface in all directions, the Robertson Ventilator operates efficiently at all times *regardless of the direction of the wind*.



**Ventilators Made of Robert-
son Protected Metal Are
Rust Proof and Never
Require Painting**

Dimensions, in.				Gauge galv. and RPM	Approximate net weights, lb.		Shipping weights, lb.	
A	B	C	C'		Galv.	RPM	Galv.	RPM
12	22 3/4	22 3/4	24	24	31	46	62	77
14	27 1/4	26 1/4	28	24	40	59	75	95
16	29 3/4	30 1/4	32	24	48	70	88	110
18	32 3/4	34	36	24	57	87	127	157
20	38 3/4	37 1/4	40	24	80	103	147	170
24	45	45 3/4	48	24	130	160	220	250
30	55 3/4	57	60	22	191	247	408	464
36	67 3/4	67 1/2	72	22	275	258	513	596
*42	74 3/4	79 3/4	84	20	528	584	638	694
*48	89 3/4	91	96	20	635	782	835	982
*54	101 3/4	102	108	20	796	969	1061	1234
*60	103 3/4	113	120	20	1127	1395	1467	1735
*66	123 1/2	125	132	20	1360	1645	1731	2015
*72	129	136	144	20	1680	1995	2084	2398
*84	149 3/4	158 3/4	168	18	2314	2805	2869	3360

*Indicates that ventilator is shipped partially knocked down.

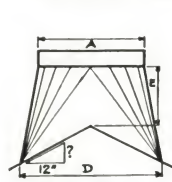
Robertson Ventilator Bases

Bases can be furnished with Robertson Ventilators to meet the requirements of any kind of roof. The three types diagrammed below are most commonly used. Types 1 and 3 are made to fit roofs of any slope; in ordering specify roof pitch. Type 6 is made to fit over concrete curbs; in ordering give size of opening and curb. Round to square bases are strongest and are shipped unless special construction is ordered.

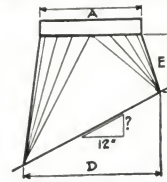
DIMENSIONS, GAUGES AND WEIGHTS OF VENTILATOR BASES

Dimensions, in.			Gauges, RPM and galv.		App. net wt., lb.		Shipping wt., lb.	
Size A	Size D	Size E			Galv.	RPM	Galv.	RPM
12	16x 16	10	22		12	16	35	40
14	18x 18	10	22		18	23	43	48
16	21x 21	10	22		25	30	50	55
18	24x 24	10	22		35	40	70	75
20	28x 28	10	22		45	55	90	100
24	32x 32	10	22		55	75	110	130
30	38x 38	12	20		75	100	135	160
36	45x 45	14	20		110	140	170	200
*42	52x 52	14	18		140	180	200	250
*48	60x 60	15	18		190	230	270	310
*54	68x 68	16	18		240	300	330	390
*60	78x 78	20	18		300	380	400	480
*66	87x 87	22	18		360	480	480	620
*72	96x 96	24	18		460	580	600	750
*84	110x110	26	16		660	770	850	950

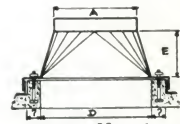
*Indicates that ventilator is shipped knocked down.



Type No. 1



Type No. 3



Type No. 6

Typical Robertson Ventilator Bases

Prices and Complete Descriptions

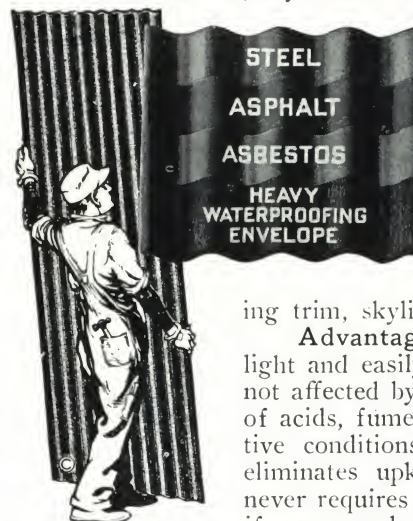
Prices, tables of capacities and complete descriptive data for Robertson Ventilators of all sizes will be sent on request.

Robertson Ventilation Data Book

The 4th Edition (52 pages) of the Robertson Ventilation Data Book contains a wealth of interesting and valuable data on ventilation. So far as we know, it is the first book that has ever been published containing data on ventilation exhaust capacities under every probable combination of severe conditions. An invaluable book for architects, engineers and plant operators. A copy is yours for the asking.

Robertson Protected Metal (RPM)

A metal building material with a steel core, which is fully protected from the most severe weather conditions, smoke, gases, fumes, condensation and all other corrosive influences, by three impervious protective



**Robertson Protected
Metal
(RPM)**

coatings: (1) asphalt, (2) asbestos felt, (3) waterproofing, applied under heat and great pressure. It is made in sheets and bars for use as roofing, siding, downspouts, gutters, general build-

ing trim, skylights and ventilators.

Advantages—RPM sheets are light and easily erected. They are not affected by the corrosive action of acids, fumes, and other destructive conditions. RPM practically eliminates upkeep expense, for it never requires painting and seldom, if ever, needs repairs of any kind. Write for complete descriptive literature and sample of the product.

ROYAL VENTILATOR COMPANY

412 Locust Street
PHILADELPHIA, PA.

Products

Manufacturers of "ROYAL" VENTILATORS of Galvanized Steel, Copper, Toncan Metal, Armco Iron, etc.:

Glass Top Ventilators; Rectangular and Square Ventilators with fire retarding dampers; Smoke Jack and Combination Ventilators; Insectproof and Birdproof Ventilators.

Features of "Royal" Ventilators

Actual tests have developed the necessity of the following parts, in combination, for producing the greatest efficiency in ventilators:

- The inverted cone
- Tapered frustrums
- Identical areas of neck and outlet

The above are standard features, embodied in every "Royal" Ventilator. It is not necessary to specify these in ordering; simply specify "Royal" Double Cone Ventilators—they are made that way.

Construction

In the selection of materials and in the construction the greatest care is taken to maintain the highest standard.

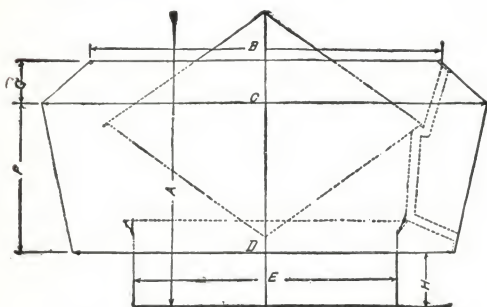
Superior and exclusive constructive features include lapped seams, giving three thicknesses of metal at joints, usually the weakest point. Edgewise braces of malleable iron running the complete length of the ventilator head, wired edges of the deflectors and standing seams in the cones all add strength and durability. The double cone has standing seams and gives two thicknesses of metal instead of one. Made in standard sizes 2 to 96 in.



Operation of the "Royal" Double Cone Ventilator

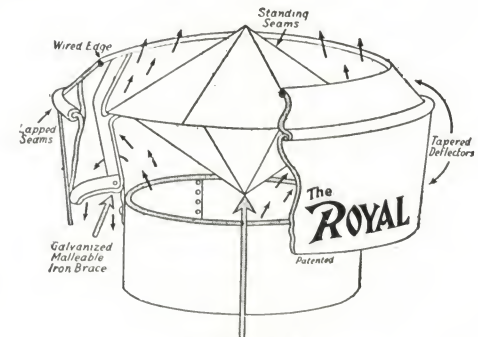
The "Royal" is so designed that full advantage is taken of the wind to produce additional draft. Complete renewal of air is accomplished under the most difficult and unusual conditions by installing "Royal" Double Cone Ventilators. The many unique and original principles embodied in the design of the "Royal" make it 100% effective and insure positive ventilation under any weather condition. Tapered frustrums deflect the outer air over and under the

edges of the frustrums resulting in a powerful suction in the tube; this means maximum exhausting capacity. Foul gases, etc., will readily pass out even when no wind is blowing. The inverted or bottom cone of the "Royal" avoids the creation of eddies, the outgoing air having free outlet unimpeded by excess friction. The upward moving foul air, etc., strikes the inverted cone and is drawn directly upward and outward. The "Royal" is not affected by down-drafts. It is adaptable to every type of building.



Sectional Drawing "Royal" Double Cone Ventilator

The
ROYAL
TRADE-
MARK
(Reg. U. S.
Pat. Off.)

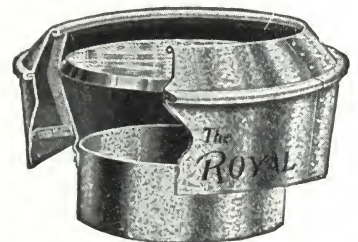


The Inverted Cone.
The reason the Royal exhausts more air per minute—also why it offers least resistance to natural or forced draft.

Double Cone Ventilator, Illustrating the "Royal" Principle—100% Efficient

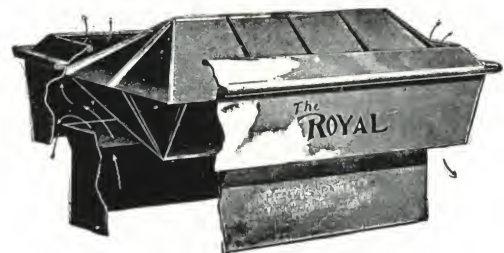


Bases Made to Fit Any Type of Roof



"Royal" Glass Top Ventilator

Contains a greater area of glass, reflects more light and gives more ventilation. Thus a 24-in. has a glass top 29 in. Full capacity of ventilation is given without interference with the light



"Royal" Rectangular Ventilator

Designed to meet conditions where the maximum amount of ventilation is required at all times. Made in any desired size, with or without dampers, glass or metal top. Also made square

"ROYAL" DOUBLE CONE VENTILATOR DATA

Size, in.	Cu. ft. exhaust per min., wind 5 miles per hour		Dimensions, in.								Area, sq. in.	Gage of iron	Weight of copper, oz.
	Temp. dif. in bldg. and outside		A	B	C	D	E	F	G	H			
	0°	20°											
10	141	186	12	13	16	14	10	5	2	3	78	24	16
12	159	417	13	15	19	16	12	6	2	3	113	24	16
16	388	512	17	20	26	23	16	8	3	3	201	24	16
18	490	832	18	23	29	26	18	8	3	3	255	24	16
20	606	911	21	25	31	28	20	10	4	5	314	24	16
22	709	1059	24	26	34	32	22	11	4	5	380	24	16
24	874	1373	24	30	39	34	24	11	5	5	453	22	16
26	1005	1631	24	33	42	36	26	13	4	3	527	22	16
28	1186	2080	26	35	45	40	28	13	5	3	615	20	16
30	1364	2390	26	35	45	41	30	14	5	4	707	20	18
32	1551	2700	25	37	47	44	32	14	5	4	804	20	18
34	1765	2987	28	40	50	48	34	15	5	4	908	20	18
36	1961	3361	28	44	56	51	36	15	6	4	1017	20	18
40	2424	4124	34	47	61	55	40	16	7	5	1257	18 and 20	18
42	2673	4680	32	52	68	63	42	17	7	3	1386	18 and 20	18
44	3124	5310	35	54	70	64	44	18	7	5	1620	18 and 20	18
48	3489	5987	39	59	75	70	48	19	8	4	1809	18 and 20	20
54	5414	8304	42	68	84	77	54	22	9	4	2390	18 and 20	20
60	6665	9721	47	76	94	82	60	23	8	8	2807	18	24
66	7851	13346	52	81	103	94	66	26	9	6	3504	18	24
72	10682	16910	50	86	108	98	72	26	10	6	4071	18	24

Send for catalogue and detail card.

LOUIS S. RYSDON & CO.

Manufacturers of "Rysdon" Exhaust Ventilator

3319 Wallace Street

CHICAGO, ILL.

LICENSED MANUFACTURER: SIOUX FALLS CORRUGATING CO., SIOUX FALLS, S. D.

Rysdon Exhaust Ventilator (Patented)

The Rysdon (Patented) Exhaust Ventilator is rigidly constructed of heavy gauge armco iron, toncan metal or cold rolled copper.

The outer windshield and inner flanges form a flue which creates a vacuum in the ventilator and prevents down-drafts, regardless of the direction or angle of the wind. A freezing sleet, snow storm or driving rain does not impair the efficient operation of the Rysdon Ventilator—it is stationary and weatherproof.

As the Rysdon Ventilator is stationary, there are no moving parts to squeak, rattle, require adjusting, freeze up or wear out. This ventilator is absolutely noiseless. There is nothing to get out of order. There is no operating expense since the Rysdon Ventilator is *always* sucking foul air out—without any loss or cost due to friction—without the original expense or continued operating cost of fans, motors, etc.



Note the Symmetrical Appearance of the Rysdon Ventilator

A Severe Test

While the Strauss Building in Chicago was being erected the air currents were deflected down the chimney of the Illinois Theatre until the natural up-draft of the flue was counteracted. The smoke, which consequently backed into the building, forced the theatre to close for three days until a Rysdon 6-ft. ventilator was installed.

After installation of the Rysdon Ventilator the up-draft in the chimney was increased 20% and the smoke was silently and efficiently sucked out.

Efficiency

As the result of competitive tests conducted by the United States Gypsum Company, we have contracted to supply Rysdon Ventilators on all their buildings.

Specification

All ventilators to be Rysdon (Patented) Ventilators of stationary type, constructed of [galvanized] [copper] rust resisting metal of proper gauge, with all bolts, braces, etc., used in construction of said ventilators to be of rust resisting metal as furnished by LOUIS S. RYSDON & Co., Chicago, Ill.



Rysdon Scientifically Constructed Ventilator—Never a Down-draft

Results of Tests

The table below gives the results of tests conducted by Armour Institute, Chicago, Ill., on June 3, 1924, on Rysdon Ventilator and other well known makes. The official report of these tests, signed by G. F. Gebhardt (per Lynn Davies, Testing Engineer) reads as follows:

"Average barometric reading 29.4 in.

"Average temperature during tests 66° F.

"In addition to the normal tests with the wind blowing horizontally or perpendicular to the axis of the ventilator, No. 1 was tested with the air blowing from

different angles varying from 35° below the horizontal to 90° above—or straight down on the ventilator. From 35° below to 45° above the horizontal the efficiency was only affected by a small amount. At greater angles it was found that the results were considerably affected by the distance between the ventilator and the roof. At 10-in. distance no air movement could be detected, at 15-in. an appreciable up-draft was observed which rapidly increased in value as the distance was made greater. At no time during the tests was there a backdraft."

CUBIC FEET FREE AIR PER HOUR WITH 8-IN. VENTILATORS

"RYSYDON"						
Wind velocity miles per hour	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
5	4,650	4,270	3,500	3,740	3,775	4,400
10	9,800	8,620	7,660	7,450	7,920	8,800
15	15,100	13,100	12,070	11,200	12,070	13,200
20	20,600	17,650	16,400	14,900	16,100	17,600
25	26,600	22,150	20,800	18,650	20,050	22,000
30	33,300	26,600	25,150	22,400	24,250	26,400

F. O. SCHOEDINGER

Manufacturer of Rotary Suction Ventilators

COLUMBUS, OHIO

Products

FOSCO ROTARY SUCTION BALL BEARING VENTILATORS; FOSCO SYPHONIC VENTILATORS; FOSCO QUAD LOCK JOINT METAL CEILINGS.

Also "Columbus" Stationary Ventilators; Puttyless Skylights; Underwriters' Tin Clad Fire Doors; Underwriters' Fireproof Metal Windows; Aseptic Metal Hospital and Surgical Furniture.

Fosco Rotary Suction Ball Bearing Ventilators

Description—The Fosco rotary suction ventilator is rigidly constructed from Armco iron or copper and supported by an adequate framework of rust resisting steel and malleable iron.

It is equipped with high grade, high speed hardened steel ball bearings, which are immersed in heavy acid resisting lubricant, fully weatherproofed and easily accessible.

Bronze bearings with highest grade bell metal balls furnished, if desired.

Operation—The Fosco rotary suction ventilator contains the *inner air passage* through which the passing winds and breezes blow with accelerated force, unhampered by conflicting cross currents, causing a pronounced vacuum in the head of the ventilator.

The head of the ventilator is much larger than the stem, allowing the rising foul air to spread out along the horizontal line of the diaphragm, where it is caught by the suction of the swiftly moving air currents discharging from the passage above and carried out.

The diaphragm consists of a smooth, curved galvanized surface, which greatly assists in the free passage of the air, especially at low wind velocities.

The ample vane always holds the mouth of the ventilator away from the wind, making same proof against weather, rain, storm and down-drafts.

As no mechanical power is used, no operating expense results.



Fosco Rotary Suction Ventilator
Mounted on square base



TRADE-MARK

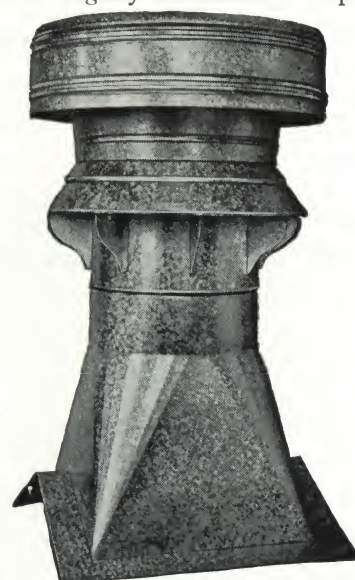
Fosco Syphonic Ventilators

Description—The Fosco Syphonic Ventilator is constructed from Armco iron or copper and is rigidly braced and supported by a framework of rust resisting steel.

The discharge area is amply sufficient to take care of the stem capacity and friction.

The Syphonic embodies features which have been worked out through years of experience and great efficiency has resulted.

Operation—The Syphonic has three large discharge areas. When passing winds and air currents strike the ventilator, an unusual suction is created and large quantities of air are pulled from the three discharge areas.



Fosco Syphonic Ventilator
Mounted on square base

Fosco Quad Lock Joint Metal Ceiling

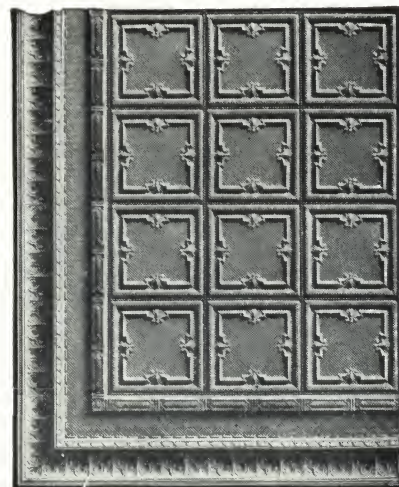
Description—The Fosco Quad Lock Joint Metal Ceiling has grooves formed on two right angled sides of the panels and tongues on the other two sides.

The nailing is done on projecting flanges of the panels and when panels are slipped together, all panel nails are concealed from view.

These lock joint panels are made on special accurately machined steel dies thus assuring absolute uniformity. Deep and clear stamping is assured by large, powerful draw presses.

Operation—When erecting Quad lock panels the wood furring strips are required 2 ft. apart only, one way of the room. No cross furring or cross nailing necessary.

Joints are tight with this construction, preventing dust from sifting through panels. These ceilings are fire resisting to a very great degree.



Quad Lock Joint Design No. 4934-A

ESTABLISHED 1909

STANDARD VENTILATOR COMPANY

Manufacturers of "Standard" Rotable Ventilators

LEWISBURG, PA.

DISTRIBUTERS IN ALL PRINCIPAL CITIES

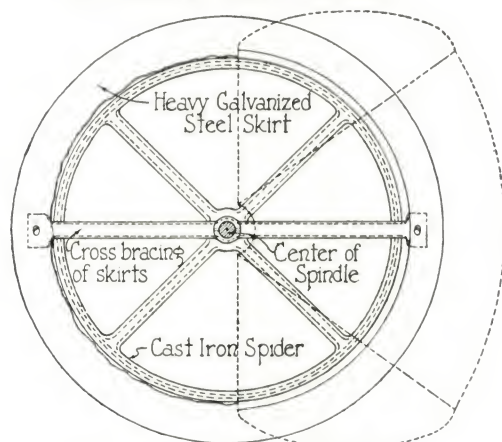
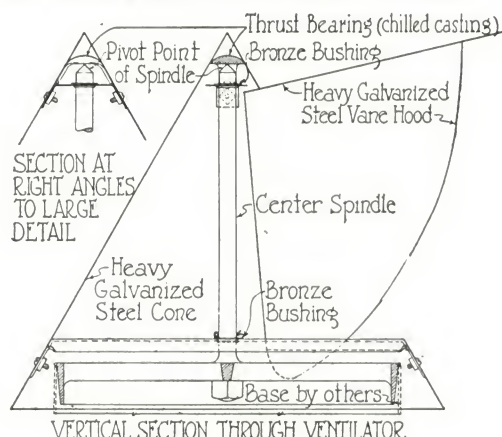
MANUFACTURED IN CANADA BY GEO. W. REED CO., LTD., MONTREAL

"Standard" Rotable Ventilator

The "Standard" Rotable Ventilator is built in the form of a cone with a vane hooded opening. The cone shape offers least resistance to the wind and gives a greater ease of balance as the wind does not have a flat surface to strike.

The vane hooded opening keeps the mouth away from the wind. The wind passing the mouth induces a siphon effect causing a continual up-draught.

The operation is noiseless and as there are practically no wearing parts it is almost costless.



PLAN SECTION THROUGH VENTILATOR.

The "Standard" Rotable has been used extensively since 1909, giving complete satisfaction. During this time the manufacturer has been continually experimenting to produce, if possible, greater results and has introduced several new features. The new features, cone-tip suspension, bronze bushings and cross bracing of skirt, have resulted in a highly improved ventilator in the following ways; greater durability, greater efficiency, quieter operation and better balance.

Uses—The ventilators are used by factories, schools, garages, public buildings, poultry houses, dairy barns, etc., to carry off gases, smoke, moisture, steam, vapor, foul air, odors, heat fumes and dust.

Body Material—The "Standard" is made of heavy Armco ingot iron in gauges of Nos. 22, 24 and 26, according to size.

Pivot Point Spindle—The body of the ventilator turns on the simple pivot point spindle. The slightest current of air will move the ventilator.

Cone Tip Suspension—The entire weight of the ventilator body is carried on a concave thrust bearing nested in the apex of the conical body. This bearing turns upon the pivot point of the stationary center spindle.

Bronze Guide Bushings—Bushings are of non-corrosive bronze. They carry no weight and serve only to keep the body vertical under stress. They minimize the friction and reduce the tendency to screech.

Cross Braced Skirt—The skirt of the conical body is provided with cross brace to increase the rigidity. The lower guide bushing is carried in this cross bracing.

Method of Attachment—The "Standard" is made with round sleeve to slip over the permanent base, or exhaust pipe.

Sizes and Siphoning Rates—Made in flue diameter sizes from 4 to 24 in. and siphoning rates of 30 cu. ft. to 1110 cu. ft. as shown in table.



"STANDARD" ROTABLE VENTILATORS

Opening or flue diam., in.	Gauge iron	Weight, lb.	Minimum siphoning rate per min., cu. ft.*	Code word	List Price
4	26	1 1/4	30	Ruddy	\$ 2.20
5	26	1 1/2	50	Rub	2.40
6	26	2 1/2	68	Rotary	2.60
7	26	3	93	Rotate	2.80
8	26	3 1/2	122	Rotula	3.20
9	26	4 1/2	162	Rotund	3.50
10	24	6	201	Rouge	4.20
12	24	8 1/2	272	Round	5.40
14	24	9 1/2	373	Rouse	8.50
16	24	13 1/2	488	Route	12.80
18	24	15	650	Rover	16.50
20	22	20 1/2	804	Royal	21.00
24	22	28	1110	Rope	26.50

*In tests the ventilators invariably show a considerably greater siphoning capacity than the ratings here given. The figures presented here represent the minimum siphoning rate with a wind velocity of 5 miles per hour which is approximately one-half the average wind velocity of the United States.

A Few Users and Jobbers of "Standard" Ventilators

J. M. & L. A. Osborn Co., Cleveland, Ohio
 Hibbard, Spencer, Bartlett & Co., Chicago, Ill.
 Wright & Wilhelm Co., Omaha, Neb.
 Follansbee Bros. Co., Pittsburgh, Pa.
 Demmler Bros. Co., Pittsburgh, Pa.
 Herrick Company, Boston, Mass.
 Harry L. Doton & Sons, Boston, Mass.
 York Corrugating Co., York, Pa.
 J. M. Warren & Co., Troy, N. Y.
 Lyon, Conklin & Co., Washington, D. C.
 Pennsylvania Supply & Mfg. Co., Allentown, Pa.
 H. P. Kinsey, Easton, Pa.
 C. A. Crosta Tinners Supply House, Denver, Colo.
 Conklin Tin Plate & Metal Co., Atlanta, Ga.
 Berger Bros. Co., Philadelphia, Pa.
 W. F. Potts, Son & Co., Philadelphia, Pa.
 Marshall Bros. & Co., Philadelphia, Pa.
 Fries, Beall & Sharp Co., Washington, D. C.
 The C. S. Mersick & Co., New Haven, Conn.
 Holmes Hardware Co., Pueblo, Colo.
 Congdon & Carpenter Co., Providence, R. I.
 Charles Millar & Son Co., Utica, N. Y.
 Albany Hardware & Iron Co., Albany, N. Y.
 J. Kinsner & Son Co., Cleveland, Ohio
 Bostwick-Braun Co., Toledo, Ohio
 Burhans & Black, Inc., Syracuse, N. Y.
 Dumphey-Smith Co., Newark, N. J.
 Mathews & Boucher, Rochester, N. Y.
 Stichter Hardware Co., Reading, Pa.
 Bayonne Steel Products Co., Newark, N. J.

THE SWARTWOUT COMPANY

Rotary Ball Bearing Ventilators

MAIN OFFICE AND FACTORY
CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 103 Park Avenue

CHICAGO, ILL., 549 W. Randolph Street

PITTSBURGH, PA., 1101 Diamond Bank Building

AGENTS AND STOCKS IN MOST PRINCIPAL CITIES, INCLUDING THE PACIFIC COAST

Products

"SWARTWOUT" ROTARY BALL BEARING VENTILATORS.

Other products manufactured are Hydromatic Steam Traps, Low Pressure Traps, Cast Iron Exhaust Heads, Feed Water Heaters, Sediment Strainers, Industrial Ovens, Steam and Oil Separators, Air Separators.

Swartwout Principle and Operation

Swartwout principle is very simple. It actively compels the flow of air. Rotating on accurately machined ball bearings, the Swartwout Rotary Ball Bearing Ventilator always faces away from the wind; the passing breeze continually creates an active suction above the mouth of the ventilator, thus pulling out a steady flow of used air from the room it is connected to.

The entire area of the opening is always efficient. As it responds to every change in wind direction made possible by perfect bearing, no part of the ventilator is ever inoperative. The wind always blows past, never into, the ventilator.

Swartwout Rotary Ball Bearing Ventilator

Standard Type—Made of rust resisting galvanized Armco Ingot Iron sheets of ample gauge covering a framework of sturdy angle iron, cadmium coated after accurately forming and punching. Built for lasting resistance, it is practically indestructible.

The ventilators are also constructed of copper, lead clad sheets, or zinc, on specification. Bearings on all ventilators are bronze, all large size to insure correct balance, and practically frictionless. No grease or oil is necessary, which is a valuable feature.

Operates easily and effectively. Only one right angle turn is required for air flow, which is accurately controlled by stormproof louvers or dampers operated simultaneously from within by means of rustproof chains over brass pulleys.

Louver-setting device permits setting of the louvers at open or closed positions. Distinctly efficient without sacrificing appearance and on account of its great capacity, fewer Swartwout ventilators are required.

Air-light Type—The standard construction, except for the substitution (on specification) of a full size, strong, wire glass top for the metal top, providing a combination skylight and ventilator. The top, steeply pitched, is self-cleaning. No obstruction of the direct passage of light is possible.

An Analysis of Ventilator Requirements

For those in whose mind there is still some confusion as to the fundamental requirements in the choice of an efficient ventilator, we offer the following:

(1) Gauge of material in regard to relative over-all dimensions and weight.

(2) Quality of material. Select a factory assembled ventilator built to endure, one built of heavy rust resisting galvanized metal or copper sheets with cadmium coated interior bracing, non-corrosive bronze bearings, bell-metal balls.

(3) Completeness. The selection of a ventilator complete with dampers, without additional cost.

(4) Capacity and general design. The years of service given under unusual conditions and the greatest possible capacity consistent with good substantial and practical design must be compared.

(5) Complete, ready for erection.

Testing Ventilators and the Swartwout Ventilator Testing Room for the Use of Architects and Engineers

So many laboratory ventilator tests have been made on identical ventilators in various parts of the country and with such varying results, that we now maintain a testing room, installed under natural conditions, for the testing of ventilators. This room is for the use of architects, engineers and prospective customers.

It is located where the wind has free access to it which avoids unfavorable eddies and uncertain results. It is equipped with the most accurate and reliable instruments obtainable, the measuring instruments being similar to those used in the United States Weather Bureau.

Comparative tests will be made or the reports of various tests of the Swartwout with other ventilators will be given upon application to this company. These tests extend over a considerable length of time and are as accurate as it is possible to make tests of this nature.

Fresh Air Requirements for Various Services

Figures in cubic feet per person per hour from table prepared by Prof. John R. Allen, Department of Mechanical Engineering, University of Michigan:

Workshops and barracks.....	3000
Office rooms.....	1800
Schools.....	2400
Hospitals.....	3600
Churches and theaters.....	2000
Dining rooms.....	1800
Toilets and bathrooms.....	2400

Capacities and Sizes of Swartwout Rotary Ventilators

For capacities, sizes and data on Swartwout ventilators, see detail drawing on following page.

Standard Specifications for Swartwout Ventilators

All ventilators to be of the rotary ball bearing type [metal top] [glass top] of [galvanized] [copper] metal, all interior members of angle iron cadmium coated after forming and punching or stamped from galvanized metal. Ventilators to turn sensitively on accurately machined special hard bronze bearings, employing bell-metal balls, and counterweighted on outside. Ventilators to be equipped with outside louver dampers to throw accumulated dirt outside of building, louver to be operated from within by chains over brass pulleys.

Gauge of metal to be THE SWARTWOUT COMPANY, Cleveland, Ohio, standard, as furnished in Swartwout Rotary Ball Bearing Ventilators at regular prices. Top of collar and bottom of hood to be stiffened with cadmium coated angle iron rings. (If desired, give standard gauge for each size, as shown.)

Note: Specifications and data for both ventilators and

bases will be gladly furnished, on request, in convenient card form to fit your card index.

When specifying, inquiring or ordering, state character and pitch of roof, and whether ventilator will rest on peak or slope of roof.

Determining Proper Ventilator Sizes

The volume of air handled by any roof ventilator is affected by many conditions. Among these conditions are wind velocity, direction of wind, location and sizes of surrounding buildings or other obstructions to free movement of air, inside and outside temperatures, location and size of open windows or doors, and methods of heating.

In planning an installation, it is essential to use a sufficient factor of safety to be certain of complete ventilation at all times. The cost of a few more or larger ventilators is insignificant when compared to the difference between satisfactory and unsatisfactory ventilation. The table in the lower right-hand column is for your guidance in determining ventilator sizes. The actual capacity will, in most cases, be much greater than that shown.

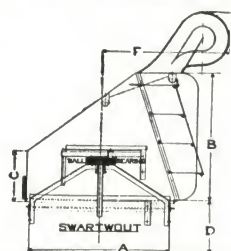
Specifications for Bases

Build each base individually for its job.

Ventilator bases to be of galvanized rust-resisting metal, two gauges heavier than ventilator, according to THE SWARTWOUT COMPANY standard for ventilator bases, and of sizes corresponding to nominal size of ventilators. Collars to be 5 in. high, grooved and riveted to body of base with 1-in. lap and 5-in. spacing. Body of base to be a square-to-round section with opening of the square 4 in. larger than the collar. Bases 18 in. and smaller to be 23 in. high over all, and larger sizes 27 in. high.

All bases to fit roof dimensions accurately with 5-in. flange, bent out, not sharp (if concrete roof, to fit detail shown), and must form an absolutely watertight juncture with the roofing material and be left so on completion. Seams at roofing line can not be allowed, except to fill in corners of base. Top of base to be absolutely level and round.

Note: For capacity, rigidity, tightness, economy, use square bases only.

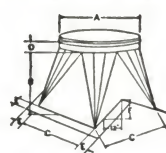


DIMENSIONS, WEIGHTS AND GAUGES OF SWARTWOUT VENTILATORS

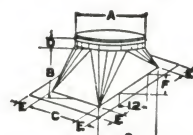
For dimensions, "A," "B," "C," "D," "E," "F," in inches see table below. In ordering, only dimension "A" is required.

INSTALLATION

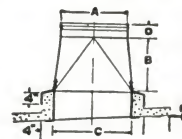
To insure proper installation and immediate satisfaction, complete directions for mounting are supplied on each ventilator.



Type A



Type B



Type C

DIMENSIONS, WEIGHTS AND GAUGES OF SWARTWOUT BASES

A	B	C	D	F	Gauge iron	Wt. copper, oz.	Net wt., lb.	Crated wt., lb.
10	9 1/8	4	5	11 1/2	24	18	15	25
12	11	4 3/4	5	14 1/4	24	18	20	30
14	12 7/8	5 3/4	5 1/2	15 1/2	24	18	30	40
16	14 3/4	6	5 1/2	17	24	18	35	50
18	16 1/2	6 5/8	6 1/2	19	24	18	45	65
20	18 1/2	7 1/8	6 1/2	21	24	18	50	75
24	22	9	6 3/4	24 1/2	24	20	60	90
30	27 1/2	11 1/8	9 1/8	30	22	24	120	190
36	33	13 1/2	11	34 1/2	22	24	160	265
42	38 1/2	15 3/4	11 1/4	41 1/4	20	28	225	400
48	44	18 7/8	11 3/4	46 1/2	20	28	320	475
54	49 1/2	20 1/4	13 3/4	47	20	28	485	650
60	55	22 1/2	15 1/2	61	20	28	560	740
66	60 1/2	24 3/4	16 3/4	62 1/2	20	28	650	825
72	66	27	16 3/4	67 1/2	20	28	780	1000

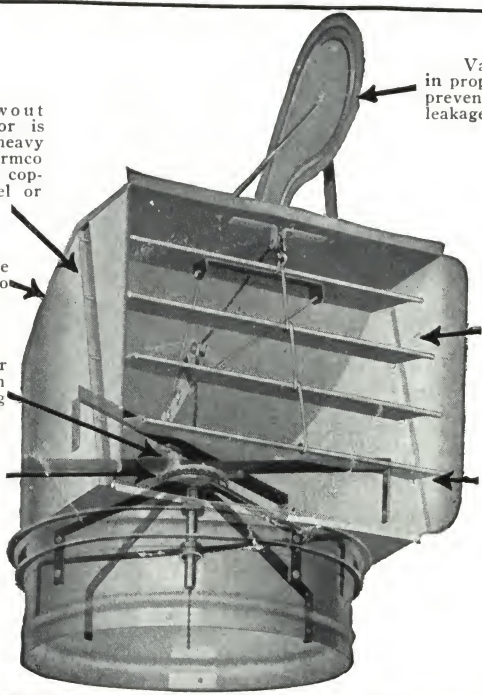
A	B	C	D	E	F	Gauge iron	Wt. copper, oz.	Aver. Net Wt., lb.	Aver. Crated Wt., lb.
10	18	14	5	5	Required dimension slope per ft.	22	24	13	15
12	18	16	5	5		22	24	18	20
14	18	18	5	5		22	24	26	28
16	18	20	5	5		22	24	35	37
18	18	22	5	5		22	24	38	40
20	22	24	5	5		22	24	45	50
24	22	28	5	5		22	24	55	65
30	22	34	5	5		20	28	80	95
36	22	40	5	5		20	28	95	110
42	22	46	5	5		18	32	105	125
48	22	52	5	5		18	32	115	135
54	22	58	5	5		18	32	125	150
60	22	64	5	5		18	32	140	165
66	22	70	5	5		18	32	155	185
72	22	76	5	5		18	32	170	200

The Swartwout Standard Ventilator is constructed of heavy gauge galvanized Armco Ingot Iron. Also copper, lead clad steel or special materials

All joints are double seamed. No bolts used

All interior members cadmium coated after forming and punching

Accurately machined bronze bearings revolving on ball-metal balls. No oiling necessary



Vane keeps ventilator in proper direction to wind, preventing back draft and leakage of snow and rain

Full area opening; no restrictions

Adjustable louver damper with ratchet attachment and chain

CONSERVATIVE AIR RATING OF SWARTWOUT ROTARY BALL BEARING VENTILATORS

Size of vent, in.	Cu. ft. per min.	Size of vent, in.	Cu. ft. per min.
12	275	36	2550
14	370	42	3400
16	490	48	4450
18	650	54	5500
20	800	60	6850
24	1100	66	8250
30	1700	72	9850

Drafting Room and Specification Helps

"The Gospel of Fresh Air," a 36-page ventilation handbook with air-requirement tables, ventilator capacities, complete drawings, specifications, photographs, etc.

Ventilation Data Card, 8 1/2 x 11 in., heavy card reference. Covers air requirements, capacities, ventilator and base specifications and drawings. Widely used for instant reference.

Co-operative Planning Service

Our engineering department, with many years of practical experience in mechanical ventilation, will gladly study ventilation problems and make suggestions absolutely without obligation.

Write us today.

E. VAN NOORDEN COMPANY

Roof Ventilators

TELEPHONE

HIGHLANDS 3040, 3041, 3042

100 Magazine Street, near Massachusetts Avenue
BOSTON, MASS.

Products

VAN NOORDEN VANCO-SYPHON VENTILATORS.

VANCO STEEL DOOR BUCK.

For "Anchor-Bar" Rolled Steel, Puttyless Skylights, see page A513.

Van Noorden Vanco-Syphon Ventilator

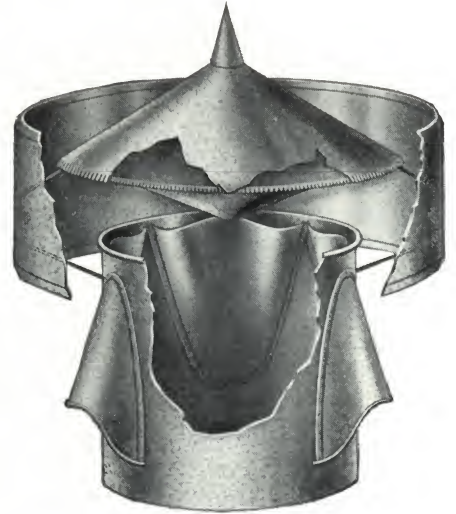
The Van Noorden Vanco-Syphon Ventilator is a stationary type roof ventilator. It has an inner cone at the head and a group of scientifically designed syphons around the upper part of shaft. Air currents striking the shaft are sucked into the syphons, and due to the diminishing area of same are compressed so that a rapid syphonage is created. These currents do not enter the shaft. Their movement is up and out, causing a powerful accel-

eration around the mouth of the shaft. Other currents striking the flaring surface of the inner cone, are similarly compressed and cause an up-draft in the center of the shaft.

The Vanco-Syphon Ventilator is stormproof and is equipped with a hinged damper.

Bases—Bases are provided with ventilators only when so required and stated.

Material—Made of sheet copper or genuine galvanized rust-resisting iron.



*CAPACITIES

Size, in.	Cu. ft. exhaust per hr.	Size, in.	Cu. ft. exhaust per hr.	Size, in.	Cu. ft. exhaust per hr.
12	28,121	18	66,810	36	249,118
14	38,405	24	111,215	48	436,170
16	49,062	30	163,421	..	.....

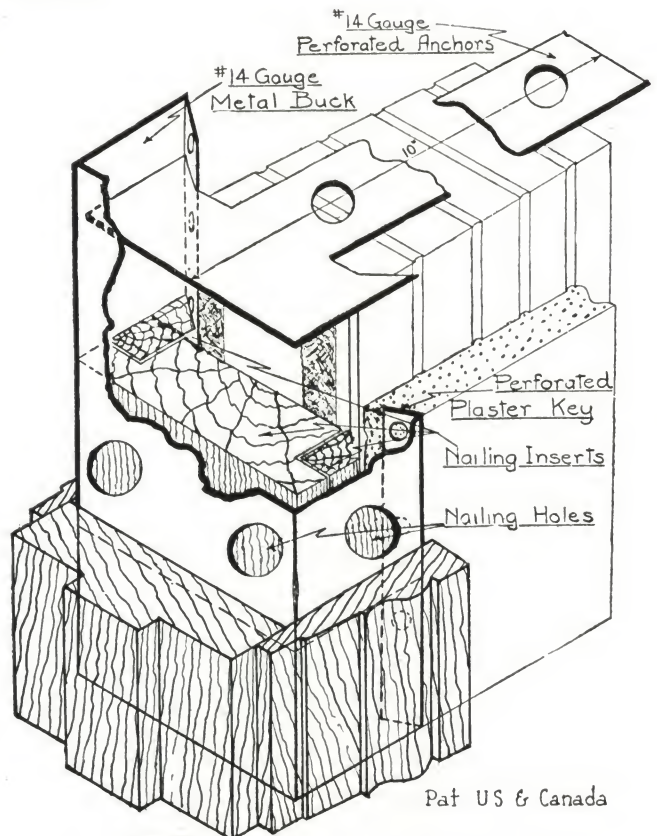
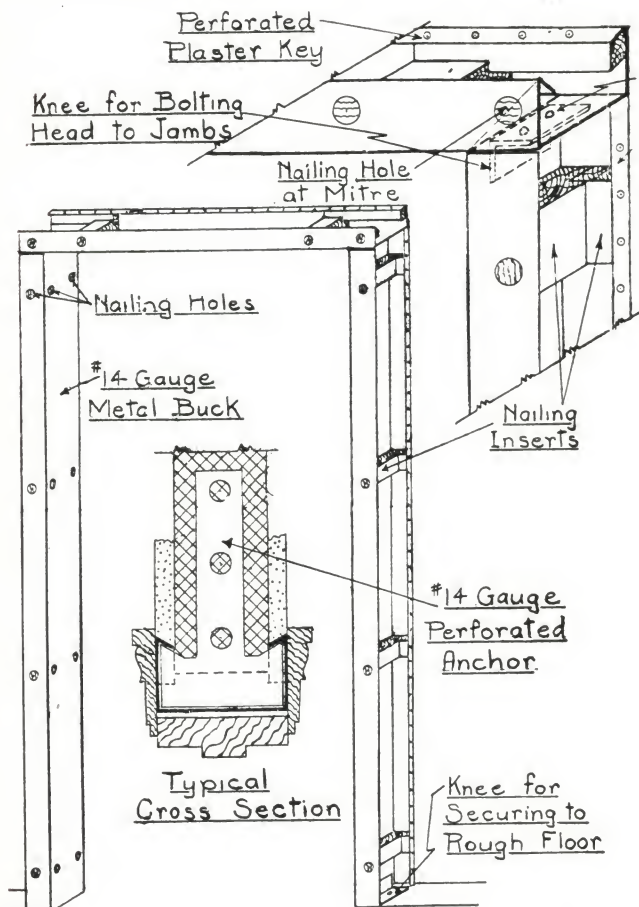
*Based on an average wind velocity of 5 miles per hour.

Vanco Steel Door Buck

These new, time-saving steel bucks can be handled exactly as though they were wooden bucks. Wood frames and trim can be nailed in the same manner as wood buck. No drilling, tapping or bolting necessary. No shimming of trim.

Another feature is the movable lock anchors and perforated plaster flanges.

They do away with loose frames and wavy plaster lines and, what is very important, they minimize erection labor.



Pat US & Canada

VANCO STEEL DOOR BUCK

BENJAMIN RIESNER, INC.

Roofers and Sheet Metal Contractors

260 East 78th Street, NEW YORK, N. Y.

TELEPHONE
BUTTERFIELD 8580

Product

RIESNER VENTILATING BRICK. (Pat. Jan. 5, 1926.)

Riesner Ventilating Brick

Description—A ventilating brick, made of cast iron or bronze with galvanized iron flue, the size of a standard brick, having a louvered face with waterdrip at top and bottom.

Three Types—"Type A" transforms to a 3-in. diameter flue and has a 3-in. brass collar as inside of wall.

"Type B" carries through wall with a 2x8-in. duct and has a register face at inside of wall.

"Type C" transforms to a 6-in. diameter flue and has a 6-in. brass collar at inside of wall.

All types are 13 in. from louvered face to inside of wall. Ventilating bricks required longer or shorter than 13 in. can be made specially.

Construction—Made of cast iron with galvanized iron flue or bronze with copper flue.

Where Used—These ventilating bricks are especially suited for use in kitchens, kitchenettes, pantries, closets, hung ceilings, attics, cellars, mausoleums, bathrooms, utility rooms and clothes closets for schools.

Advantages—Does not take up any room, it is bricked into the wall.

Particularly useful in kitchens to remove gas fumes, steam cooking odors and foul air, where there is no room for vertical vent shafts and bulky ventilators.

When kitchens are properly ventilated and gas fumes, steam and cooking odors removed, the walls do not discolor and kitchens do not require painting as often.

Weatherproof, Durable, Economical—Riesner Ventilating Bricks are absolutely weatherproof by their design, durable because of the material used, and economical—for the first cost is the only cost.

Installation—The ventilating brick is "bricked" into the wall by the mason as the wall goes up, 6 in. below the ceiling line with the louvered face to the outer air and flue or register face in the room.

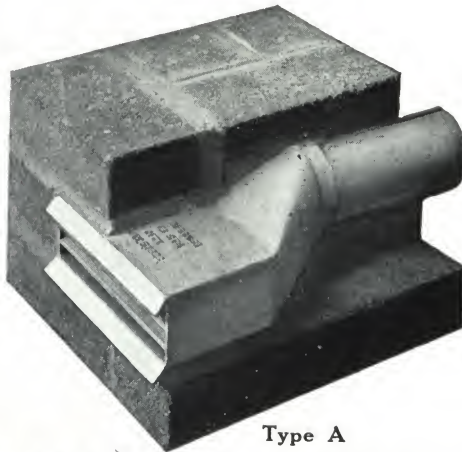
Specifications—Specify under masonry heading: "Install Ventilating Bricks as manufactured by BENJAMIN RIESNER, INC., 260 East 78th Street, New York, N. Y., in the wall 6 in. below bottom of ceiling beam." (Specify type, where brick is to be installed, and whether cast iron or bronze.)

Prices—"Type A"—Cast iron 13 in. long with 3-in. diameter brass collar, \$5.50 each, net f.o.b. New York, N. Y.

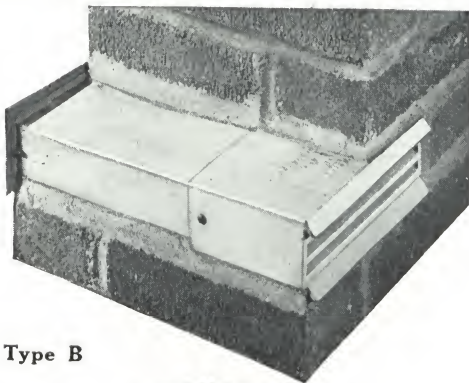
"Type B"—Cast iron 13 in. long with 2x8-in. register face, \$6.50 each, net f.o.b. New York, N. Y.

"Type C"—Cast iron 13 in. long with 6-in. diameter brass collar, \$11.50 each, net f.o.b. New York, N. Y.

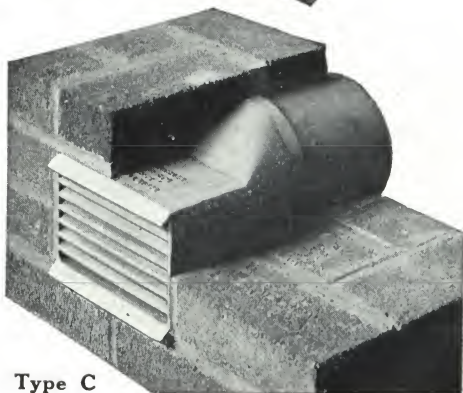
Note: Cast bronze prices on application.



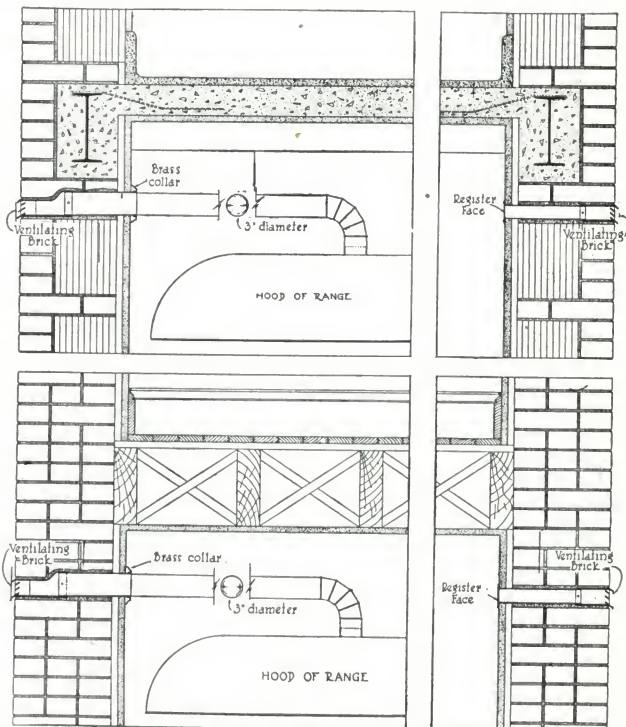
Type A



Type B



Type C



Ventilating Brick in Walls of Fireproof and Non-fireproof Construction

SHEET STEEL TRADE EXTENSION COMMITTEE

Use of Sheet Steel for Cornices
Oliver Building, PITTSBURGH, PA.

For List of Supporting Members, see page A796

For Sheet Steel Roofs, see page A440; for Interior Uses of Sheet Steel, see pages A796-797

Advantages

- Easy adaptability to any unusual design.
- Great strength with comparative lightness and lasting safety.
- Life equal to that of the building.
- Lowest first cost and negligible maintenance.
- Incombustible and impervious.

Service

The research and engineering facilities of the SHEET STEEL TRADE EXTENSION COMMITTEE are at the instant service of any architect upon request and without obligation.

Specifications

Complete standard specifications for the fabrication and setting of sheet steel cornices should be found under the A.I.A. file No. 12L2 in your files.

Copies sent free upon request.

By the use of this standard specification the architect can eliminate most of the detail drawings of supporting members and joints and can confine his efforts to the showing of a simple cross section and front elevation, inserting the following short form specification into his general specification:

Short Form Specification for the Fabrication and Setting of Sheet Steel Cornices

General Conditions—The general conditions of the American Institute of Architects, Fourth edition (1925) shall form a part of this specification and contract and all work shall be subject to the provisions thereof.

Work Included—The work included in this contract comprises the furnishing of all materials and all labor, transportation, etc., necessary to fabricate and set all sheet steel cornices in accordance with the contract drawings and these specifications.

Materials and Workmanship—It is hereby mutually understood and agreed by all parties to any agreement arising from the use of this specification that the standard specification for the fabrication and setting of sheet steel cornices as issued by the SHEET STEEL TRADE EXTENSION COMMITTEE shall be and is hereby made a part hereof for the class appropriate to this operation as fully as though recited herein in detail. Copy of said specification is on file in architect's office and may be examined on application or copy thereof can be obtained free of cost from the SHEET STEEL TRADE EXTENSION COMMITTEE, Oliver Building, Pittsburgh, Pa.



Sheet Steel Cornice on Denver, Colo., Building
H. W. J. EDBROOKE, Architect



Thirty-year Old Sheet Steel Cornice on the Joseph Horne
Department Store Building, Pittsburgh, Pa.



Seventeen-year Old Sheet Steel Cornice on
Beacon Building, Wichita, Kan.
Fabricated of No. 24 gauge galvanized sheet steel

THE BERGER MANUFACTURING CO.

Steel Ceilings and Sidewalls
CANTON, OHIO

BRANCHES

BOSTON, MASS., 307-315 Dorchester Avenue
NEW YORK, N. Y., 514-524 West 25th Street
PHILADELPHIA, PA., 16th Street and Washington Avenue
CHICAGO, ILL., 3622 South Morgan Street

ST. LOUIS, MO., Third Street and Russell Avenue
NORTH KANSAS CITY, MO., 14th and Charlotte Streets
MINNEAPOLIS, MINN., 1701-1729 Broadway N. E.

SAN FRANCISCO, CAL., 1120 Mission Street
ROCHESTER, N. Y., 212 Wilder Building
LOS ANGELES, CAL., 405 East Second Street
DALLAS, TEX., Corinth and Pearl Streets
ROANOKE, VA.
JACKSONVILLE, FLA.

EXPORT DEPARTMENT: 514-524 West 25th Street, NEW YORK, N. Y.

Products

BERLOY STEEL CEILINGS and SIDEWALLS in wide variety of attractive designs to harmonize with various styles of architecture and furnishings.

For Floor Cores, see page A108; for Metal Building Material, see pages B1286-1289; for Lockers and Shelving, see pages B2096-2097.

Steel Ceiling Advantages

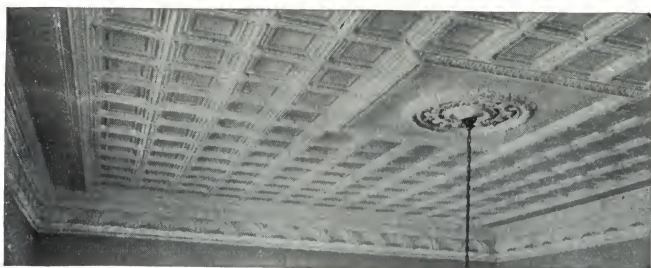
Briefly stated, the advantages of Berloy Steel Ceilings are beauty, safety, permanence, fire resistance, bacteriological cleanliness and ultimate economy.

Berloy Modern Steel Ceilings

Berloy Ceilings are formed on a draw press under a pressure of 900 tons. This brings out beauty, accuracy and sharpness of detail which can never be secured by the old drop hammer process which has been discontinued in the making of Berloy Ceilings and Sidewalls.

Berloy Designs

Berloy Steel Ceilings are made in beautiful and practical modern designs. These designs are made in wide variety to offer a range of choice for every service.



Berloy Metal Ceiling in Masonic Temple, Wilmington, Ohio

Various types of cornice border and field plates can be combined to form an endless variation of finished effects. Many of the best combinations are clearly illustrated in the big Berloy Catalogue D27 which will be sent to any architect on request to the nearest Berger office.

Berloy Steel Sidewalls

For many uses steel sidewalls are also desirable and a variety of practical and attractive modern Berloy designs are available for the purpose.

Popular Priced Plates

For garages, lofts, basements, factory rooms and similar places where the more artistic designs are not required, Berloy popular priced ceiling and sidewall plates can be used with a considerable economy both in cost of ceiling material and in erection costs.

Details of Erection

Berloy Steel Ceilings can be erected on any supports to which nailing strips can be attached or they can be suspended, if desirable.



The ceilings are furnished with practical working drawing and erection instructions. They go into place without difficulty and workmen experienced in building can erect the ceilings without any special skill or training.

Experienced steel ceiling erectors are, however, available in nearly every city.

All Berloy Ceiling Plates are supplied painted both sides with a good ground coat. Further painting can be in any desired color.

Estimates and Drawings

The corps of experienced Berloy Ceiling Draftsmen are at the service of any architect in planning the use of Berloy Steel Ceilings and Sidewalls, with estimates of cost.

This service is free to architects. Send sketch and exact dimensions of room, state height of ceiling, indicate preference as to style or design of ornamentation desired, with any other information which will assist our ceiling experts in meeting your desires.

Ask for Information

As one of the world's largest manufacturers of steel ceilings, with a wealth of experience in planning



Berloy Ceiling in St. Clement's Church, Minneapolis, Minn.

and erection, we are glad to answer questions, supply information about steel ceilings and send catalogues of designs, etc. Address nearest Berger office.

Steel Ceiling Users

Modern designs and modern methods have combined to make Berloy Ceilings more practical and desirable than ever before, and their use is increasing rapidly. They may be used wherever finished ceilings are desirable.

Following is a list of representative buildings in which Berloy Steel Ceilings have been used:

Regent Hotel, St. Louis, Mo.
American Athletic Club, Chicago, Ill.
Knoxville Power & Light Co., Knoxville, Tenn.
Dance Hall, 308 West 52nd Street, New York, N. Y.
Manhattan State Hospital, Ward's Island, New York, N. Y.
Citizens National Bank, Covington, Ky.
High School, Athens, Ohio
General Motors Corporation, Muncie, Ind.
Plaza Theater, White Sulphur Springs, W. Va.
Kissam Hall, Vanderbilt University, Nashville, Tenn.

THE EDWARDS MANUFACTURING CO.

INCORPORATED 1901

Metal Ceilings and Roofing

CINCINNATI, OHIO

BRANCH OFFICES AND WAREHOUSES

DALLAS, TEX., Corner of Market and Collin Streets

NEW YORK, N. Y., 81-83 Fulton Street

Products

EDWARDS METAL CEILINGS and WALLS.

METAL SHINGLES.

METAL SPANISH TILE.

PATENTED PRESSED STANDING SEAM CORRUGATED STEEL ROOFING.

Also, "Reo" Cluster Shingles, Metal Culverts, Metal Garages, Portable Steel Buildings, Metal Wall Coverings, Metal Lath, Corrugated Iron Roofing and Siding, Steel Imitation Brick and Stone Siding, Galvanized Iron Cornice, Eaves Trough, Conductor Pipe, Cellular Metal Fireproofing and "Keyridge" Reinforcement and Lath, "Edmanco Tightcote" Fire Resisting Paint.

Edwards Metal Ceilings and Walls

Metal ceilings are no longer a luxury—they may almost be said to be a necessity. Where formerly they were used almost exclusively in churches, stores, halls and other buildings, they are now extensively used also in private residences.

There are a number of excellent reasons for this growing popularity. From every viewpoint the metal ceiling is the ideal ceiling.

In the first place, it is unusually attractive. With the wide variety of patterns which comprise the Edwards line to choose from, any architectural effect can be obtained.

Nor do the advantages of a metal ceiling end with its beauty and attractiveness. It is economical, the first cost being slight, and, with proper care, no subsequent expense for repairs.

It is the most sanitary and easiest to keep clean of any ceiling; is absolutely proof against fire, moisture and vermin.

Makes the room cool in summer and warm in winter; and eliminates danger from falling plaster.

Edwards Metal Shingles and Metal Spanish Roofing Tile

Are made from best qualityterne plate, furnished painted or "Tightcote" galvanized, also in copper.

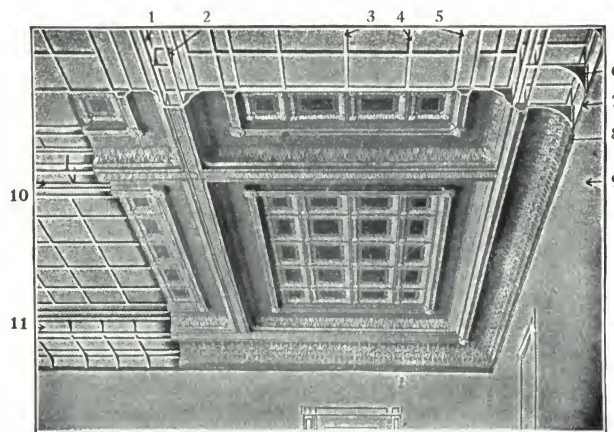
Their exceedingly attractive appearance is only one of the numerous advantages which commend them to builders and architects.

They are proof against fire, lightning, rain, snow and wind.

Do not warp or rot as wooden shingles do; and when laid according to the simple directions, will last a lifetime.

All Edwards metal shingles and metal Spanish tile are made with a patented side lock. Their interlocking device permits of a tight interlocking of each shingle or tile with the one lying next to it, so that, when the entire roof is laid, it is practically the same as

one solid sheet of metal, without a crack or crevice anywhere through which a drop of water can seep. Although the seams are absolutely watertight, the lock is so devised as to allow for expansion and contraction



DETAILS OF APPLICATION, EDWARDS METAL CEILING

Furring strips, $\frac{3}{8} \times 1\frac{1}{4}$ in. soft wood, can be applied over old plaster direct to joist or wood ceiling.

(1) Construction of false beam. (2) Brace form. (3, 4, 5) Furring strips for ceiling. (6) Cornice bracket. (7) Furring strips at bottom of cornice or cove. (8) Cove. (9) Side wall. (10) Construction of false beam. (11) Showing small cornice at top of large cove



Plate No. 1735



Center, No. 2312

EDWARDS FRENCH RENAISSANCE METAL CEILINGS



FIG. 104
Gothic
10x14 in.

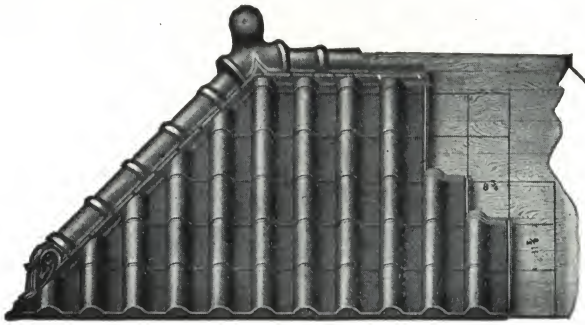


FIG. 211
Roman
10x14 in.



FIG. 157
Queen Anne
10x14 in.

EDWARDS METAL SHINGLES



Method of Applying Tile and Fixtures



FIG. 367. Tile for Main Part of Roof



FIG. 369. Tile-Starter or Eave Tile, with Closed End for Edge of Roof at Gutter

FIG. 414. Hip or Ridge Finish
Height, 6 in.; width, 7 in.; length, 28 in.

FIG. 409. Ridge Flashing Nailed to 2x4-in. Strip on Ridge. Ridge Finish Fastened to Flashings with Cleats, 10-ft. Lengths



Method of Locking Valley Tile into Valley

FIG. 397. 3-Way Finial, 2 Hips, 1 Ridge.
Height, 17 in.; width, 17 in.

DETAILS EDWARDS METAL SPANISH ROOFING TILE

of the metal due to heat and cold, and thus there is never any danger of the roof buckling, warping and springing leaks.

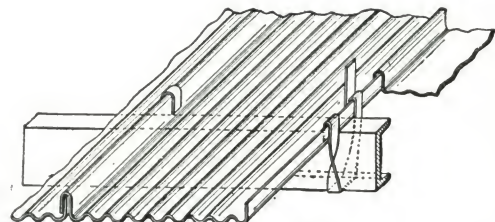
Patented Pressed Standing Seam Corrugated Steel Roofing

Edwards patented pressed standing seam corrugated steel roofing is especially adapted for use on structural steel buildings, as will be seen by the accompanying details. This roof has perfectly tight seams and can be applied directly to the purlins without rivets of any kind. Made in Nos. 16 to 28 gage, painted or galvanized.

In the use of this new roofing, a saving of 11% can be effected on side seams alone, and a much tighter side lock is assured. The method of cleating makes the cleats absolutely tight and at the same time allows for vibration. It makes a 50% more water-tight job. It has another advantage in that it can be placed on the roof and worked entirely from above, no scaffolding of any kind being necessary; and an entire roof can be put on without puncturing the sheets in the least, preserving the galvanized coating intact.

While the cost of this material is somewhat more than the regular corrugated sheets, the saving in side laps and application more than makes up for the difference.

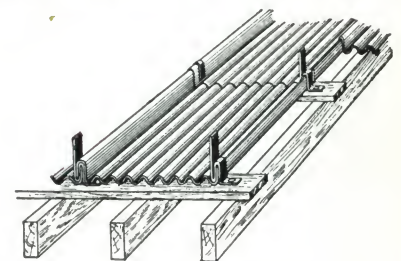
This roofing has been applied to a number of large buildings in various parts of the country and is giving absolute satisfaction. One roof, put on 6 years ago, covers a single building requiring over 1000 squares.



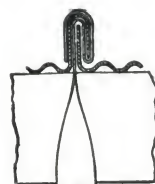
Applied to Steel Purlins



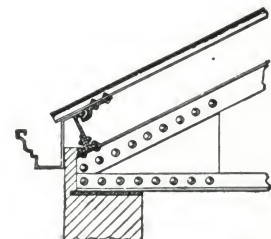
Cleat after Sheet is Applied



Applied to Wood Sheathing



Section through Cleat



Finishing out Eaves when Gutters are Used

DETAILS EDWARDS PATENTED PRESSED STANDING SEAM CORRUGATED STEEL ROOFING

AMERICAN ROOF TRUSS COMPANY

WM. H. WADDINGTON, PRESIDENT

Engineers and Constructors of Roof Trusses

5 North La Salle Street
CHICAGO, ILL.

TELEPHONE

FRANKLIN 1720, 1721

Products

Manufacturers and erectors of AMERICAN WOOD BOWSTRING TRUSSES.

Where Used

Public garages, service stations, machine shops, warehouses, schools, banks, gymnasiums, bowling alleys, aeroplane hangars, grandstands, dance halls, and other buildings where clear floor space is needed.

Span and Spacing

Trusses designed for 25 to 135-foot spans. Spacing is usually 16 to 20 feet on centers, depending on length of building.

Height at Center and Ends

The standard height at the center on all spans is one-eighth of the length of the truss. The height of the ends is governed by the size of the lower chord timbers varying from 6 to 12 in. according to span and loading.

Service

Trusses are built on the job by us and erected in place as soon as pilasters are up, completely installed,

ready for the roof joists, anywhere in the United States.

When requested, we can figure on building trusses on the job and buyer can do his own erecting.

Information Required for Estimates

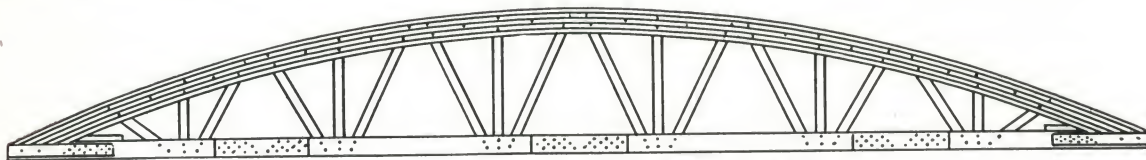
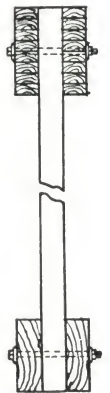
- (1) Number of trusses required.
- (2) Span out to out of walls or center of columns.
- (3) Spacing between trusses.
- (4) Loads. Regular roof load in pounds per square foot. State if any ceiling load. For unusual loading conditions send plan or photostat.
- (5) Address of job, nature of building, owner's and architect's names.

Specifications

Roof trusses shall be American Wood Bowstring trusses furnished by AMERICAN ROOF TRUSS COMPANY, 5 North La Salle Street, Chicago, Illinois.

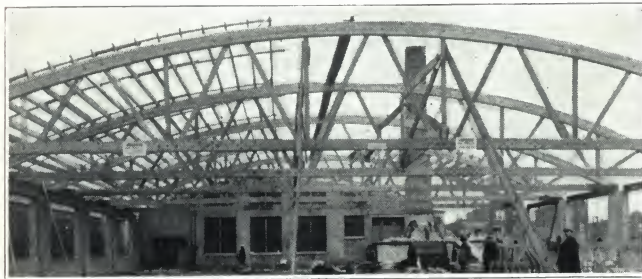
Literature

Send for illustrated folder and valuable suggestions covering economical layout and brick saving features.



American Wood Bowstring Truss

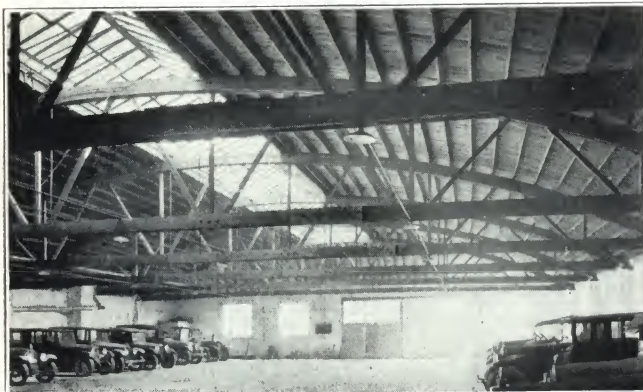
Spans 25 to 135 ft.



90-ft. Span Trusses, Garage, Cleveland, Ohio



121-ft. Span Trusses, Factory, Marshalltown, Iowa



80-ft. Span Trusses, Garage, Peoria, Ill.



46-ft. Span Trusses, Factory, Clearing, Ill.

ARCH ROOF CONSTRUCTION CO., INC.

TELEPHONE
WISCONSIN 5845

Engineers and Contractors
104 West 42nd Street, NEW YORK, N. Y.

Products and Service

Design, Construction and Erection of LONG SPAN ROOF ARCHES for public garages, auditoriums, convention, exhibition and fair buildings, warehouses, theaters, factories, airplane hangars, gymnasiums, bowling alleys, skating rinks, and all buildings where unobstructed space, maximum light and ventilation are desired.

ARCH ROOF CONSTRUCTION CO., INC., will design the arches, supply all materials and do the erection, or ordinary materials can be supplied and erection done by local contractors.

Construction and Materials

By using straight lengths of the usual structural materials combined with special castings, a practical way has been evolved of applying the arch principle with its beauty and great strength to the economical construction of buildings having spans up to 200 ft. or more, where unobstructed space is desired.

Columns, posts and trusses are eliminated with this construction, and a clear interior giving a maximum amount of light and ventilation obtained.

Strength

Arch roof construction can be of timber or steel or a combination of both. Standard structural shapes and sizes are employed in a patented design with patented castings to produce a roof of unusual strength. It may be fireproof, fire-retarded or non-fireproof.

While designed for ordinary roof loads of 40 lb. per sq. ft., in a test by Columbia University it successfully carried a uniform load of 80 lb. per sq. ft. and then, for an unsymmetrical test, half of the sand on one-half of the arch was removed. This loading was considerably increased when the sand absorbed about 2 in. of rain, and also by the effect of wind at velocities from 48 to 70 miles per hour on this open structure. This test was made while building was in course of construction, unenclosed, with only part of roof in position.

Advantages of Arch Roof Construction

Maximum strength and long life.
Unobstructed light and ventilation.
Sidewalls of brick, wood sheathing, sheet iron, canvas, or folding or rolling doors.
Full use of all floor space.

Economy of material and labor.

Temperature economically warm in winter and cool in summer.

Reduced fire hazards, ease of controlling fires and low insurance rates.

Added dignity, distinction and character to all long span buildings.

Can be dismantled and erected with 100% salvage.

Adaptable to practically every type, style and size of building.

Engineering Service

ARCH ROOF CONSTRUCTION CO., INC., will co-operate with architects, engineers and contractors in planning the most economical and efficient design for particular buildings. A request will bring additional information.



Queens Country Motor Vehicle Dealers' Association Exhibit

Arch roof construction permitted free use of all space for exhibition purposes and provided a place large enough for the complete display

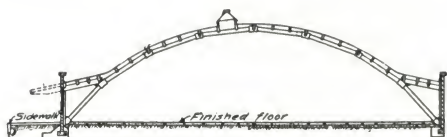


Fig. A. Simplest Type, Built with or Without Sidewalk Overhang
Sidewalls may be replaced by doors, rolling shutters or canvas. Unusually high salvage value

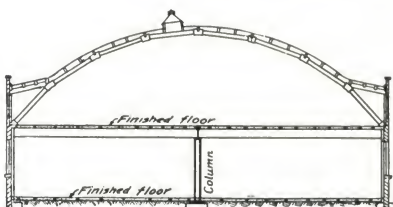


Fig. B. Same Type as Fig. A, Adapted for 2 or More Stories
Unobstructed top floor and minimum number of columns below

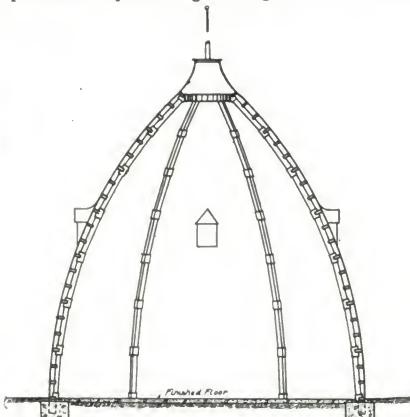


Fig. F. For Buildings of Interior Gothic Architecture

Ends may be finished flat, or dome construction. Adapted to the dignity of churches, etc., and also to the economical construction of temporary buildings

Types of Arch Roof Construction
Patented Jan. 15, 1924, other patents pending

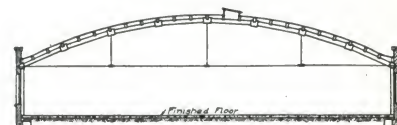


Fig. C. For Buildings Where Tie Rods Are Required
Offers maximum light, air and attractive appearance at minimum cost

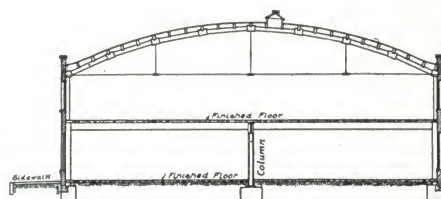
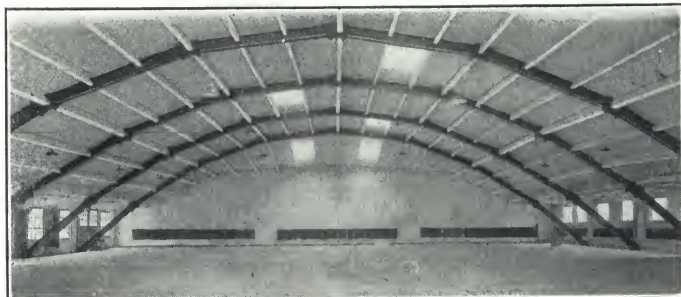
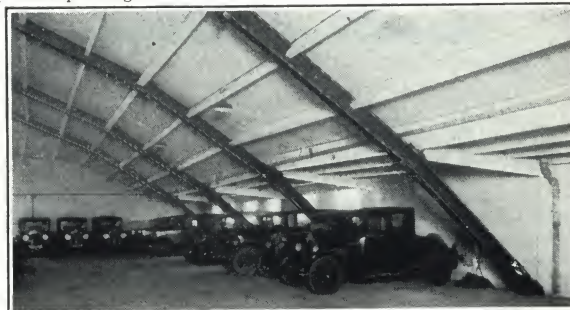


Fig. D. Same Type as Fig. C, Adapted for 2 or More Stories
Unobstructed top floor and as many floors below as desired



100-ft. Span



100-ft. Span

E-Z-BILT MANUFACTURING CO., INC.

Manufacturers of Heavy Mill (Slow Burning) Trusses and Buildings

Hillside Avenue and 175th Street

JAMAICA, N. Y.

FACTORY: SUFFOLK, VA.

Products

HEAVY MILL (SLOW BURNING) TRUSSES.
HEAVY MILL (SLOW BURNING) BUILDINGS.
CONCRETE CAPS AND BASES.

Heavy Mill (Slow Burning) Truss

This is strictly in accordance with the specifications of both the National and the Mutual Fire Insurance Underwriters, and is acceptable to them at as low a rate of insurance in one-story buildings as an unprotected steel truss, and at a lower rate in buildings of two or more stories.

Only long leaf yellow pine in solid timbers is used, none of which measure less than 6 in. in the rough in their narrowest dimension.

All rods, plates and bolts used are in accordance with the current specifications of the American Society for Testing Materials.

All rod verticals are covered with heavy grade asbestos pipe tubing, the rods and nuts at the ends with a coating of plaster, so as to develop the full resistance of the truss.

Low Price—Due to our source of supply, improved machinery, low labor cost, and methods of production, we are in a position to place same on the market at as low a price as a wood truss made of light material.

Shipped Completely Assembled—Where height does not exceed railway carrying facilities, trusses are shipped completely assembled or built up in two or three sections, depending upon the length and quantity ordered, and when shipped in sections all that is necessary is to bolt them together on the job.

Where height necessitates knocked down shipments all members are marked numerically, in which case the detailed erection drawings furnished by us are marked with corresponding numbers, so that the assembling on the ground is simplicity itself.

All knocked down trusses are assembled at our factory prior to shipment.

Sizes—We manufacture all spans from 25 to 125 ft.

Quotations—In writing us for quotations kindly give us the following information:

Number of trusses needed.
Spacing between trusses.
Regular roof loads in pounds per square foot.
Distance out-to-out walls.
Ceiling loads or special loads.

Heavy Mill (Slow Burning) Buildings

We can furnish at a great saving in price any type or size wood frame building of Heavy Mill or ordinary type construction either from your plan or from one prepared by us.

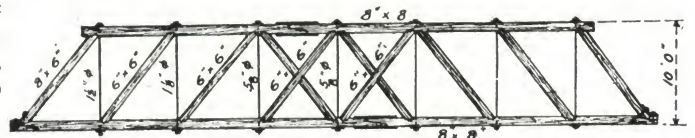
We are in a low price labor market and fabricate and prepare all our material with the most modern machinery and methods. The same methods are employed with wood as are used by steel fabricators.

We save on freight, as buildings are cut to size, shape and fit complete, ready to erect. You pay freight on actual material used, not on waste also.

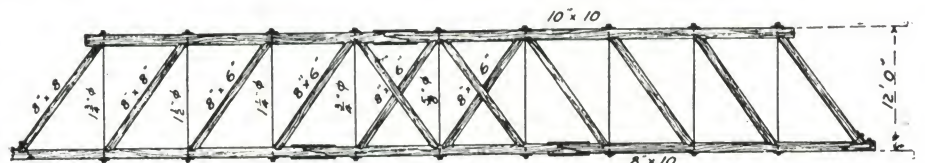
E-Z-Bilt buildings can be erected by unskilled labor, in accordance with detailed erection plans, which we furnish with every building.

Concrete Caps and Bases

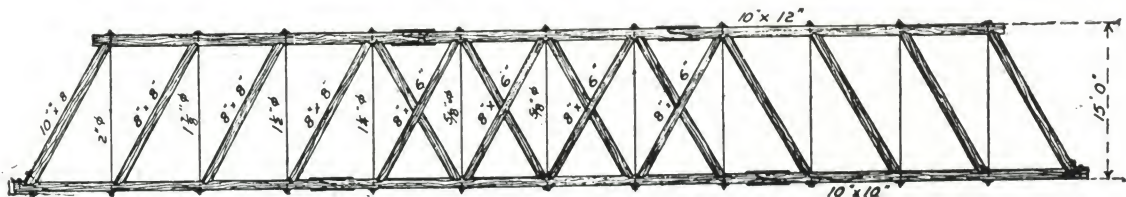
Precast, reinforced concrete caps and bases to support any weight.



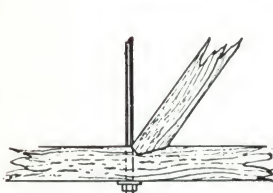
Truss I 60'0" Span



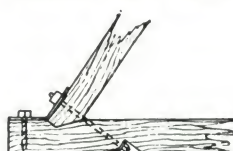
Truss II 80'0" Span



Truss III 100'0" Span



Intermediate Joint



End Joint



Splice in Chords

Heavy Mill (Slow Burning)

THE MACOMBER STEEL COMPANY

Manufacturers of Standardized Steel Roof Trusses

1929 Tenth Street, N. E.
CANTON, OHIO

Products

MASSILLON STEEL ROOF TRUSSES.

Also Massillon Reinforcing Trusses and Steel Forms, Bank Vault Reinforcing, Metal Lath, Steel Windows and Doors.

For Massillon Bar Joists and Massillon Light Joists, see pages A574-575.



Massillon Purlins, Monitors and Columns

Massillon Bar Joist Purlins are standardized and provide an economical construction for carrying concrete roof decking on metal lath. Massillon Light Joist Purlins with wood nailer affixed are standardized for economically supporting wood sheathing or other light roof decking.

Massillon Monitor Frames are standardized for both types of trusses and adapted to the standard steel window openings.

Massillon "H" Columns are standardized with caps and bases for the usual single story building. These are fabricated from Bethlehem "H" sections. Such additional structural steel as may be required can be fabricated and shipped complete with the trusses.

When the above Massillon products are specified all erection plans are prepared by our engineers and the material is consolidated in one shipment. This consolidation speeds up the erection of the building and reduces cost.

Massillon Steel Roof Trusses

Massillon Trusses are standardized in both the curve chord (bow string) and hip ("A" frame) types. Each truss is built up of heavy single angle sections and electric arc-welded to heavy gusset plates and bearing angles at the ends.

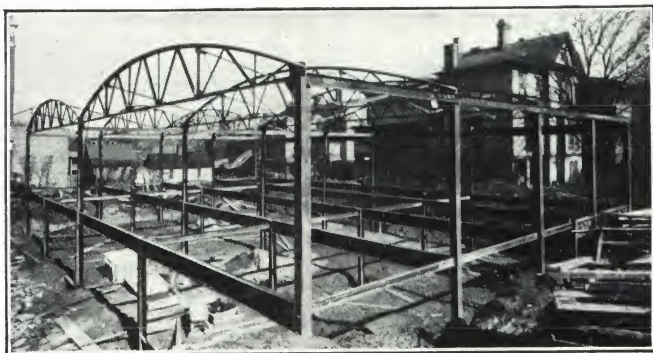


Curve Chord Type



"A" Frame Type

Standard structural angles and plates with 1/4-in. minimum thickness of metal are used throughout. Special trusses are built with double angle sections for certain special load conditions.



Trusses Used with Structural Steel Frame

Where Used—These trusses are used for roof supports where clear open floor space without supporting columns or walls is required. They are used primarily over gymnasiums, auditoriums, assembly rooms, dance floors, and in garages, industrial and commercial buildings.

Standardized Features—A complete series of trusses is standardized for both light roof decking, such as wood sheathing, and for heavy roof decking, such as fireproof concrete slab on metal lath construction, providing a maximum efficiency for all load conditions. Standard bracing is provided for each truss for different center-to-center spacing of trusses. Wall anchors are standardized for anchorage in masonry supports. Standard punching is provided in the top chords for all types of purlin construction. Standard punching is provided for truss bracing, for anchoring trusses to supports, and for attaching standard monitor frames when used.

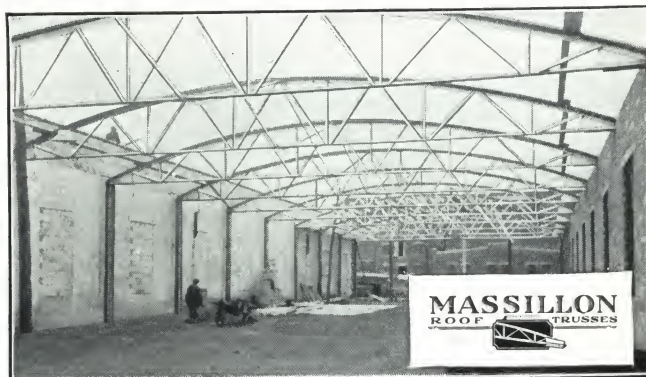
Through standardization each truss is suitable for a range of spans. This enables us to produce the highest quality product at a moderate cost and keep trusses in stock for prompt shipment for all normal span and load requirements.

Designing Features—Published safe loading tables permit the architect and engineer to select and lay out Massillon Trusses for his particular building. The trusses are used with or without suspended ceilings. They are adaptable for carrying concentrated loads such as balconies, trolley beams, etc. They allow the architect complete freedom for designing the building for its particular purpose.

The use of Massillon Standardized Trusses eliminates the preparations of individual shop drawings for approval. Erection plans are rapidly prepared from the architect's general plans and easily checked. This materially speeds up the shipment of trusses and completion of the building.

Construction Features

Many trusses are sold in smaller towns where erection facilities are limited. Massillon Trusses are specially designed for ease in handling and erecting with labor that is available in all parts of the country. The longer trusses are shipped in two sections with provision for splicing in the field. All field connections are made with turned bolts carefully fitted.



Trusses Bearing on Steel Columns and Wall

Roof Truss Specifications

The trusses shall be Massillon Steel Roof Trusses as manufactured by THE MACOMBER STEEL COMPANY at Canton, Ohio. All truss members shall be standard structural steel shapes proportioned to carry stresses at designed full load in accordance with the American Institute of Steel Construction specifications. No metal less than 1/4 in. thick shall be used.

All shop connections shall be electric arc-welded and designed with a factor of safety of five on their ultimate strength. A minimum weld of 4 in. shall be provided for each connection. All connections shall be shop tested to twice the stress developed in the design for full load conditions. Where trusses are shipped in sections for assembling in the field, all field connections shall be made with turned bolts with holes reamed to a neat fit.

Trusses shall be braced with Massillon standard bracing as designed for specified load, span, and center-to-center spacing of trusses. Trusses shall be punched for attaching purlin construction as shown on the general plan.

Trusses shall be painted with one shop coat of aluminum paint prepared from pure aluminum, ground to a fine powder and applied with proper fluid vehicle.

Scope of Service

The Massillon Roof Truss Pamphlet will be mailed to architects and engineers upon request. The sales representatives of THE MACOMBER STEEL COMPANY offer a complete engineering service in the use of Massillon products. Offices located in all principal cities.

LAMELLA ROOF SYNDICATE, INC.

TELEPHONE
BRYANT 4933

45 West 45th Street, NEW YORK, N. Y.

LICENSEES

WEST COAST DISTRICT: THE TRUSSLESS ROOF Co., 1007 South Harvard Boulevard, LOS ANGELES, CAL.
MISSOURI and SOUTHERN ILLINOIS: MISSOURI LAMELLA ROOF Co., 602 Bank of Commerce Building, ST. LOUIS, MO.
COLORADO: N. L. Ross, 233 North Franklin Street, COLORADO SPRINGS, COLO.
TEXAS and OKLAHOMA: LAMELLA TRUSSLESS ROOF Co., 801 Kirby Building, HOUSTON, TEX.

GULF STATES DISTRICT: NON-PLUS LAMELLA CONSTRUCTIONS, INC., 221 Balter Building, NEW ORLEANS, LA.
SOUTHERN ATLANTIC STATES: LAMELLA CONSTRUCTIONS, INC., 1013 Realty Board Building, MIAMI, FLA., and 801 Norris Building, ATLANTA, GA.
NEW YORK TERRITORY: LAMELLA ROOF Co., 47 West 45th Street, NEW YORK, N. Y.

Lamella Roof Construction

The Lamella unit system of roof construction has been developed to meet the widespread demand for a simple and reliable type of long span roof construction, which can be built at a reasonable price. It is especially suitable for garages, theaters, exhibition and fair buildings, churches, hangars, armories, and similar enclosures where high clearance or large areas of uninterrupted floor space must be housed. Within the last five years over 12,000,000 sq. ft. of Lamella roof has been constructed. Single spans run as wide as 130 ft. and in any length desired.

Lamella Unit

The Lamella unit is an especially designed timber unit, with beveled ends, bored for bolted connections, and a top curve to suit the radius of the finished roof.

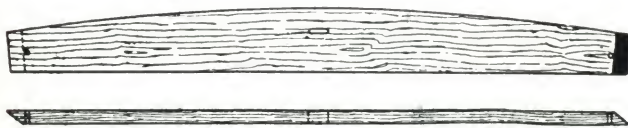


Fig. 1. Lamella Unit

Material

The quality of lumber used for Lamellas is No. 1 common. The strength and the price of the lumber control the kind to be selected, such as long leaf yellow pine, short leaf yellow pine, Douglas fir (Oregon pine) and others. The Lamellas can be manufactured at any planing mill equipped with a circular saw, a band saw and a boring machine.

Assembly

These units are assembled by bolting together, using standard machine bolts and nuts and special washers. It will be observed that lateral shrinkage of the timber after erection has no effect on the alignment of the joints. A netlike construction results, which may be developed into four principal types of arch roofs as follows:

(a) *The Flat Segmental Arch Roof, Fig. 2*, the thrust of which is taken up by tie rods. This is used largely for garages, factories, car barns, hangars and various kinds of industrial buildings. The rise of the arch is about one-sixth of its span.

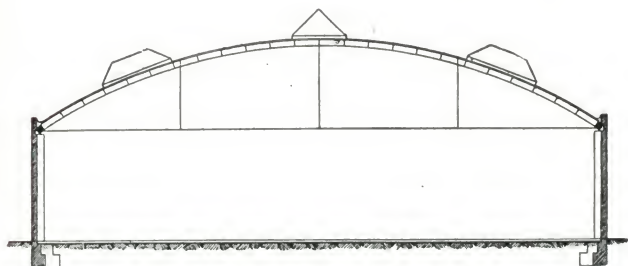


Fig. 2. Flat Segmental Arch Roof

(b) *The Segmental Arch Roof*, the thrust of which is taken up by buttresses, concrete piers or wooden bents (Fig. 3). This is especially suitable for warehouses and exhibition buildings.

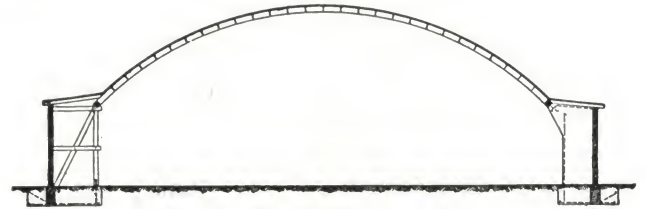


Fig. 3. Segmental Arch Roof

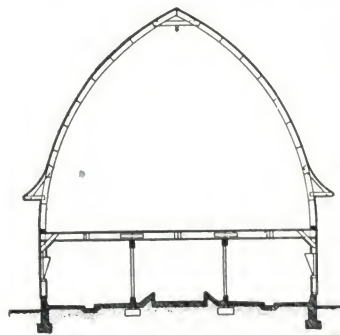


Fig. 4. Gothic Arch

(c) *The Gothic Arch* (in Fig. 4), especially suitable for churches, residences, barns and such warehouses where goods are stored in bulk, such as grain, ore, etc. The Lamella roof construction may start at the ground.

(d) *The Broach or Circular Roof*, used principally for exhibition buildings where a particular architectural design is desired.

Economy

Lamella construction is built up from short length timber which can easily be obtained and handled. Due to its unique arrangement it takes care of all engineering requirements in an ingenious but simple manner. On account of its highly standardized nature the erection itself is merely an assembly proposition. All these factors co-operate in reducing the costs and inaccuracies of erection.

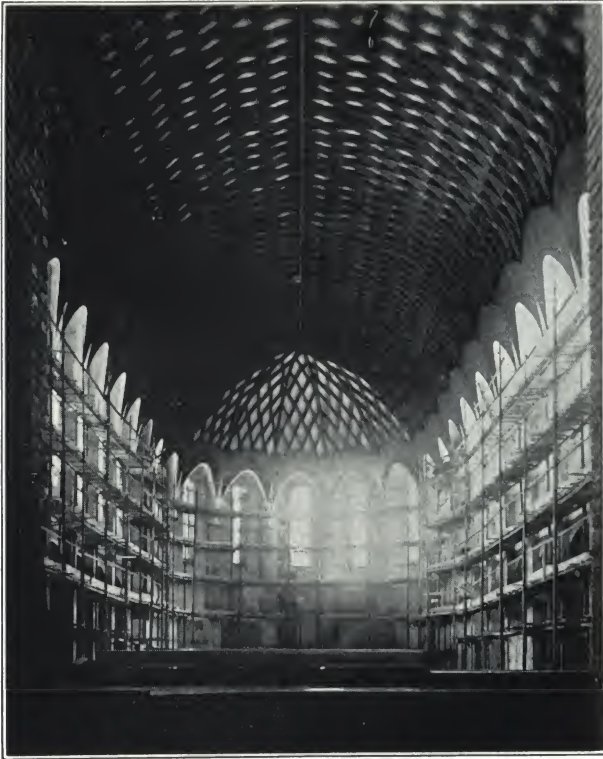
Safety

Accidental damage to Lamella members can readily be repaired, and even if units are destroyed the stresses will be carried by the surrounding network. The great flexibility of the system results in a particularly tenacious and enduring structure, which will absorb and distribute severe concentrations of loading.



A Lamella Roof That Came Through the Florida Hurricane Unharmful

E. E. Norwood Dance Hall, Miami, 3 days after September, 1926, hurricane. Although the storm blew in the front windows and thereby had free access below the roof, the Lamella construction remained intact



Church with Gothic Lamella Roof

Safe Loads

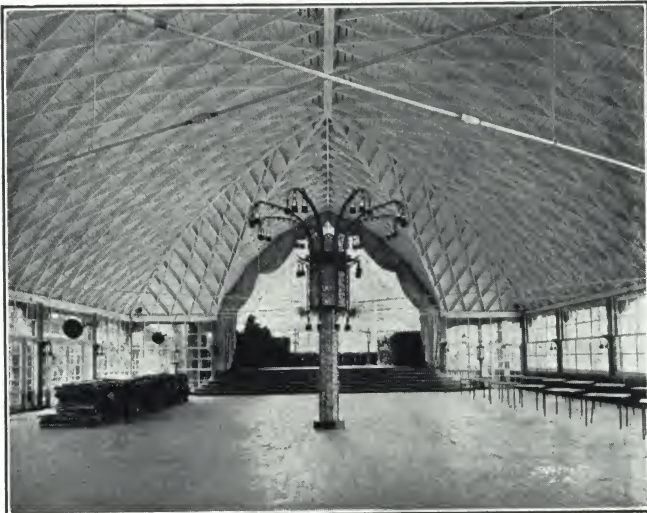
The safe loading of Lamella systems has been very carefully worked out, checked and confirmed by tests and practical construction throughout the United States and abroad. Any licensee of the company will make recommendations as to sizes and types of construction for any loading at any factor of safety. Extremely high wind loading may be carried and we have built structures carrying a 6-ft. snow load.

Fire Resisting Qualities

In Lamella construction there are no trusses, girders or columns to carry fire from the floor and distribute it along the roof. There are no trusses or ribs under concentrated load, the failure of which by fire might cause the collapse of the entire structure. The load carrying members are spread over a great area and are correspondingly hard to destroy.

Architectural Qualities

Lamella roofs allow a maximum utilization of the enclosed space. Distribution of light is not impeded by purlins and trusses. When sheathed on both sides a remarkable insulating quality results, as the air spaces are small in area and entirely separated, preventing the excessive heat transfer in the long channels between double sheathed purlins and joists.



Lamella Roof for Breakfast Club, Los Angeles, Cal.

Lamella roofs are symmetrical and of sweeping graceful design. They lend themselves to a wide range of architectural treatment.

Salvage Value

Unit construction of this type has unexcelled salvage value. Temporary buildings may be dismantled and re-erected with a minimum of loss—an unusual and most valuable feature for timber construction.

Data Required for Estimates

- (1) Type of roof (a, b, c, or d).
- (2) Outside measurements of building and exact information in case building is not rectangular.
- (3) Height of springing line above ground or upper floor and rise of arch desired.
- (4) Loading required in pounds per square foot; give required live and dead roof load (exclusive of Lamella construction); ceiling load if any. If roof carries any concentrated loads such as balconies or cranes, submit plans.
- (5) Sizes and locations of skylights.
- (6) Location of job.
- (7) For roofs *without* tie rods (Type b, c, and d) give the following additional information:
 - (a) Kind of supports (buttresses, wooden or steel bents).
 - (b) Height, width and spacing of supports.
 - (c) Bearing capacity of soil and whether building is on property line.

Specifications

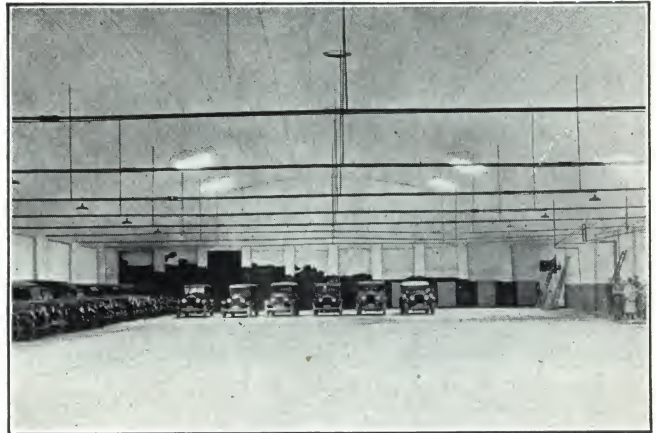
Roof construction shall be "Lamella Roof" to be built and erected or furnished by the LAMELLA ROOF SYNDICATE, INC., 45 West 45th Street, New York, N. Y., or its licensed agencies.

Engineering Service

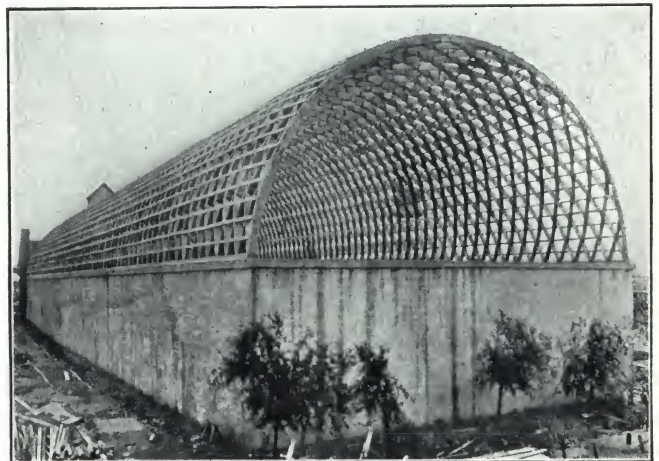
Our engineers will gladly co-operate with architects in securing an efficient and economical layout.

Literature

Write for pamphlets and illustrations describing buildings erected on the Lamella system.



Lamella Roof of the Packard Nash Garage, Hackensack, N. J.
100 ft. span, 220 ft. long. Lined with fireproof boarding



Lamella Roof for Cotton Seed Storage Building,
Wichita Falls, Tex.

McKEOWN BROS. COMPANY, INC.

Manufacturers of Wood Trusses

21 East 40th Street
NEW YORK, N. Y.
TELEPHONE, LEXINGTON 10040

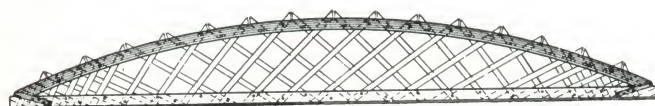
5235 So. Keeler Avenue
CHICAGO, ILL.
TELEPHONE, LAFAYETTE 2985

Products

Manufacturers and contractors for roof trusses of wood for all types of buildings, such as: Garages, Machine Shops, Factories, Aeroplane Hangars, Warehouses, Riding Rings, Banks, Stores, Gymnasiums, and Churches.

Experience and Facilities

McKEOWN BROS. COMPANY, INC., is, so far as known, the largest manufacturer and erector of wood roof trusses in the United States. They have been in operation continuously since 1894 and are the pioneers



McKeown "Lattis-Truss" Construction

Lattis Trusses are built of material having a minimum thickness of two inches, thoroughly nailed and bolted to transfer the stresses. An actual loading test, conducted under the supervision of New York City Building Departments, proved its great carrying capacity and substantiated the theory of its design.

This truss, because of its interlacing system of web members, is highly applicable for carrying unknown concentrated loads



Sixteen 100-ft. "Lattis-Trusses" in Yellow Taxi Garage,
419 East 60th Street, New York, N. Y.

HYDE & SHEPARD, Architects



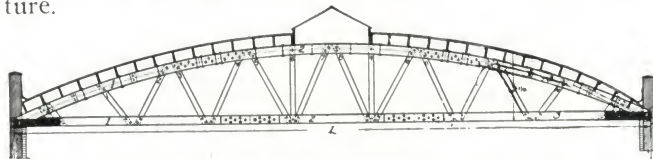
Four 60-ft. "Lattis-Trusses," Standard Oil Co. Garage,
Miami Beach, Fla.

STANDARD OIL CO., Architects
Photo taken after hurricane

in the construction and manufacture of circular upper chord roof trusses.

A modern wood-working plant with latest machinery is maintained at Chicago for the manufacture of "Factory Built" Bowstring trusses and timber trusses of all types.

Our equipment includes special machinery (patented) for gluing laminated timbers to any curvature.



McKeown Bowstring Trusses (System of Webbing Optional)

Bowstring trusses are built of material having a minimum thickness of three inches. All stresses are transmitted through bolted connections. Web members have solid sections.

"Factory Built" Bowstring trusses are fabricated complete in Chicago and shipped knocked-down for easy handling and assembly on the job. The pieces that form the upper chord of the "Factory Built" Bowstring trusses are glued together with waterproof glue, nailed and bolted and the upper chord is independent of the web members for strength and curvature



Eight 122-ft. and Nine 100-ft. "Bowstring" Trusses, Public
Service Ry. Bus Garage, Lake Street, Newark, N. J.

PUBLIC SERVICE PRODUCTION Co., Engineers and Constructors



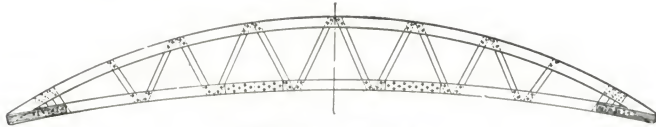
Ten 93-ft. "Bowstring" Trusses, B. D. Heath Motor Co.,
Charlotte, N. C.

LOCKWOOD-GREEN & Co., Engineers

Data Required for Estimates

Estimates upon Standard Lattis trusses, Standard Bowstring trusses or "Factory Built" Bowstring trusses, will be gladly furnished and without obligation, upon receipt of the following information:

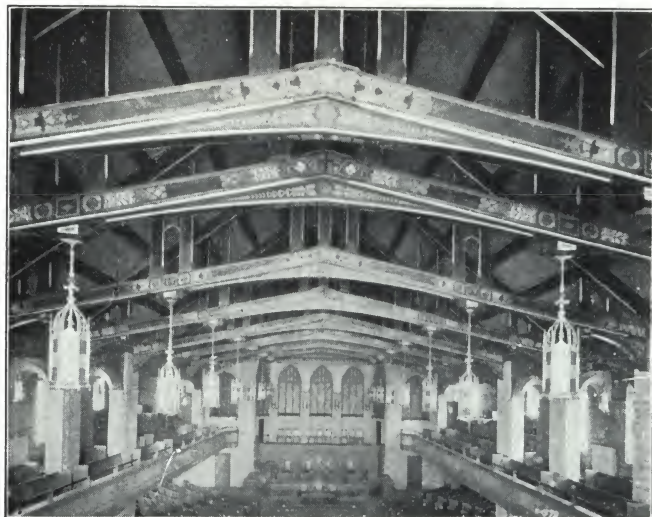
- (1) Outside width of building, thickness of walls and number of trusses required.
- (2) Spacing of trusses.
- (3) Loading required in pounds per square foot; give required live and dead roof load, ceiling load if any.
- (4) If trusses carry any concentrated loads such as balconies or cranes, estimates cannot be given unless plans are submitted.
- (5) Estimates upon Hammer-beam trusses with Gothic Arch, or timber trusses of any type cannot be furnished unless plans or pencil sketches are submitted.

**Crescent Truss**

Crescent trusses have a curved lower chord and can be furnished with either a lattis or Bowstring system of webbing. This type of truss is highly applicable for dance halls, or auditoriums where it is desirable of getting away from the ordinary flat ceiling effect.



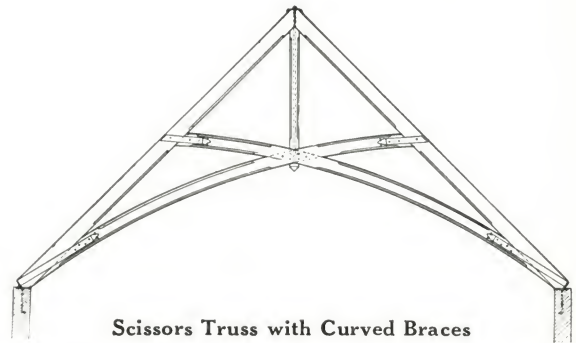
"A" Frame Truss with Modified Hammer-beam,
King's Highway Baptist Church, Brooklyn, N. Y.
 HELENE, CORBETT & HARRISON, Architects



Timber Trusses, Second Presbyterian Church,
Evanston, Ill.
 HOLMES & FLYNN, Architects

Engineering Data and Service

Out-lined blue-prints and folders showing installations of all types of trusses are available. In addition, we maintain an engineering service which will be glad to work in conjunction with architects to secure an economical and efficient layout or design.

**Scissors Truss with Curved Braces**

Scissors Trusses with Straight Braces, Bronxville Field Club,
Bronxville, N. Y.
 O. F. LANGMANN, Architect



Hammer-beam Truss with Gothic Arch, St. Andrew's
Episcopal Church, Evanston, Ill.
 W. T. BAILEY, Architect

SUMMERBELL TRUSS COMPANY

Wood Roof Trusses

30 North La Salle Street
CHICAGO, ILL.
TELEPHONE, FRANKLIN 0590

756 East 29th Street
LOS ANGELES, CAL.
TELEPHONE, HUMBOLDT 8174

Products

Manufacturers and erectors of Wood Roof Trusses.

Wood Roof Trusses

Spans designed from 30 to 125 ft. in accordance with best standard engineering practice and to comply with various local ordinances.

Trusses can be erected at the building site anywhere. No delays due to inability in obtaining materials; local lumber yards carry in stock all sizes of materials used in the construction of this truss.

Information Required for Estimates

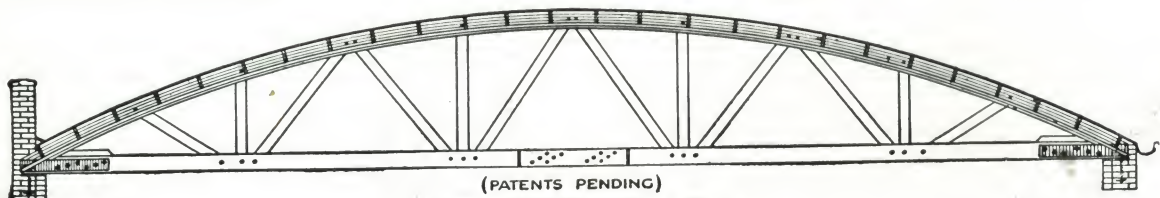
In requesting quotations the following information is necessary:

(1) Number of trusses required. (2) Span out-to-out of building walls. (3) Spacing of trusses. (4) Loads: roof, ceiling or special loadings. (5) Location of building, name of architect and owner's name.

Service

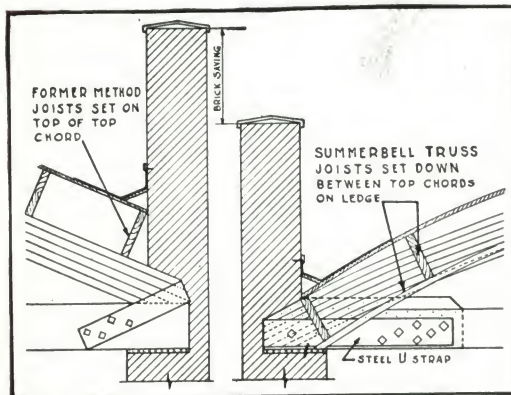
Estimates and details furnished on request.

It is suggested that architects avail themselves of our engineering service in any design calling for special types of roof trusses.

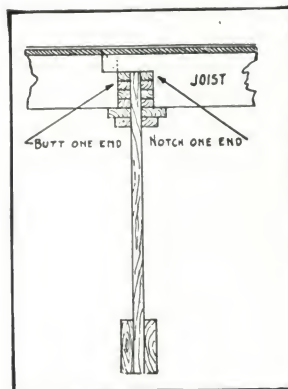


Summerbell Wood Roof Truss

Large solid section web members spaced far apart assure maximum light distribution. Heavy laminated top chord and bottom chord of two large solid sections reduce fire hazard. Note that the arch of the top chord is uniform from end to end and that there are no sharp breaks which cause rain to carry gravel to the gutters, or allow tar melted by the sun to run down

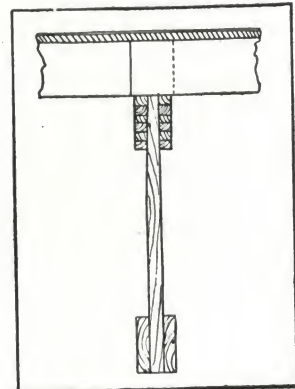


End Details



Section Standard Summerbell "Rigid-roof" Construction

Summerbell trusses save several courses of brick wall on all sides of the building in addition to making a rigid roof

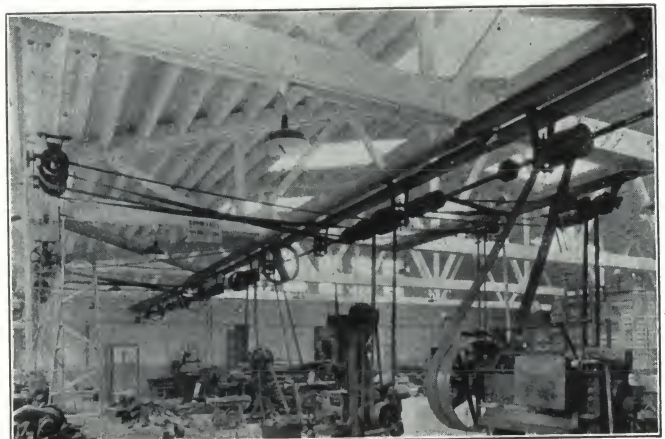


Section of Ordinary Construction

Roof joists set on top of top chord. Trusses of this type can be furnished, if desired



100-ft. Span Trusses in Garage



100-ft. Span Trusses Carrying Shafting Load in Factory Building

BATES EXPANDED STEEL TRUSS CO.

Bates-Truss Joists
EAST CHICAGO, IND.

Product

BATES-TRUSS EXPANDED STEEL JOISTS.

Description

The Bates-Truss Joist is an expanded one-piece steel truss. In the expansion process, no material is cut from the web of the original section; the web is simply slitted and expanded. The expansion process transforms the web of the I-beam section into an open lattice truss web. The act of expanding increases the depth of the beam and materially increases its strength.

The Bates-Truss Joist functions as a steel truss. Its properties are readily calculable by standard for-

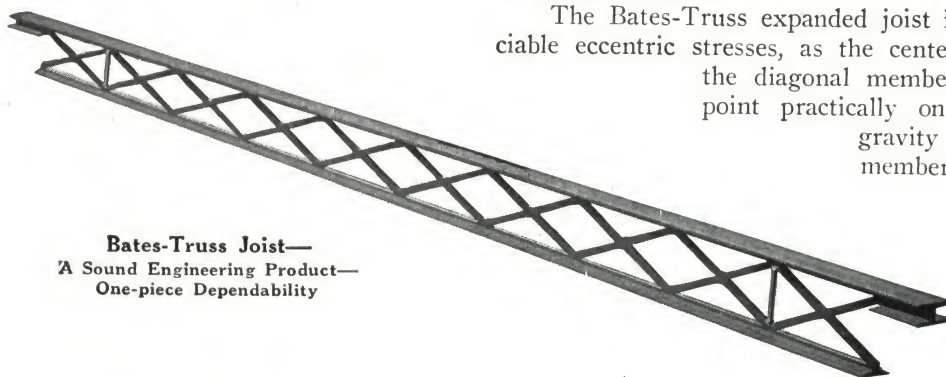
mulae. Its strength is uniform. The process of manufacture automatically tests every joist for any possible defect in either material or workmanship. The human equation is eliminated.

Advantages

The Bates-Truss Joist lends itself readily to all types of joist floor construction. The open web of the expanded truss is an obvious advantage over a solid web, because it permits piping to be run easily through the joists.

The Bates-Truss expanded joist is a one-piece steel truss—neither rivets nor welds are relied upon in stress of shear or tension.

The Bates-Truss expanded joist is without appreciable eccentric stresses, as the centers of gravity of the diagonal members intersect at a point practically on the centers of gravity of the chord members.



Bates-Truss Joist—
A Sound Engineering Product—
One-piece Dependability

Specifications

General Description—The system of floor construction will use Bates-Truss Joists of the sizes detailed. The joists shall be placed parallel to each other on spacings as detailed, and shall be supported at their ends on either structural beams or on masonry. Concrete shall be poured over the joists to form a slab inches thick, supported by (either mesh lath or forms) . Diamond mesh lath is to be attached to the ceiling side of the joists, and inches of ceiling plaster applied.

Bates-Truss Joists—The joists shall conform to the standards established by the BATES EXPANDED STEEL TRUSS CO. and shall be made from structural grade steel expanded. All joists are to be of sizes specified on the plans. Where the sizes of the joists are not indicated, they shall be in accordance with the manufacturer's tables of safe loads.

Bearings—At least 4 inches of bearing shall be provided where the joists rest on masonry, and at least 3 inches of bearing shall be provided where the joists rest on steel supports.

Bridging—Bridging wire is to be placed at suitable intervals in the length of the joists. The wire is to be secured to the flanges of the joists, connecting each joist to its adjacent joist by a system of crisscross bracing. The end joists of each panel are to be suitably side anchored to the structural steel member or masonry.

Steel Lath—The steel lath for the floor shall be ... (plain or rib) ...

lath weighing pounds per square yard. The steel lath for the ceiling shall be (plain or rib, depth of rib) weighing pounds per square yard. The lath is to be securely fastened to the joists with Bates lath clips. Rib lath is to be attached with the ribs up.

Temperature Rods—Temperature rods inches in diameter are to be placed on inch centers.

Note: The use of temperature rods or mesh reinforcing is not universally specified. It is, however, a valuable insurance in certain types of floor finishes to prevent cracks due to expansion and contraction.

Nailing Strips—Where wood floors are called for over the concrete, screed or nailing strips shall be embedded in the concrete slab. The nailing strips shall be 2 in. wide by 1 in. deep (or of greater depth) and shall be held in position by screed chairs, or by other suitable means, while the concrete is being poured. Screed strips shall be run (preferably at right angles) to the joists on inch spacings.

Concrete—Concrete for the floor slabs shall be (usually 1) part cement, (usually 2) parts sand and (usually 4) parts gravel. A comparatively dry mix is recommended to minimize dripping.

Loading Tables

Complete loading tables for Bates-Truss Joists are included in the Bates-Truss Joist general catalogue. The tables are prepared in both 16,000 and 18,000-pound stress values.



CONCRETE STEEL COMPANY

Havemeyer Truss

42 Broadway, NEW YORK, N. Y.

For Sales Offices, Warehouses and Fabricating Works, see page A125

For Havemeyer Concrete Reinforcement Bars, Devices, etc., see pages A125-127

Havemeyer Truss

The Havemeyer Truss is a scientifically designed truss, of the Pratt type, electrically arc-welded, and when used in connection with a concrete floor slab and metal lath ceiling, makes an economical fireproof construction which can be erected quickly and requires no form work.

General Description

Havemeyer Trusses are made up of five bars, four being chord members and one being used as a web member. The top and bottom chords are made of two Havemeyer Bars each, as this section has been found by actual test to be peculiarly well adapted for arc-welding. The web member is composed of a plain, round bar. These five bars are formed in the shape of a Pratt truss and electrically arc-welded at all intersections. The ends of the truss are connected by welding to a tee section, which acts as a bearing plate for the truss. Actual tests made have shown that the Pratt type of truss is particularly well adapted for this construction. Special attention has been given to the design and arrangement of end web members, which are so arranged as to provide for additional stresses at that point—the result of extensive laboratory tests.

The holes in the web of the Tee at each end provide best means of anchorage when used on masonry or concrete walls.

All steel used is made from highest quality open hearth structural grade steel, with a minimum ultimate tensile strength of 55,000 lb. All welds are carefully made by experienced welders and a rigid system of inspection and testing insures a uniform product. All trusses are dipped in black paint before shipment, the paint used containing no volatile driers, such as gasoline or naphtha.

General Use of Trusses

Havemeyer Trusses can be used economically on many different types of buildings. Where a building is erected of structural steel columns and girders, trusses are used in forming the slab. As these trusses are very simple to erect and are placed on top of the beams or girders, no extra fabricating is necessary. Havemeyer Trusses are also

used on structural concrete buildings for carrying the floor slabs, the columns and girders being reinforced concrete. They are used on residence work and are particularly recommended for the first floor even if the house is to be built of frame, and when properly put in place in connection with concrete slabs, they form an effective fire-stop for fires originating in the basement or cellar. The trusses are particularly suited for use in such buildings as hospitals, schools, apartment houses, hotels, institutions, garages, etc., built for light loads.

Havemeyer Trusses, with open webs, allow space for running pipes, electrical conduits, etc. This has been found of great advantage in most types of buildings.

These trusses are made to fit all spans from 4 to 31 ft.

Where a truss is laid on steel beams or girders, a clip is driven over the end of the truss and the upper flange of the structural support to hold the truss firmly in place.

A metal lath ceiling can be readily attached to the underside of the truss.

Metal Lath and Specialties

In making bids, our estimate includes furnishing of trusses, rib lath for floor slabs, ceiling brackets, anchors, clips for fastening trusses to girders in the case of steel buildings, sleeper clips, lath wedges, and annealed wire for bridging, also metal lath for ceilings when it is required.

Where small openings are required in the floor, we furnish headers which are easily attached and form a simple method of providing for these conditions.

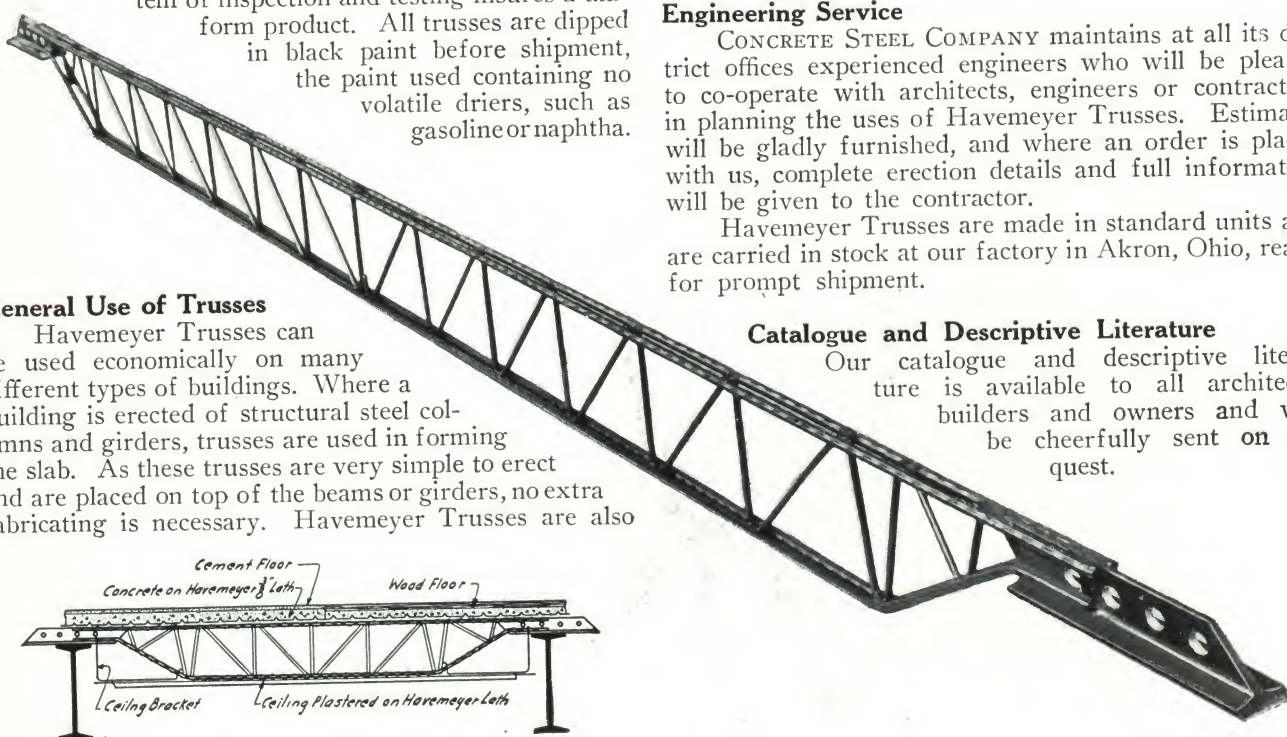
Engineering Service

CONCRETE STEEL COMPANY maintains at all its district offices experienced engineers who will be pleased to co-operate with architects, engineers or contractors in planning the uses of Havemeyer Trusses. Estimates will be gladly furnished, and where an order is placed with us, complete erection details and full information will be given to the contractor.

Havemeyer Trusses are made in standard units and are carried in stock at our factory in Akron, Ohio, ready for prompt shipment.

Catalogue and Descriptive Literature

Our catalogue and descriptive literature is available to all architects, builders and owners and will be cheerfully sent on request.



GABRIEL STEEL COMPANY

Manufacturers of Steel Joists

2441 Bellevue Avenue, DETROIT, MICH.

Products

GABRIEL STEEL JOISTS.

For Rolled Steel Coal Chutes, Ash Pit Doors, Dome Dampers, Package Receivers and Fireplace Ash Dumps, Concrete Inserts, see page A612.

Gabriel Steel Joists

Gabriel steel joists are designed especially for floor

GABRIEL
ROLLED STEEL
PRODUCTS

Floor Construction Application

Gabriel "W" Type joists are designed to replace wood joists where a wood floor is desired. A wood nailing strip, rigidly attached to the side of the top cord, permits nailing the rough subfloor directly to the joist in the same manner as to a wooden joist. Plaster board

construction in all types of light occupancy buildings. They are adaptable to either wood or concrete flooring and insure practical fireproof construction without the delays coincident with reinforced concrete construction. Constructed from standard rolled steel sections, they are really steel trusses in miniature. They weigh approximately only half as much per foot as wooden joists of equal strength. Top chord of specially designed section affords maximum rigidity both vertically and horizontally.

Advantages of Use

Their advantages of usage, aside from their natural reduction of fire hazard, lie in their strength and the ease, speed and economy with which they can be installed. Framing of openings is properly taken care of. Individual joist capacity warrants a comparatively wide spacing which gives economy in installation of plumbing, heating and electrical work. No cutting is necessary. Plaster cracks due to wood joist shrinkage are entirely eliminated.

Sizes and Capacities

Gabriel joists are furnished in two types: Type "W" joist for use with wood floors, Type "C" joist for use with concrete floors. Gabriel Type "W" joists have a capacity of from 100 to 130 lb. per ft. of joist. Gabriel Type "C" joists, 170 to 200 lb. per ft. of joist. Variations in length of both "W" and "C" type joists are closely graded. A bearing plate is attached to all joists.

In design a complete analysis of all main and secondary stresses has been made. In the case of each joist, all stresses in every joist member have been carefully computed by analytical methods, and checked by graphical solution. We will gladly send loading tables upon request.

can be applied as a soundproofing and dustproofing subfloor and subflooring nailed through this into the nailing strip. Finish floor is nailed in the usual way. For fireproof construction we recommend laying a non-combustible plaster board on top of joists before laying wooden floor.

When structural floor is to be concrete, the Gabriel "C" Type joist should be used. For reinforcing the usual concrete slab, we recommend the use of a non-sagging metal lath. An important feature of the Gabriel joist is the ease and economy in attaching this lath rigidly to the steel joist. Ceiling lath can be attached very easily to either the "W" or "C" type joists.

Pipe and Conduit Installations

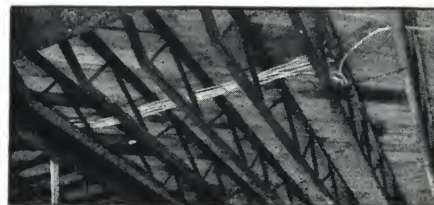
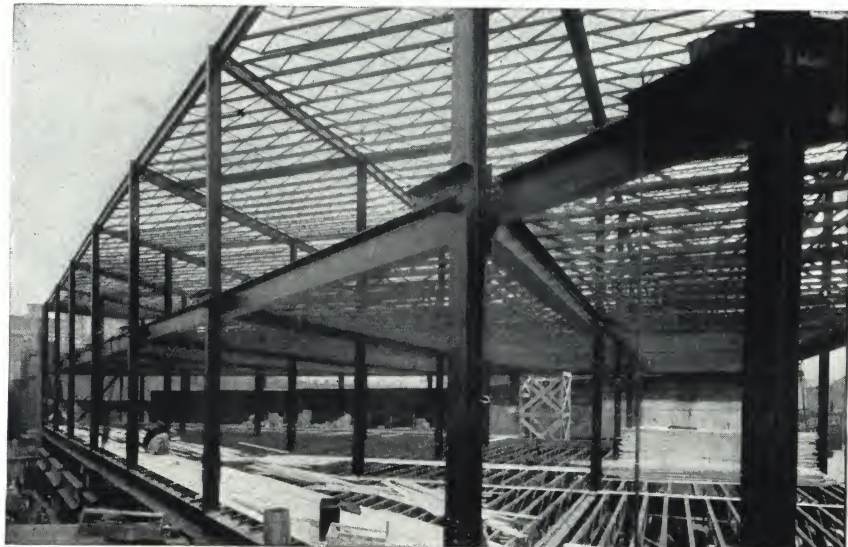
Because of the design of the top cord member, it has been possible to provide a relatively large spacing of panel points and give ample space for the installation of pipes, conduit, etc., concealed between the floor and the ceiling. The illustrations below show this factor clearly.

Erection Drawings

A steel joist layout showing location and mark of all joists is made by our engineering department. In preparing architectural or structural drawings, it is only necessary to specify the type of Gabriel joist required and the center to center spacing. The Gabriel nomenclature gives the depth of the joist, the type of joist and the over-all length. Mark numbers simplify the spotting and placing of joists on the job. Indestructible metal tags upon which the mark is clearly stamped are attached to every joist.

Shipping

Gabriel joists are always carefully loaded and securely braced against movement in transit. The number of joists, joist mark and over-all length are carefully checked. Every care is taken to insure joists being delivered to the building site in perfect condition.



Application and Advantages of Gabriel Joists

Left is shown wooden floor being applied to Gabriel "W" Type joists.

Upper and lower illustrations show how easily conduit and pipes can be installed



THE MACOMBER STEEL COMPANY

Manufacturers of Standardized Bar Joists and Light Joists

1929 Tenth Street, N. E.
CANTON, OHIO

Products

MASSILLON BAR JOISTS.
MASSILLON LIGHT JOISTS.
Also Fabricated Structural Steel and Steel Reinforcing.
For Massillon Steel Roof Trusses, see page A565.



Massillon Bar Joists

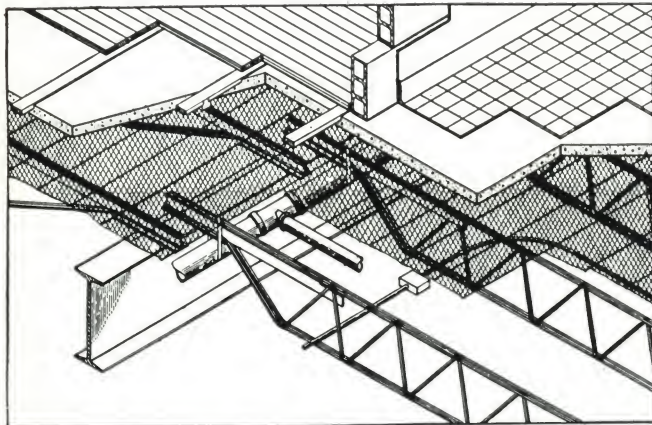
Each joist is a rugged, shop-fabricated, structural unit built up from two round top bars, two round bottom bars and an interconnecting web bar. They are solidly arc welded to bearing and vertical plates at the ends.

The use of round steel bars furnishes a perfect welding surface at all connections, insuring a solid

structural unit. No bars less than $\frac{3}{8}$ in. in diameter are used. No metal less than $\frac{1}{4}$ in. thick is used, insuring permanence and strength. The open web construction produces economy and convenience in the installation of piping.

Each joist is standardized and suitable for a variation in spans. A complete series of joists is provided for efficiently carrying all loads for spans from 4 ft. to 30 ft. 6 in.

Where Used—Massillon Bar Joists are used for building fireproof floors (and roofs) for the most rigid fireproof require-



ments. They are specified by foremost architects for their finest buildings and approved by practically all city building departments. Standardized for any sizes or shape floor panels, they are used in all types of buildings.

Typical Floor (or Roof) Construction—The joists are placed on masonry walls, steel or concrete beams in the same manner as other joists. The center of gravity of the joist is below the points of support. They rest in their natural position.

The joists are covered with rib lath fastened to the top bars of the joists. A concrete slab poured on the metal lath serves as a base for the finished floor surface. This floor finish may be wood, terrazzo, tile, cement or any other surface.

Wood floors are nailed to wooden nailing strips embedded in the concrete slab. Conduits and piping are run through as well as parallel to the joists. Ceiling below the joists is finished by applying plaster on metal lath attached to the bottom bars of the joists.

Standard Features—Standard joists cover the complete range of spans from 4 ft. to 30 ft. 6 in. All joists of each size are uniform and identical in dimensions. The distance from the top of the top bars to the bottom of the bearing plates is a uniform depth of $2\frac{1}{2}$ in.

All connections are solid steel arc-welded. Each weld is individually tested and inspected prior to shipment. Rigid inspection of each and every operation to the final painting insures a uniform workmanlike product. Standardization enables us to make shipments from stock on practically all orders.

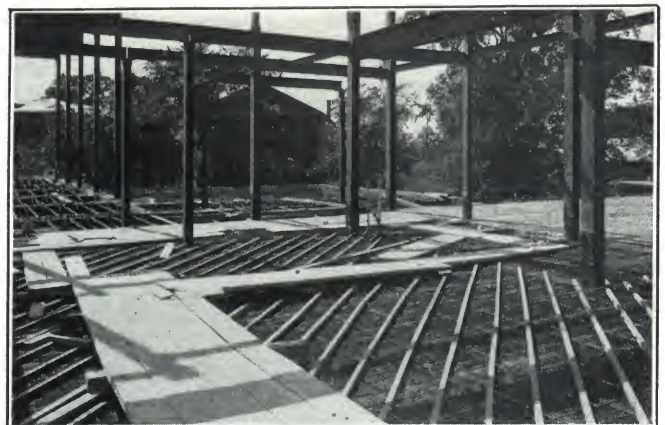
Construction Features—Each joist is tagged with a metal tag giving the symbol. Layout drawings show the quantity of each joist going in every panel and the spacing. Shipments are loaded in cars by floors or sections of the building. Joists when unloaded may be stocked in stock piles on the job or placed in position.

Two men can handle the heaviest joist. They are placed in position without the use of special erection equipment. Except where the ends would project through the face brick or some structural member, no cutting is required. In the few cases where this occurs, the

ends are cut to specifications and cut ends identified by painting yellow. This does not affect the structural strength.

After joists are put in position they are braced laterally. This holds them in position until the floor slab has set. The top lath is placed and held fast by driving Massillon lath wedges through the lath in between the top bars. Nailing strips, if used, are held by a special screed clip or wired in place. The concrete is usually poured as fast as the lath is placed.

As the structural strength is not dependent upon the slab a rough flooring of 2-in. boards may be placed on the joists as soon as the joists have been braced. This can be used for storage of materials.



Construction View—Joists, Floor Lath and Nailing Strips in Place

Piping Installations—The open web construction permits plumbing, electrical conduits, soil pipes and other floor accessories to be run through as well as parallel to the joists. This eliminates suspended ceilings. The clear space of $2\frac{1}{2}$ in. over supporting beams assists materially in placing smaller pipes to best advantage.

Future changes and relocation of piping are made through the ceiling—there is no need of tearing up floors or cutting out concrete.

Economies—Massillon Bar Joist Floor Construction is so designed as to secure the most practical benefits from each material involved and provide a maximum of efficiency. The saving in dead weight results in more economical designs for columns, beams and foundations. Heavy and expensive construction equipment is not required. Wood forms are eliminated. There is a tremendous saving in the volume of materials to be transported, hoisted and man-handled. No delays are occasioned by floor construction—immediately the joists are in place the next operation can proceed. The result is a saving of from 20 to 30% in time of erecting the building.

Standard Specifications Massillon Bar Joists

General—The floor [roof] is to consist of a finish surface laid on a slab of concrete poured on metal lath supported by Massillon Bar Joists. A plastered ceiling is to be applied below on metal lath furred to or suspended from the bottom bars of the joists.

Massillon Bar Joists—Massillon Bar Joists as manufactured by and with dimensions to conform to the standard as published by THE MACOMBER STEEL COMPANY shall be used. No bars less than $\frac{3}{8}$ in. diameter and no metal less than $\frac{1}{4}$ in. thick to be used. All connections on the joist to be electric arc-welded. Full facilities to be provided by the manufacturer at all times for the proper inspection, chemical or physical, of the material used and workmanship employed in manufacture.

Paint—All joists to be painted before leaving the factory. No volatile driers such as gasoline or naphtha to be used in the paint.

Placing of Joists—Joists are spaced to conform to safe loading tables published by the manufacturer. They are to be placed in position exactly in accordance with layout. The end joists in each panel are to be securely anchored and intervening joists braced to them by means of one or more lines (as specified in layout) of Massillon bracing wire wrapped around the top or bottom bars and pulled taut.

Steel Lath—The steel lath used on top of the joists for reinforcing the floor slab shall be $\frac{3}{8}$ -in. rib lath weighing not less than 4 lbs. to the square yard. The steel lath used under the joists for ceiling shall be flat diamond mesh lath weighing not less than 3 lbs. to the square yard. All lath to be painted before leaving the factory. $\frac{3}{8}$ -in. rib lath with the ribs up to act as furring may be used as ceiling lath. The lath in all

cases to be securely wired to supports with No. 16 gauge soft iron wire.

Furring—The bottom of the joists to be furred with $\frac{1}{4}$ -in. round rods or $\frac{1}{2}$ -in. box furring channels spaced not more than 16 in. center to center. (If $\frac{3}{8}$ -in. rib lath with ribs up is used, the furring is not required.) This furring to be placed at right angles with the joist and securely wired to the bottom bars of the joists with No. 14 gauge soft iron wire. The ceiling lath in turn to be securely wired to the furring.

Concrete Floor Slab—Where top lath is used, cover the lath to required depth (usually 2 in.) with concrete. If wood floor finish is specified, lay all nailing strips before placing concrete.

Nailing Strips—Where wood floor finish is specified, a 1x2-in. ($\frac{3}{4}$ x1 $\frac{1}{4}$ in.) screed or nailing strip shall be placed on top of the lath at right angles or angling with the joists. Where the screed crosses the joists it is to be blocked up from the lath about 1 in., using Massillon screed clips, small pieces of wood, broken tile or concrete, and then securely fastened by Massillon wedges or wire to the top bars of the joists. The concrete fill is then placed between the screeds, care being taken to completely fill the space under the screed. Wood finish is nailed directly to the screeds.

Bearings—Where the bar joists are supported by masonry walls the joists shall have an end bearing measured along the length of the joist of at least 4 in. When supported on steel plates or sections the bearing to be at least 2 in. In no case are the joists to be rigidly connected to supporting members.

Plaster—On all moderate sized buildings use lime or gypsum (hard wall) plaster. The total thickness for all coats to be not less than $\frac{3}{4}$ in. For larger buildings in congested areas, use a cement plaster for the ground coat. The second and third coats to be gypsum or lime plaster, mixed and applied as per the manufacturer's specifications to a total thickness, including all coats, of $\frac{3}{4}$ in. The cement ground coat to be mixed and applied as follows—the first coat (ground or scratch):

1 sack portland cement	15 lbs. wood fibre
2 $\frac{1}{2}$ cu. ft. clean sharp sand	2 lbs. long cattle hair or cocoanut fibre
10 lbs. hydrated lime	

All to be mixed together until of uniform color and then water added to the required consistency. Apply with considerable pressure, obtaining a good key, and then roughen the surface by scratching diagonally in both directions. This coat to be applied to a thickness of $\frac{3}{8}$ in. over the lath.

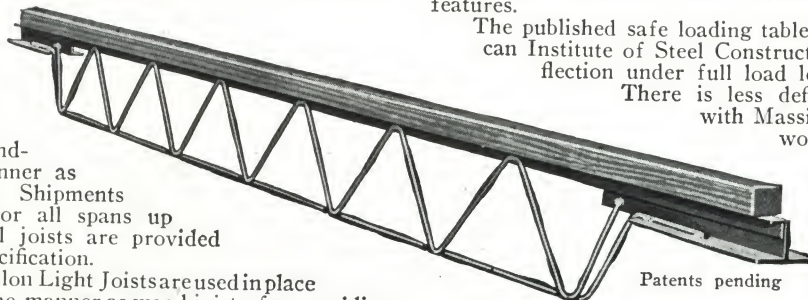
Massillon Light Joist

Each joist is a rugged shop fabricated structural unit made from wood and steel. The top member consists of a wood nailer affixed to a structural steel angle. The web section consists of round steel bars (minimum diameter $\frac{3}{8}$ in.) electro-welded at their intersections and to the top member and bearing angles.

These joists are standardized in the same manner as the Massillon Bar Joist. Shipments are made from stock for all spans up to 23 ft. 6 in. Special joists are provided for longer spans on specification.

Where Used—Massillon Light Joists are used in place of wood joists, in the same manner as wood joists, for providing a rigid floor (or roof) with a high degree of fire resistance.

Typical Floor (or Roof) Construction—The joists are placed and braced in the same manner as wood joists. Wood flooring or subflooring is nailed directly into the top member. Piping and conduits are placed through as well as parallel to the joists. Metal ceilings, metal lath and plaster, plaster board and other standard types of ceilings are readily attached to the bottom bars of the joists.



Advantages of the Construction—As this construction is used in buildings where wood joist construction is permitted, a comparison with wood joist construction will best bring out its features.

The published safe loading tables are based on the American Institute of Steel Construction specifications with deflection under full load less than 1/360th the span.

There is less deflection and less vibration with Massillon Light Joists than with wood joist construction.

Steel is not affected by changes in weather. The use of Massillon Light Joists eliminates the shrinkage and warping that is present in all wood joist floors. This eliminates the

cracking of plaster so common to wood construction.

The open web construction eliminates cutting of joists in placing piping. This results in a workmanlike and dependable job. It saves headroom and reduces the cost of installing piping and other floor accessories.

The Massillon Light Joist gives a high degree of fire resistance. This is greatly in excess of that afforded by wood joists, as steel forms the bottom and web members.

Scope of Service

The Massillon Bar Joist and the Massillon Light Joist are two of the line of steel building products manufactured and marketed under the "Massillon" name by THE MACOMBER STEEL COMPANY. Descriptive literature and designing data furnished on request.

A complete engineering service is provided in preparing drawings and estimates based upon the use of these products. This service may be obtained from our authorized sales representatives or by sending plans to our home office at Canton, Ohio.

THE RIVET-GRIP STEEL CO.

Manufacturers of Rivet-Grip Steel Joist

MAIN OFFICE

2404 Prospect Avenue, CLEVELAND, OHIO

WAREHOUSES AND FABRICATING PLANTS AT CLEVELAND, OHIO AND CANONSBURG, PA.

LIST OF REPRESENTATIVES IN PRINCIPAL CITIES

ALBANY, N. Y., CONTRACTORS' SALES CO.
ATLANTA, GA., HUGH J. BAKER & CO.
BUFFALO, N. Y., KENMORE BUILDERS' SUPPLY CO.
CHARLESTON, W. VA., CONCRETE ENGINEERING PRODUCTS CO.
CHICAGO, ILL., HUGH J. BAKER & CO.
CINCINNATI, OHIO, HUGH J. BAKER & CO.
DALLAS, TEX., R. J. DEWEES COMPANY
DAYTON, OHIO, HUGH J. BAKER & CO.
DECATUR, ILL., HUGH J. BAKER & CO.

DENVER, COLO., J. W. BRANNAN SAND & GRAVEL CO.
DETROIT, MICH., CAPITOL STEEL CORP.
FORT WAYNE, IND., HUGH J. BAKER & CO.
HELENA, MONT., RAYMOND C. GRANT
INDIANAPOLIS, IND., HUGH J. BAKER & CO.
LANSING, MICH., CAPITOL STEEL CORP.
LOUISVILLE, KY., LOUISVILLE BUILDERS' SUPPLY CO.
MILWAUKEE, WIS., A. F. WAGNER ARCHITECTURAL IRON WORKS
MINNEAPOLIS, MINN., THE HUSTAD CO.

NEW YORK, N. Y., FERRO BUILDING PRODUCTS CO.
OMAHA, NEB., GATE CITY IRON WORKS
PHILADELPHIA, PA., AMERICAN STEEL ENGINEERING CO.
PITTSBURGH, PA., AMERICAN STEEL ENGINEERING CO.
SAN FRANCISCO, CAL., J. A. KINKEAD
ST. LOUIS, MO., HARRY C. UHLENHAUT
SALT LAKE CITY, UTAH, CHAS. F. PORTER CO.
WHEELING, W. VA., TYLER IRON WORKS

Products

RIVET-GRIP STEEL JOISTS.

RIVET-GRIP RIGID SHOP FABRICATED TRUSSES.

Bridge Roadway Reinforcement (description on request).

For Rivet-Grip Bank Vault Reinforcement, see pages A1104-1105.

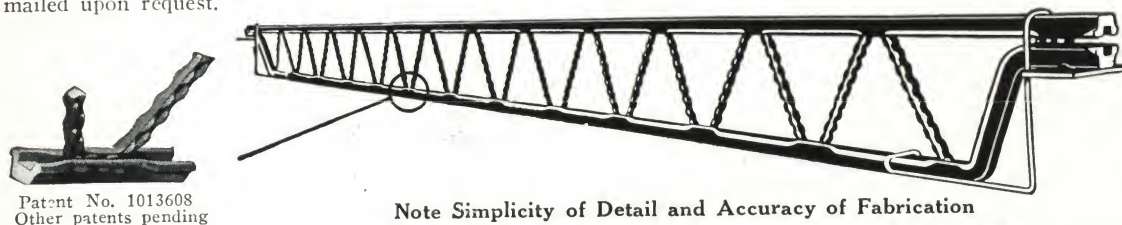
Literature

Folder giving complete details and loading tables will be mailed upon request.

Uses

Rivet-Grip Steel Joists are used for fire-safe floor and roof construction, or wherever a rigid, permanent, fire resisting and economical type of construction is desired in light occupancy buildings.

Rivet-Grip Steel Joists have been in the market for four years and have been used in several hundred buildings, which include apartment houses, banks, office buildings, schools, churches, libraries, theaters, hotels, garages, stores and residences.



Design

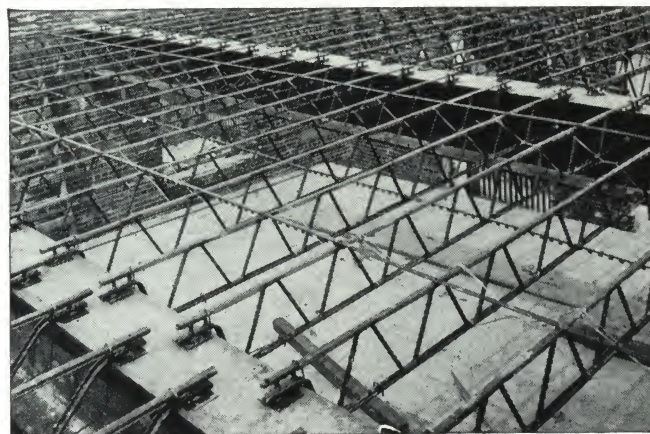
Rivet-Grip Steel Joists are fabricated from specially rolled, heavy steel sections. The truss construction gives light weight with the greatest possible carrying strength. The top and bottom chords consist of heavy rolled flange sections and the lightest web members are $\frac{3}{8}$ in. thick. The web members are joined to the chord members by the Rivet-Grip process, which produces a uniform and positive mechanical connection and develops the full strength of component members of the truss.

These joints are so rugged and completely encased by the chord sections, that they are positively protected from damage in shipment or rough handling in the field. There are no welded connections except on bearing plates and no thin metal members subject to corrosion. All joists are painted with rustproof paint before shipment.

Our special continuous notched angle and double diagonal galvanized wire bridging is always furnished with our Rivet-Grip Steel Joists. This bridging not only serves to hold the joists in place before concreting, but also acts as a series of transverse trusses for distributing concentrated loads, which come on the completed floor.

Advantages

Rivet-Grip Steel Joists are lighter, unit for unit, than ordinary structural member of equal strength. They are easily handled by workmen, as individual units or in bundles by cranes,



Rivet-Grip Steel Joists in Place Ready for Top Lath

Note that joists are simply dropped into position with ends resting on top of beams or walls. Also note the two rows of notched angle and double diagonal bridging at the third points of the joist

in order to obtain uniform ceiling heights. They are delivered complete with erection marks on metal tags fastened to each joist.

Designing and Estimating Service

THE RIVET-GRIP STEEL CO. or nearest representative will gladly submit estimates upon request. The following items can be included in the estimate: Rib lath for floor slabs, temperature steel, furring rods, beam clips for fastening joists to steel beams and screed or sleeper clips and metal lath for ceilings, in addition to our standard notched angles and galvanized wire bridging.

Assistance in preparing the most efficient and economical layout for any building will be given without incurring any obligation.

Continued on next page

TOTAL SAFE LOAD IN LBS. PER SQ. FT. ON STANDARD RIVET-GRIP STEEL JOISTS, SPACED 11¼ IN. ON CENTERS

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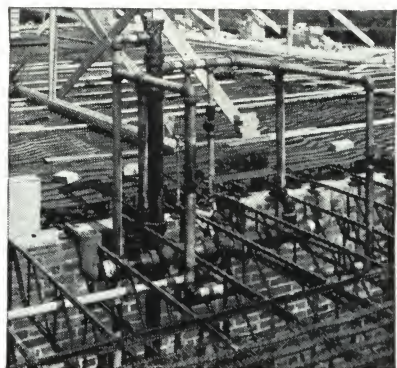
Maximum fiber stress, 16,000 lb. per sq. in. Special tables for Series R. joists for 18,000-lb. fiber stress will be furnished on request.
Loads to the left of heavy lines are limited by shear.

Weights per lineal ft. include bridging angles and wire and bearing plates.

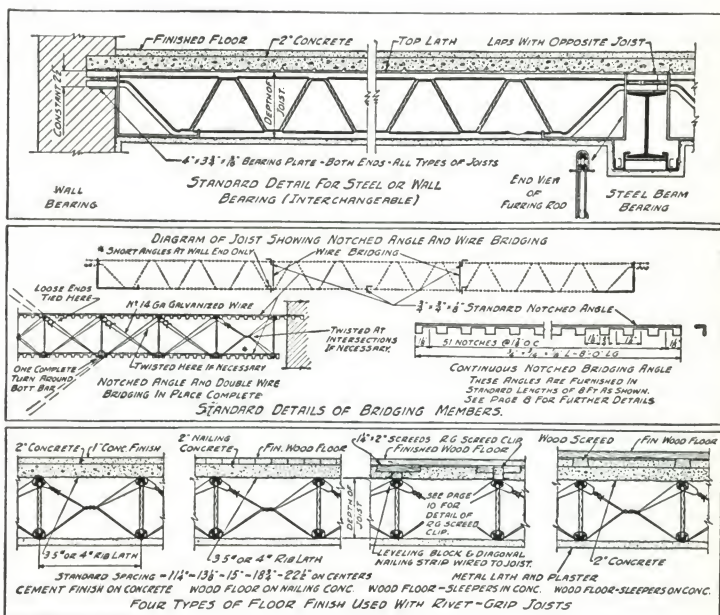
Rivet-Grip steel joists made up of heavier sections can be furnished for unusual conditions of loading or spans over 30 ft.

*To Find Loads per Square Foot for Standard Joist Spacings—*For 11½-in. joist spacing, multiply loads in above table by 1. For 13½-in. joist spacing, multiply these loads by 6/7. For 15-in. joist spacing, multiply by ¾. For 18¾-in. joist spacing, multiply by ⅔. For 22½-in. joist spacing, multiply by ½.

To Determine Safe Superimposed Load—Find safe load per sq. ft. as indicated above. From this figure, subtract (1) weight of slab, joists and ceiling, and (2) weight of finish and fill. Rivet-Grip steel joist floors including top slab and ceiling, but not including finish and fill, weigh approximately 40 lb. per sq. ft.



Note Network of Piping Extending Through Rivet-Grip Joists



Floor Construction Details, Rivet-Grip Steel Joists

Specifications for Rivet-Grip Steel Joist Floor Construction

(1) **Steel Joists**—Provide and set Rivet-Grip Steel Joists, as manufactured by THE RIVET-GRIP STEEL CO., Cleveland, Ohio, as shown or noted on drawings. Where sizes of joists are not indicated on drawings, same shall be in accordance with manufacturer's tables of safe loads. All joist trusses shall conform to standard details of THE RIVET-GRIP STEEL COMPANY.

(3) **Furring Rods**—Where ceiling lath is attached directly to bottom chords of joists, provide and place Rivet-Grip furring rods for extending bottom chords of joists full length between supports to carry ceiling lath.

(4) **Centering**—For centering and reinforcing, a rib lath of (specify weight) shall be laid on, lath side down, and wired or clipped to top chords of joists with ribs extending at right angles to joists.

(5) **Concrete Slab**—Place temperature rods of size and at spacings specified and pour 2-in. concrete slab of 1:2:4 mix.

Where integral or monolithic finish is specified, same must be applied before slab has taken final set, and mix of finish must be kept as dry as it is possible to work. The absorption of excess water by dusting on dry cement is not permissible.

Where finish is to be applied after the rough slab has set up and thoroughly hardened, the slab surface must be left roughened so as to provide adequate bond for the finish.

Note: (a) While finishes as thin as $\frac{3}{4}$ in. may be applied after slab has hardened, for best results the finish should be of 1:2 mix at least $1\frac{1}{4}$ in. thick.

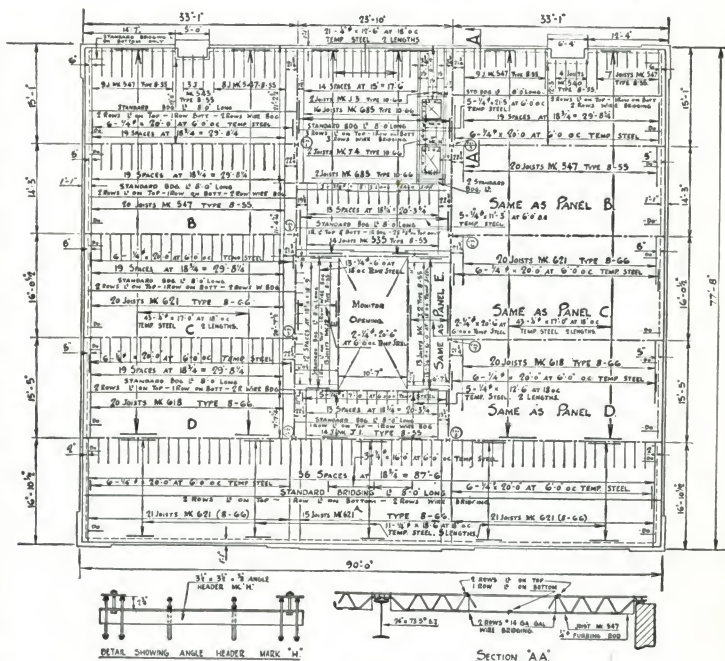
(b) Temperature rods are essential when monolithic finish is used and must be left as near to the top of the rough slab as possible.

(c) The use of $\frac{1}{4}$ -in. rounds 18 in. on centers parallel and 24 in. on centers at right angles to joists is recommended.

(d) In garage floors or other structures with heavy line loads the rough slab should be at least 3½ in. thick.

(6) (*Where Wood Floor is Specified*)—Insert approved clips in concrete slab and attach 2x2-in. [$1\frac{3}{4}$ x $1\frac{3}{4}$ -in.] screeds or nailing strips evenly leveled, on top of slab.

(7) **(Optional Method—Embedding Screens in Slab)**—Place 1½ [1¼ x 1½-in.] screens or nailing strips over lath and at an angle with The screens shall be supported 1 in. above lath to allow concrete between them and lath. The screens shall either be supported l attached to Rivet-Grip screed clips or supported by blocking and securely to joists.



TYPICAL LAYOUT AND PLACING PLAN FOR RIVET-GRIP STEEL JOISTS

(8) **Ceilings**—Ceilings shall be constructed by furring bottom of joists with ¼-in. round rods or furring channels spaced not more than 16 in. on centers. A flat lath shall then be wired to the furring rods or channels.

Note: (a) The furring rods or channels may be omitted if a $\frac{3}{8}$ -in. rib lath is used with the rib side against the bottom chords of joists.

(b) Where extreme fire resistiveness is desirable, we recommend the use of 1-in. furring channels in place of $\frac{1}{4}$ -in. round rods.

TRUSCON STEEL COMPANY

Manufacturers of Steel Joists

YOUNGSTOWN, OHIO

For Branch Offices, See Local Telephone Directory

Products

P-G (Plate Girder) STEEL JOISTS.

O-T (Open Truss) STEEL JOISTS.

For Concrete Reinforcement, see pages A134-135; for Steel Roof Decks, see page A171; for Steel Windows and Doors, see pages A1082-1085; for Metal Lath, etc., see pages B1306-1307.

Truscon P-G (Plate Girder) Steel Joists

The Truscon P-G (Plate Girder) Joist is made of structural shapes, combining utmost efficiency of design with economy of material. This joist is a combination of the most perfect grade of structural steel angles welded by the high pressure electric welding method to



a rolled strip, the whole forming a plate girder of great strength. Being made in depths from 6 to 14 in., inclusive, they give the engineer considerable leeway in arriving at the most efficient design.

Truscon Service

Truscon's organization of Sales Offices completely covers the country. Through any of these offices you can obtain the services of a competent engineering force thoroughly acquainted with the most economical practice in the application of Truscon Steel Joists.

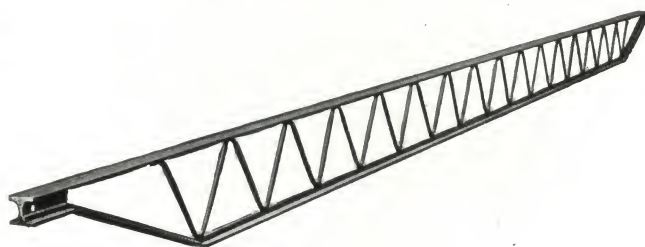


TRADE-MARK

Truscon O-T (Open Truss) Steel Joists

The Truscon O-T (Open Truss) Steel Joist is a Warren truss in which the top and bottom chords are specially rolled "tee-shaped" members providing the greatest resistance to buckling strains.

The web member is continuous from end to end to positively transmit the stresses, and is carefully welded to the top and bottom chords.

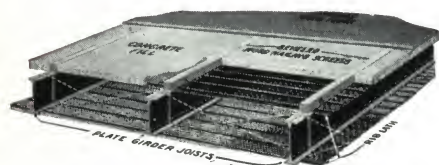


The entire design is efficient and exceptionally economical of materials.

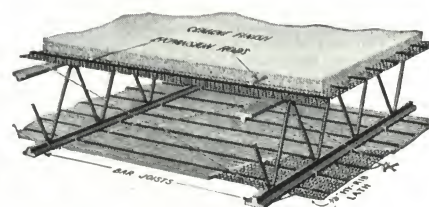
These joists can be furnished in depths varying from 8 to 16 in., inclusive.

Floor Finishes

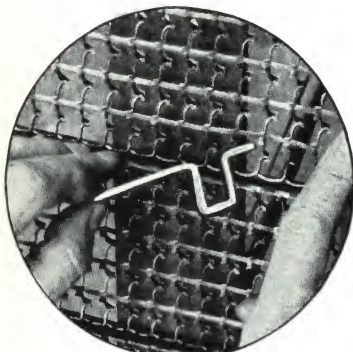
Truscon Steel Joist Construction adapts itself readily to any type of floor finish. Wood nailing screeds, embedded in the concrete fill, simplify the laying of wood floors; while a cement topping over the concrete fill makes an ideal base for linoleum, carpets, or composition floors.



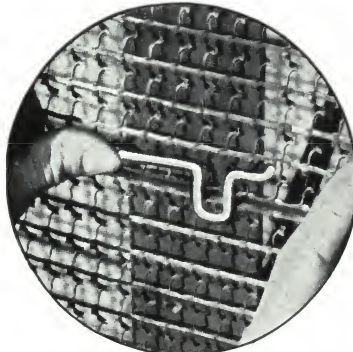
Wood Finish



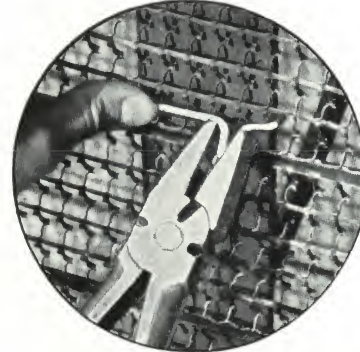
Cement Finish



Clip is held by the long end and in the left hand, and the short end is inserted through the mesh of the lath



Inserting the long end of the clip through the mesh and held in this position with the thumb



Pinching together the small U-shaped portion of the clip which lays on top of the lath

Method of Attaching Lath to Truscon Steel Joists

VAN RENSSELAER P. SAXE

CONSULTING ENGINEER
REPRESENTING STANDARD CONCRETE STEEL CO.

System "M" Structural Steel
BALTIMORE, MD.

REPRESENTATIVES

ALLSTON (BOSTON), MASS., C. W. TILTON, C. E., 44 Quint Avenue

BUFFALO, N. Y., L. W. REEDER, 920 White Building

CLEVELAND, OHIO, WHITACRE ENGINEERING CO., 1836 Euclid Avenue

PHILADELPHIA, PA., BRADFORD STETSON, 21st Street and Hayes Avenue, Camden, N. J.

NEW YORK, N. Y., GUY B. WAITE Co., 413 E. 31st Street

PITTSBURGH, PA., VICTOR DIDIER, Fulton Building

RALEIGH, N. C., R. E. BALL, Box 880

TROY, N. Y., G. SAXTON THOMPSON, C. E., 257 Broadway

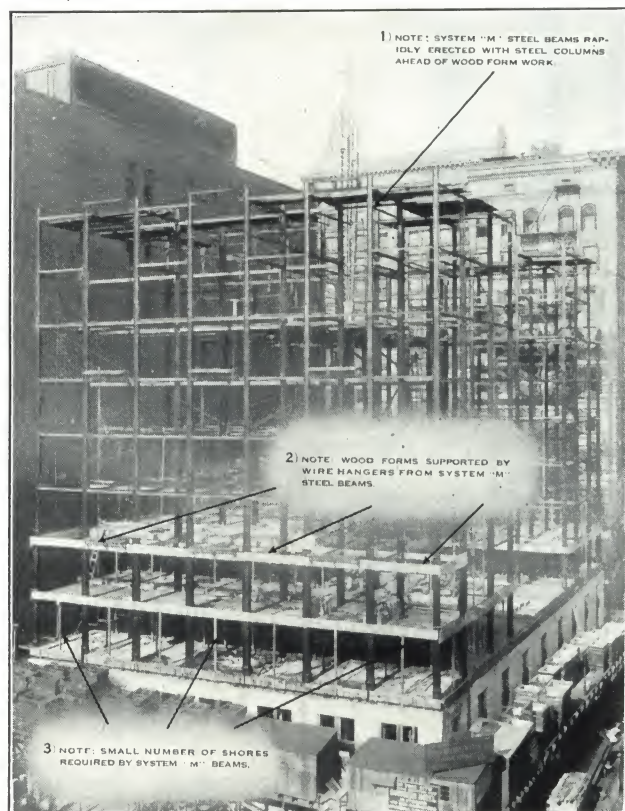
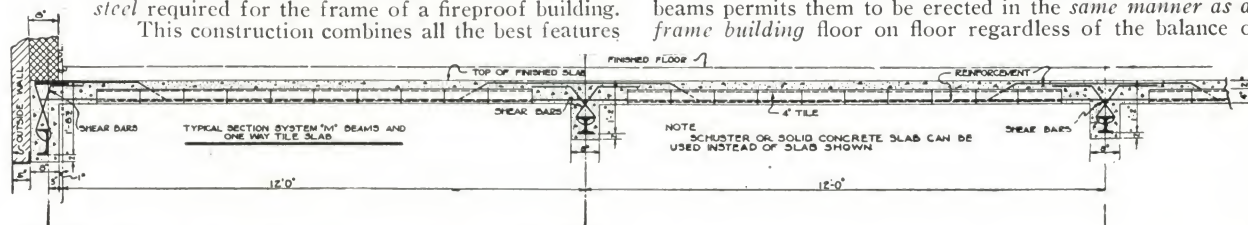
System "M"—A Steel Construction at the Cost of Concrete

System "M" is a patented type of light structural steel beam, designed so when combined with concrete that it will make savings of 40% to 60% of tonnage of structural steel required for the frame of a fireproof building.

This construction combines all the best features

of structural steel frame construction, such as *speed and safety of construction*.

The use of structural steel columns with the System "M" beams permits them to be erected in the *same manner as a steel frame building* floor on floor regardless of the balance of the



Southern Hotel
LUCIUS WHITE, Architect



U. S. Woolen Co.,
New York
A. S. GOTTLIEB, Architect



War Risk Bureau
WYATT & NOLTING, Architects

construction which follows the steel frame. (See note 1 on illustration.)

All wood forms being hung from System "M" steel beams permit uninterrupted *placing of forms during the poorest weather conditions*, so that there are always forms ready for concrete pouring when the weather permits. (See note 2 on illustration.)

All steel beams are fastened to structural steel columns with bolts fastened to beam seats riveted to columns carrying full load to be supported at column. System "M" beams are designed to be the *same over-all depth as similar capacity structural steel beams* fireproofed with concrete. Any type of floor slab may be used with System "M" beams. (See note 3 on illustration.)



System "M" beams are in use for spans up to 50 ft. and carrying loads up to 1500 lb. per sq. ft., and in buildings up to 20 stories high.

System "M" construction, *covering a period of many years*, has been successfully used with economical results in hundreds of large buildings, a list of which will be gladly furnished on request.

Co-operative Service

For the benefit of any who may wish to use, or have information on this construction, a well organized engineering service is maintained. This service covers making complete structural plans, specifications and foundation designs, checking over all shop and detail drawings, and supervisory inspection of erection. Preliminary engineering service is free of charge.

For buildings where System "M" is used a royalty charge, based on square footage of building, is made to the owner of the building, who benefits from the saving made by this construction.

CREX PATENT COLUMN CO.

GENERAL OFFICE AND WORKS

TELEPHONE

2300-2310 South Springfield Avenue

LAWDALE 2634, 2635

CHICAGO, ILL.

BRANCHES

MILWAUKEE, WIS., 951-53 Thirtieth Street

DECATUR, ILL., Box 299

TOLEDO, OHIO, Summit and Sandusky Streets

Product

Manufacturers of CREX PATENT COLUMNS.

Construction

Crex Patent columns consist of an outer shell of steel filled with concrete, and only the best materials are employed in their manufacture.

Especial care is taken in filling these columns so that the concrete filling shall be perfectly solid and uniform throughout, thus obtaining the full strength of a solid concrete interior.

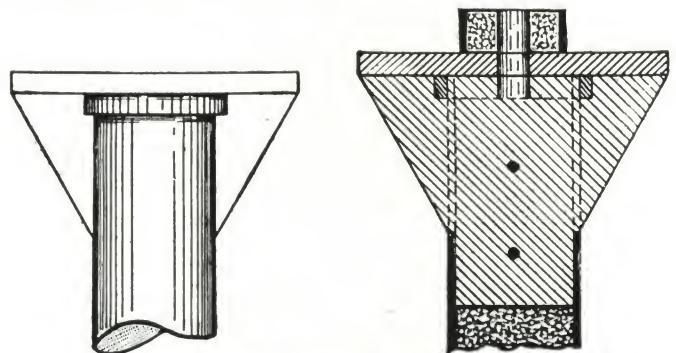
The caps and connections are made of steel, of sufficient strength to receive the superimposed loads.

CREX PATENT COLUMN CO. holds the original patent for an all-steel cap. The cap being entirely of steel, its strength can be reliably computed.

The connections are made in such a manner that only a steel plate separates the shaft of the lower column from the one above, securing the full strength of the column at the connection. Crex columns can be

furnished in about one-fifth the time required for other columns.

CREX PATENT COLUMN CO. was formed for the purpose of supplying the increased demand for this class of columns with the best that can be made, both as regards strength and appearance.



Crex Patent All-steel Two-way Brackets

HEAVY WEIGHT CREX COLUMNS

Out-side diam., in.	r	Thick-ness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe loads in pounds									
							Length in feet									
							6	8	10	12	14	16	18	20	22	
3½	1.18	.216	2.24	7.58	7.07	14.65	30200	26920	24000							
4	1.32	.226	2.69	9.11	9.62	18.81	36800	33900	30600	27200						
4½	1.45	.237	3.19	10.79	12.57	23.47	44100	42100	38400	34800	31200					
5	1.70	.247	3.71	12.54	15.90	28.70	51200	51200	47800	44200	40500	37000				
5½	1.87	.258	4.32	14.62	19.64	34.51	59600	59600	57800	53800	50000	46200	42200			
6	2.22	.280	5.61	18.97	28.27	47.58	77400	77400	77400	74400	74400	70200	66200	61800	59700	53400
6½	2.61	.301	6.96	23.54	38.48	62.48	96600	96600	96600	96600	93100	86800	84600	79700	75500	
7	2.97	.322	8.44	28.55	50.27	79.46	117800	117800	117800	117800	117800	113400	108600	104000	99200	
7½	3.28	.344	10.03	33.91	63.62	98.60	143800	143800	143800	143800	143800	142800	137600	132600	127000	
8	3.66	.366	11.92	40.48	78.54	120.10	167000	167000	167000	167000	167000	167000	165600	159000	154800	
8½	4.03	.388	14.02	48.81	99.10	148.10	205600	205600	205600	205600	205600	204000	204000	204000	200000	

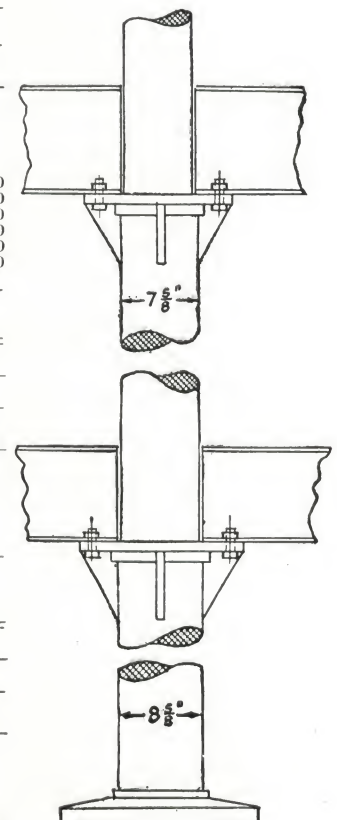
LIGHT WEIGHT CREX COLUMNS

Out-side diam., in.	r	Thick-ness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe loads in pounds									
							Length in feet									
							6	8	10	12	14	16	18	20	22	
3½	1.20	.120	1.28	4.33	8.35	12.79	17660	15840	14000							
4	1.33	.134	1.64	5.53	10.93	14.57	23000	21200	19200	17100						
4½	1.54	.134	1.85	6.25	14.10	20.57	25900	25240	23200	21200	19120					
5	1.71	.148	2.29	7.67	17.42	25.38	32100	32100	30000	27500	25500	23300				
6	2.04	.165	3.05	10.28	25.25	35.95	42400	42400	42000	39600	37160	34600	32000	29600		

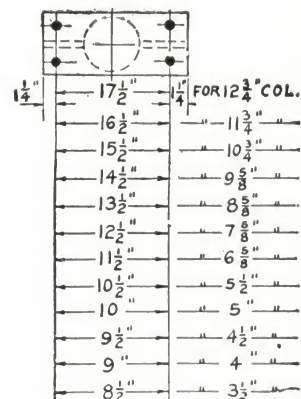
Standard steel boiler tubes, Crane Co., 1913.

EXTRA HEAVY WEIGHT CREX COLUMNS

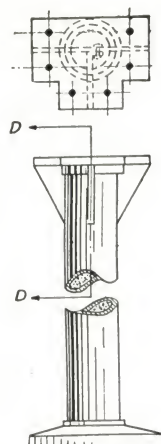
Out-side diam., in.	r	Thick-ness of steel, in.	Area of steel, sq. in.	Weight of steel per ft., lb.	Area of concrete, sq. in.	Weight of column per ft., lb.	Safe loads in pounds									
							Length in feet									
							6	8	10	12	14	16	18	20	22	
3½	1.15	.300	3.03	10.25	6.67	17.05	40200	35900	31600	27500						
4	1.30	.318	3.70	12.51	8.87	21.52	51800	47440	42760	38000	33100					
4½	1.47	.331	4.43	14.98	11.45	26.66	62300	59400	54400	49600	44500	39440				
5	1.65	.356	5.21	17.61	14.39	32.90	73500	72000	67720	62500	57600	51700	46400			
5½	1.83	.375	6.14	20.78	18.19	39.07	85500	85500	81900	76400	70800	65200	59400	53800		
6	2.19	.432	8.44	28.57	25.97	55.07	119000	119000	119000	113600	107100	100800	94100	87500	81100	
6½	2.54	.500	11.26	38.05	34.47	72.86	156800	156800	156800	156800	149400	142000	134800	127600	120000	
8½	2.89	.500	12.81	43.39	45.66	89.50	178600	178600	178600	178600	178200	170200	163000	155400	148000	



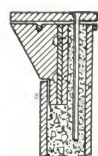
Steel Bracket Cap Construction



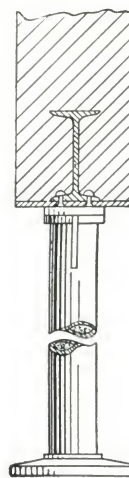
Spacing of Holes in Plates for Bracket Caps



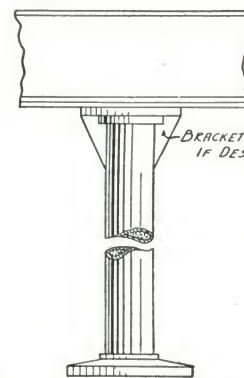
Three-way Bracket



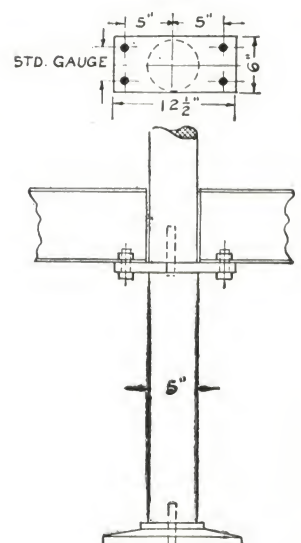
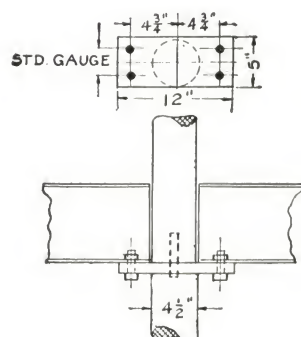
SEC DD



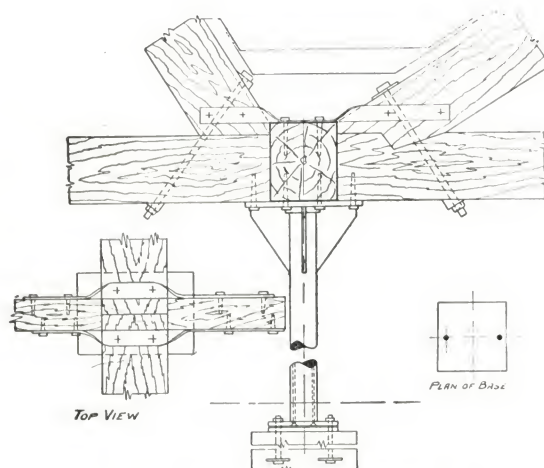
Details Showing Crex Columns in Store Front Construction



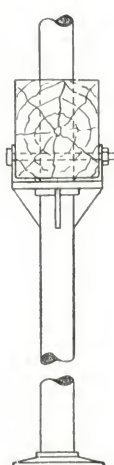
BRACKETS MAY BE OMITTED IF DESIRED.



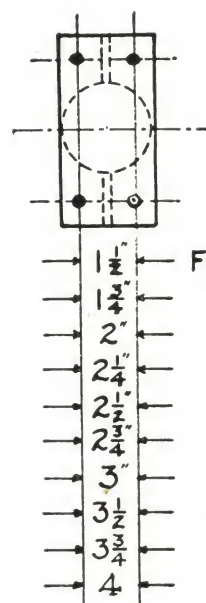
Stack for Partitions, Apartment Buildings



Details Showing Crex Columns in Sawtooth Construction



Elevation of Crex Columns Showing Steel Corbel Used in Mill Construction



Standard Gauge for I-Beams

Approval

Crex Patent columns are approved by the building departments of all large cities.

Adaptability

Crex Patent columns are used extensively in factories, apartment buildings, stores, etc.

Prices, etc.

Quotations and any additional information furnished on request.

Installations

Crex columns have been installed in thousands of buildings in various parts of the United States. This fact gives proof of the economy, reliability and fine appearance of Crex columns.

LALLY COLUMN CO.

Manufacturers of Concrete Filled Columns
CAMBRIDGE, MASS.

FACTORIES

CHICAGO, ILL., 4001 Wentworth Avenue

CAMBRIDGE, MASS., Erie and Albany Streets

BROOKLYN, N. Y., 211-249 Lombardy Street

Products

LALLY COLUMNS with patented Steel Connections and Bracketed Caps securely fastened, making a rigid tie between beams and columns.

Patents

Various improvements on Lally columns are covered by numerous patents under different dates extending from 1898 to the present time.

Infringements will be prosecuted.

Manufacturing Process

LALLY COLUMNS are manufactured by the LALLY COLUMN CO., INC., of New York, the LALLY COLUMN CO., Cambridge, Mass., and the LALLY COLUMN CO. of Chicago, representing an annual production of hundreds of thousands of columns.

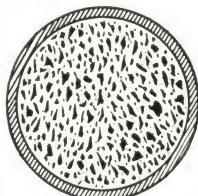
The column is a *shop-made* unit manufactured under the most thorough and careful supervision and inspection, and is shipped to the job ready for erection.

Standard tested mild steel pipes, $3\frac{1}{2}$ to $12\frac{3}{4}$ inches outside diameter, are cut to the lengths required by plans and specifications, slotted to receive beam connections and splice plates, set up perpendicular on level bases and held in a vertical position by lateral supports. A machine-mixed stone concrete fill is deposited in the shell and, to insure dense concrete, shaft is agitated before initial set takes place by an electric hammer operated on exterior of pipe. The vibration compacts the concrete, liberates the confined air and eliminates all air holes and cavities in the aggregate. The resulting material is of considerably greater compressive strength than ordinary cast-in-the-field concrete. When seasoned, the column is lifted out of position, sandpapered on the exterior surface to remove all cement, and then painted.

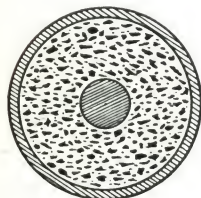
Reinforcements for Lally Columns

To meet various requirements, including the amount of load to be carried, Lally columns can be reinforced as shown in the accompanying illustrations.

In all cases the concrete is *compressed*, eliminating all air voids (Fig. 1).



Outer Shell Filled with Compressed Concrete



Single Steel Bar Reinforcement



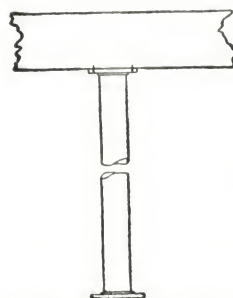
Pipe Reinforcement



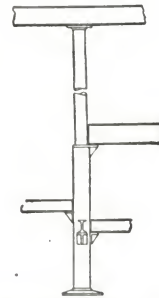
Four Angle Iron Reinforcement

Fig. 1. Sectional Views Showing Manner of Reinforcement of Lally Columns

Note: The angle iron reinforcement above makes a compact fireproof column; column is designed so that load is carried by the four angle irons and concrete within radius of same; outer shell and outer concrete act as fireproofing, making a column practically indestructible



Plain, with Ordinary Plate for Wood Beam Connection



With Beam Supports at Different Elevations

Fig. 2. Types of Lally Columns

Bracket and Beam Support

Where one column sets over the other, our latest construction of bracket and beam support is used, as shown in Fig. 3. This style of cap consists of crown plate and steel bracket inserted through slots in column shaft and firmly affixed thereto.

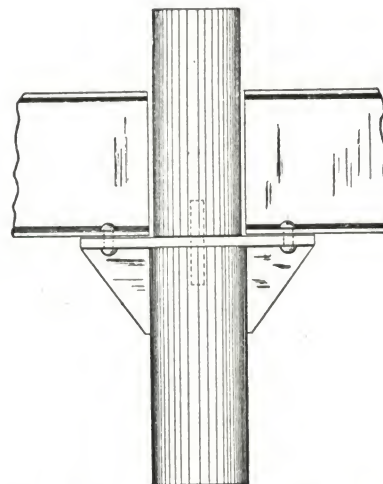


Fig. 3. Steel Bracket and Beam Support

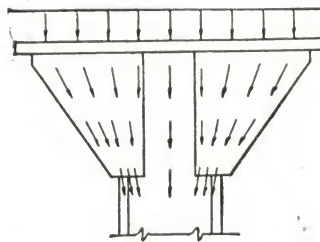


Fig. 4. Steel

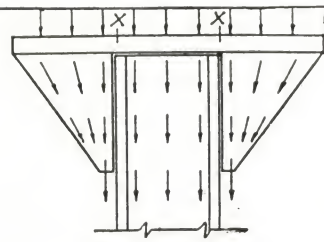


Fig. 5. Cast Iron

Bracket Caps

Fig. 4. Cross section of a typical Lally steel bracket cap showing diagrammatically with arrows how all the load on the cap plate is distributed to the column, eliminating the chance of failure due to improper distribution of the load

Fig. 5. Cross section of a typical loose cast iron cap showing by means of arrows that only part of the load is distributed directly to the column, thereby causing failure by shear at the points marked "x." Load between points "x-x" is the only load carried by the column

Approvals

The Lally column is endorsed by engineers throughout the country, and approvals have been granted for its use by all the leading city building departments after extensive tests and investigations. Its adaptability to all forms of building construction, its economy in first cost and in floor space occupied, its speed of erection, as well as its strength, durability and practical performance, have been demonstrated by successful and uniformly satisfactory use under especially severe conditions.

Fire Resistance

The value of the Lally column in fire resisting construction has been frequently demonstrated both in actual fires and scientifically conducted fire tests. This type of column section, without additional exterior protection, has withstood the flames and high temperatures of some of the greatest fires; such as the Chelsea conflagration in April, 1908, the Salem fire in June, 1914, the Standard Oil fire at Greenpoint, N. Y., in September, 1919, and the fire in the Edison Phonograph Works at West Orange, N. J., in December, 1914. In this latter fire, large pieces of steel and cast iron melted in the same building in which concrete-filled pipe columns were used and there were evidences of exposed concrete having been fused. The defect produced on the concrete-filled steel pipe columns was a slight lateral bend which was generally less than 1 inch. A complete report on the fire in the Edison Phonograph Works was prepared under the joint auspices of the National Fire Protection Association and the National Board of Fire Underwriters and gives in detail the effects of fire on the various materials which entered into the construction.

In the Underwriters' Laboratories at Chicago, Ill., 1917-1919, two types of Lally columns were tested in a series of fire tests of structural steel, reinforced concrete, steel pipe and cast iron columns. The Lally columns were unprotected on the exterior surface. These columns were tested under Standard time-temperature fire curve conditions while supporting loads in excess of the recommended design loads. As a result of the tests, the comparative fire resisting ratings of Lally columns were determined as 25 minutes for the unreinforced, which was 11% overloaded during the test, and 45 minutes for the reinforced section, which was 3% overloaded during the test. Actual test runs were 36 minutes and 1 hour 11¼ minutes, respectively. Compared to these ratings, unprotected structural steel and round cast iron columns were granted tentative ratings of only 10 and 20 minutes, respectively. Lally column ratings would probably have been still further increased if the test loads had not exceeded the safe working values recommended.

Safe Loads

We call attention to a material change in the safe loads, as shown in the table below, increasing the accepted safe loads for Lally columns. Please bear in mind that when a project is designed for Lally columns according to this strength list they should be specified, and no other concrete filled column substituted unless the sizes are increased to a diameter that will be equal in carrying capacity to the genuine Lally columns.

References

The names and addresses of the principal purchasers and satisfied users of Lally columns will be furnished on request.

SAFE LOADS FOR LALLY CONCRETE FILLED COLUMNS IN THOUSANDS OF POUNDS

Limit of Length=40 Diameters ($l/r=120$) $P=(A_c+12 A_s) (1600-24l/a)$

Diam. of col., in.		Weight per ft., lb.	Area of steel, sq. in.	Area of concrete, sq. in.	Unbraced length of column in feet																*Max. length, ft.
					6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Light weight	3½	13	1.27	8.35	26.1	24.2	22.2	20.3	18.3	16.4	14.5									11.91	
	4	17	1.63	10.94	35.6	33.4	31.2	29.0	26.8	24.6	22.4	20.2								13.71	
Heavy weight	3½	15	2.23	7.39	37.9	35.1	32.3	29.4	26.7	24.0										11.64	
	4	20	2.68	9.89	49.2	46.1	43.1	40.1	37.0	33.9	30.9	27.9								13.37	
	4½	24	3.17	12.73	61.8	58.5	55.3	52.0	48.8	45.5	42.3	39.0	35.8	32.5						15.10	
	5	29	3.69	15.95	75.6	72.0	68.6	65.2	61.7	58.2	54.7	51.3	47.8	44.3	40.9	37.4				16.83	
	5½	36	4.30	20.01	92.1	88.3	84.6	80.8	77.1	73.3	69.6	65.8	62.1	58.3	54.6	50.8	47.1	43.3		18.78	
	6⅝	49	5.58	28.89	128.3	124.2	120.0	115.8	111.7	107.5	103.4	99.2	95.0	90.9	86.7	82.6	78.4	74.2	70.1	22.45	
	7⅝	64	6.92	38.74	166.0	161.4	156.9	152.3	147.8	143.2	138.6	134.1	129.7	125.0	120.5	115.9	111.4	106.8	102.3	25.92	
	8⅝	81	8.40	50.03	211.1	206.1	201.1	196.1	191.0	186.0	181.0	175.9	170.9	165.9	160.8	155.8	150.8	145.8	140.7	29.38	
	9⅝	100	9.97	62.79	259.2	253.8	248.3	242.8	237.4	231.9	226.5	221.0	215.6	210.1	204.6	199.2	193.7	188.3	182.8	32.84	
	10¾	123	11.91	78.86	319.1	313.1	307.2	301.3	295.4	289.4	283.5	277.6	271.6	265.7	259.7	253.8	247.9	241.9	236.0	36.74	
	12¾	169	14.58	113.10	421.9	415.4	408.8	402.3	395.8	389.2	382.8	376.2	369.7	363.2	356.7	350.1	343.6	337.1	330.6	43.77	

*Radius of gyration equals $\frac{1}{10}$ quantity in this column.

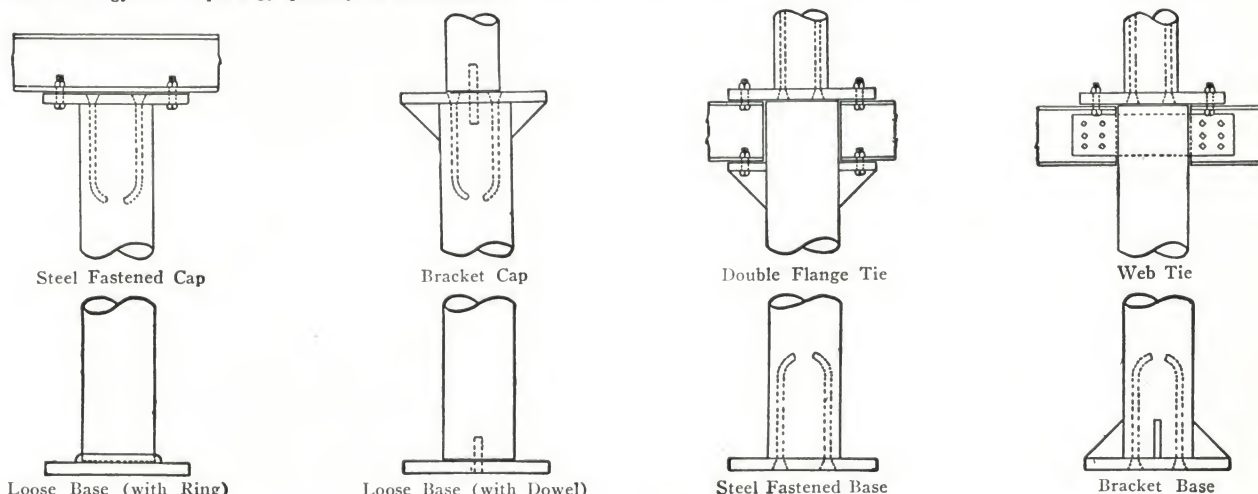


Fig. 6. Various Types of Lally Steel Caps and Bases

Specify Lally columns complete with steel caps and bases as manufactured by LALLY COLUMN Co.

THE DUPLEX HANGER CO.

East 53rd Street and Lakeside Avenue
CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., 16 Warren Street
PHILADELPHIA, P.A., 2216 W. Columbia Avenue

NEW ORLEANS, LA., 1508 Masonic Temple Building
BOSTON, MASS., 88 Broad Street

Products

"Duplex" JOIST, WALL, CONCRETE BLOCK and I-BEAM HANGER; "Duplex" POST CAPS, POST BASES, WALL PLATES and WALL BOXES, for warehouses, factories, heavy mill construction and all other wood constructed buildings.

For Incinerators, see page C3357.

Specifications

"Duplex" hangers and post caps are designed with a large factor of safety to carry the timbers for which they are intended. If architects and engineers will, when using hangers and post caps, specify "Duplex," the proper hangers and post caps for the timbers will be furnished.



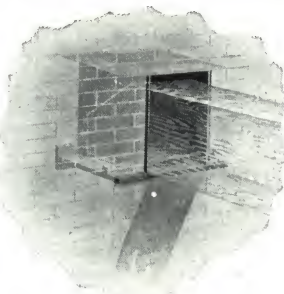
"Duplex" Joist Hanger

"Duplex" Hangers

Single Joist Hangers—Are made of malleable iron and every hanger is thoroughly tested.

The best and most economical hangers for timber framing.

"Duplex" Joist Hangers reduce the shrinkage of joists to a minimum.



"Duplex" Wall Joist Box

"Duplex" Concrete Block Joist Hanger

The best hanger for concrete block construction. It is made with a larger bearing plate than our ordinary wall hangers so as to distribute the load over a greater area of the concrete block. Very practical where it becomes necessary to frame joists into old brick walls or party walls. Avoids the cutting of a large hole.

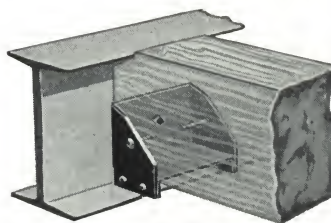


"Duplex" Concrete Block Wall Joist Hanger

R & L Joist Hangers—The best hangers for the heaviest type of mill construction. By using this type of hanger, the entire building is tied together laterally. No other method of construction does this. Made in two parts and can be adjusted to fit the various timbers for which they are intended.



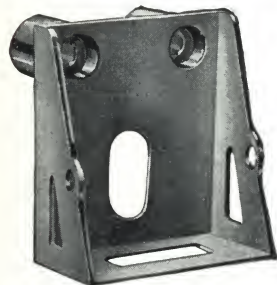
R & L Joist Hanger



"Duplex" I-beam Shelf Hanger

I-beam Box and I-beam Shelf Hangers

Are noted for being one of the most economical devices for framing wood joists to I-beams. All of the load is carried on the lower flange of the I-beam, this being the only correct method.



For Very Heavy Mill Construction

Heavy Duty R & L Joist Hangers—This hanger combines all the features of the R & L hangers, but is made in one piece, instead of pairs.



"Duplex" Wall Joist Hanger

"Duplex" Steel Post Caps

The "Duplex" Post Caps are made of mild, open hearth steel and consist of three pieces; a bearing bracket and two side plates bolted together with four heavy bolts. All engineers who have investigated and used this cap are unanimous in declaring it to be the best design for rigid construction. Tests have fully proven the great strength of this design and that it

is not possible to break the cap when even more than six times the ultimate safe load of the timber is applied.

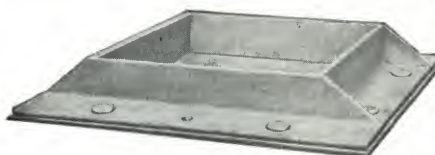
These caps are furnished for 1-way, 2-way, 3-way and 4-way construction and may be had for timbers larger than the post.



Four-way Construction

"Duplex" Steel Post Bases

Are made of steel plates and angles to fit the post. More economical than cast iron plates.



"Duplex" Steel Post Base



Girder Same Size as Post Below



"Duplex" Wall Hanger, Extra Heavy
"Underwriters' Type." For heavy mill construction

Steel Wall Hangers—Have no equal in carrying timbers clear of the wall. Distribute the load perfectly over the bearing surface of the masonry. Furnished for standard and extra heavy construction.

THE IDEAL HANGER COMPANY

1270 East 53d Street
CLEVELAND, OHIO

Products

IDEAL JOIST HANGERS (Wall Hangers, Wall Boxes and Metal Lumber Hangers); POST CAPS; POST BASES.

Also Barn Framing Fittings.

Ideal Joist Hangers

Introduction—Ideal hangers are made of the best grade open hearth steel bars and are formed so the hanger fits flat against the timber, increasing the carrying capacity of the hanger. This hanger fitting close on all sides does not interfere with furring and permits the use of spikes or lag screws to fasten the hanger to the girder.

No costly framing. Easily applied and neat in appearance. The same section of bar is used throughout, giving the strongest construction at an economical cost.

Single Hanger, Style "A"

—These hangers are standard construction and are carried in stock for every size timber.

Double Hanger, Style "B"

—For use where joists frame opposite each other on wood or I-beam girders. The double hanger consists of two single hangers, each riveted to strap connections to hang over the wood or I-beam girder. Unquestionably, the strongest construction.

Directions for Ordering—Give size of joists and also width of girder over which hanger must span, or, in case of an I-beam, exact width of flange, or if more convenient, height of I-beam and weight per foot, so that flange width can be obtained.

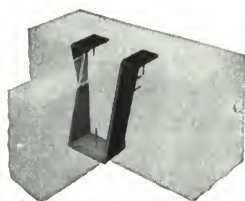
Single Hanger, Style "C"

—Used where a single joist frames against an I-beam channel or wood girder, the arms of the joist hanger running over the top.

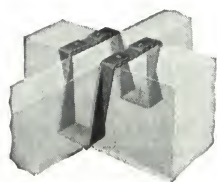
Directions for Ordering—Give size of joist and dimensions over which hanger arms must go, namely: width of timber header, or, in case of I-beams or channels, width of flange or height and weight per foot so flange width can be obtained.

Metal Lumber Hangers

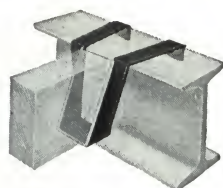
—Are the most economical and



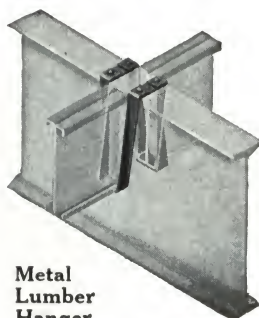
Ideal Single Hanger,
Style "A"



Ideal Double Hanger,
Style "B"



Ideal Single Hanger,
Style "C"



Metal
Lumber
Hanger

satisfactory method of framing steel I-joists and save from 60 to 75% of the cost of shelf angles. Being a shop-fabricated product of known strength and integrity, the use of Ideal metal lumber hangers follows the simplest possible design. Easily placed, safe, strong and secure. Send plans for estimate.

Ideal Steel Post Caps

Cap No. 2—Combines all the features necessary to strength in construction. Easily installed, no framing being necessary. The angles on the bottom of the cap are bent to form a socket into which the post fits, preventing any twisting of the cap. Channel is of open hearth plate steel riveted to the socket. Brackets are riveted to channel to carry beams framing on the side. Girders and beams will be flush unless otherwise noted.

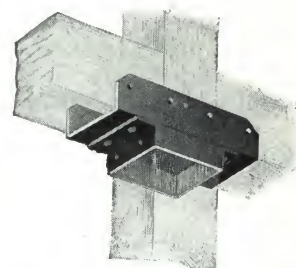
Directions for Ordering—In ordering 3 or 4-way construction, give the following information: size post below; size post above; width and height of main girder; width and height of beams on side of cap.

Cap No. 3—Forms a complete bearing channel for the girder. Heavy angles underneath give necessary strength for lighter type of construction. Holes are punched in the cap for tying the girders and post to the cap. This cap permits the use of wider or smaller girders than the post. Furnished in any size from warehouse stock.

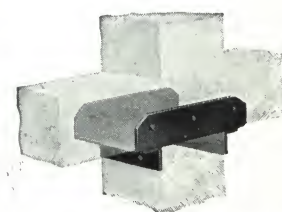
Directions for Ordering—Always give size of post on which cap is placed, size of post which rests on top of cap and size of girder.

Ideal Post Bases

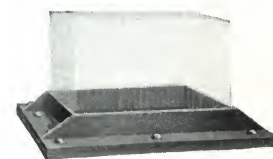
Made of heavy steel plates with angles riveted on to form a socket for the post, providing necessary spread for standard construction.



Ideal Steel Post Cap No. 2



Ideal Steel Post Cap No. 3



Ideal Post Base

Service

Ideal post caps, Ideal hangers and other Ideal products are made of the best material obtainable by competent workmen on modern machines. Prompt shipments are made from stock. Estimates and quotations cheerfully furnished and designs submitted by engineers who are specialists in timber construction.

THE VAN DORN IRON WORKS COMPANY

Manufacturers of Post Caps and Joist Hangers

TELEPHONE
RANDOLPH 6630

2685 East 79th Street, CLEVELAND, OHIO

EASTERN DISTRIBUTORS: THE ROTHROCK COMPANY, INC., 404 Washington Avenue, LONG ISLAND CITY, N. Y.
Telephone, Stilwell 8282. A complete stock carried at this point

Products

STEEL POST CAPS; POST BASES; WALL BOXES; JOIST, WALL and I-BEAM HANGERS; WALL and FLOOR PLUGS.

Also manufacturers of Anchors, Metallic Furniture, Structural Steel Work, Ornamental Iron Work, Metal Filing Cabinets and Desks, Steel Shelving, Iron Fencing and Fire Escapes; Dump Truck Hoists and Bodies.

For Steel Office Equipment, see page B2186; for Steel Jail Construction, see pages C3410-3411.

Materials and Guarantee

The steel used in all Van Dorn products is the best obtainable. All goods are guaranteed to be first class, both as to materials and workmanship, and "just as represented."

General Description

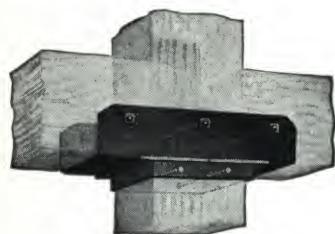
Van Dorn post caps are made to sizes which will permit close framing of all timbers, being made to conform to actual timber sizes as published by the Southern Pine Association. The construction is such that every ounce of metal is used to the best advantage.

Blue Prints—Blue prints showing the exact details and dimensions of the various Van Dorn post caps, hangers, etc., will be furnished on request.

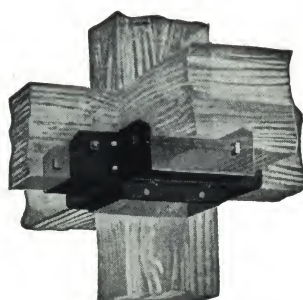
Van Dorn Steel Post Caps

Van Dorn steel post caps are made to meet all conditions of timber framing. They are manufactured to carry timbers either one, two, three or four ways. They are made from special steel plate, which adds greatly to their carrying capacity.

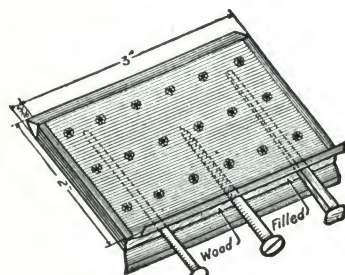
Description—Van Dorn standard steel post caps have a girder carrying channel 6 in. deep, made of $\frac{1}{4}$ -in. mild steel plate. The bearing is 6 in., reinforced by the riveted leg of the angle, which forms a closed socket fitting closely around the post.



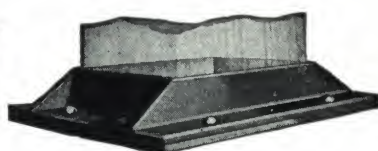
Two-way Cap



Four-way Cap



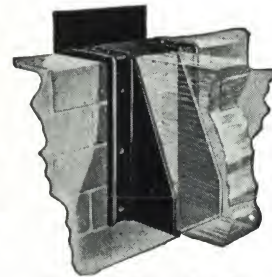
Griptite Wall Plug



Post Base



No. 1 Hanger



No. 4 Wall Hanger



No. 7 I-beam Hanger
(Hooking over flange at back)



No. 6 Double Hanger

A Van Dorn post cap, identical to those illustrated, of standard stock material, tested at the Case School of Applied Science, carried a sustained load of 150,000 lb. Substantiated by other tests, the carrying capacity of Van Dorn post caps is assured.

Van Dorn Steel Wall Boxes

Van Dorn wall boxes have a close fitting cover and ample anchorage at back of box; timber is self-releasing. Ventilation is provided around the beam.

Van Dorn Hangers

Van Dorn steel joist hangers are made from specially rolled ribbed bar and special rolled angle. Superior to any other make on the market. By adding bent plates of the desired shapes, the standard (No. 1) joist hanger is readily adapted to the production of a number of different styles for use over steel I-beams, or in brick or concrete walls.

No. 1 or Regular Joist Hanger—The side flanges are wrought with a groove and ridge, the ridge serving as additional strength, especially at the angle of the prong where the severest strain comes. The spikes hold joist and headers together—season cracks will not affect the strength of the connection.

Completeness of Line

Van Dorn post caps and joist hangers are made in standard types to take care of regular framing conditions, and also in special types to take care of unusual framing conditions.

We can supply post caps and joist hangers as well as wall plugs, post bases and wall boxes for whatever your requirements.

Send blue prints or plans for estimate.

Catalogue and Prices

Catalogue 94B and prices furnished on request.

AMERICAN FLAG POLE CO., INC.

Distributors of "Lingo" Swaged Tubular Steel Flag Poles

102 Atlantic Avenue
BOSTON, MASS.

Products

"LINGO" SWAGED TUBULAR STEEL FLAG POLES.

WOOD FLAG POLES; TOPMAST FLAG POLES; SPECIAL FLAG POLE FITTINGS, including Non-tangle Flag Rod and Weatherproof Rotating Truck.

"Lingo" Swaged Tubular Steel Flag Poles

We are the New England distributors for this sturdy and long-lived flag pole. We are prepared to furnish "Lingo" poles complete with ornamental bases and all accessories. For detailed information on these poles, see pages of John E. Lingo & Son in this volume.

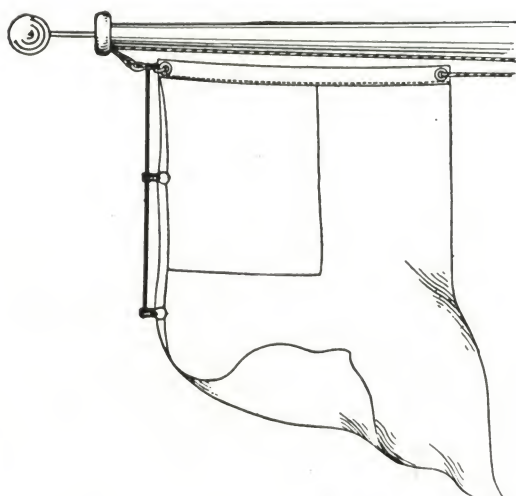
Non-tangle Flag Rod

The scientific fixture for use with horizontal flag poles. Light, durable and efficient. The light metal rod having a ring and a hook at one end and a swivel clamp at the other end can be attached instantly, and absolutely prevents the colors from tangling in any wind or twisting around the pole. Longer rods have intermediate swivel clamps. With this non-tangle rod, flags last much longer and always present a proper appearance when flown.

Made of brass or galvanized iron in various lengths to suit any size flag.



Non-tangle
Flag Rod



Non-tangle Flag Rod
Attached to Flag

NON-TANGLE FLAG ROD

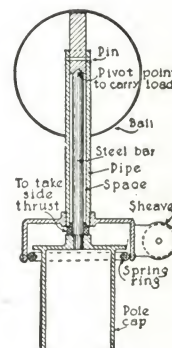
Size of flag, ft.	Length of rod	Price, each
2½x 4	1 ft. 6 in.	\$0.80
3x 5	2 ft. 0 in.	0.90
4x 6	2 ft. 6 in.	1.00
5x 8	3 ft. 6 in.	1.20
6x10	4 ft. 6 in.	1.55
8x12	5 ft. 0 in.	2.30
9x15	7 ft. 0 in.	3.20
12x18	8 ft. 0 in.	4.55

Weatherproof Bronze Rotating Truck

For use on vertical wood or metal flag poles. It swings from a pivot point up inside the ball, thus permitting the flag to swing around the pole at the slightest change in the direction of the wind, and preventing the flag from tangling. There is much less friction than ball bearing. Furnished with automatic spring cleat which eases the tension in the halyards when the flag rotates.

As the fixture caps the top of the pole, it prevents wood poles from rotting and protects metal poles from moisture. Snow and ice will not interfere with its action.

Made of weatherproof bronze with gold-leafed copper ball.



Detail of Rotating
Truck

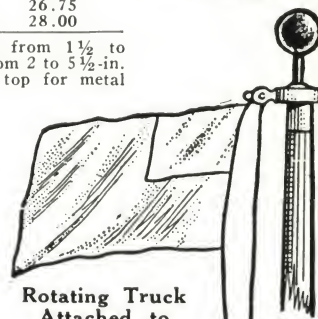
ROTATING TRUCK AND BALL		
Size of pole, top, in.	Diameter of ball, in.	Price, each
1½	4	\$11.00
2	5	13.50
2½	6	15.75
3	6	17.00
3½	7	19.50
4	8	22.00
4½	8	23.00
5	9	26.75
5½	9	28.00

Note: Trucks for metal poles from 1½ to 4-in. diameter, and for wood poles from 2 to 5½-in. diameter. Give inside diameter at top for metal poles.

TOPMAST FLAG POLES, WOOD*

Height of complete pole, ft.	Price
50	\$150.00
60	190.00
75	225.00
85	300.00
100	490.00
125	800.00

*Complete with lower mast, topmast, cross trees, gold-leafed ball, truck, halyards and cleat.

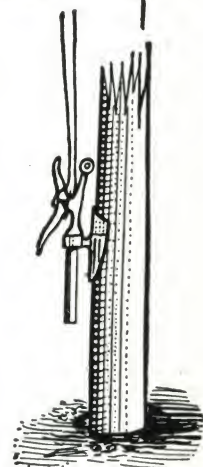


Rotating Truck
Attached to
Flag Pole

ONE-PIECE WOOD FLAG POLES*

Height, ft.	Approx. diameter, in.		Price
	Butt	Top	
10	2¾	2	\$ 4.50
12	2¾	2	6.00
15	3	2½	10.00
16	3	2½	10.50
18	3¾	2½	16.00
20	3¾	2½	20.00
25	3¾	2½	40.00
25	6	3	40.00
30	7	3½	50.00
35	7	3½	60.00
40	8	4	72.50
45	8	4	110.00
50	9	4½	130.00
55	9	4½	145.00
60	10	4½	190.00
75	11	4½	285.00
85	13	5	425.00
100	19	6	665.00

*Fitted with gold-leafed ball, lignum vitae truck, halyards and cleat. Painted.



Halyard Cleat

Steel and Specially Made Poles

Prices and catalogue on steel poles will gladly be sent on request. Estimates promptly furnished on specially built pole installations.

BABCOCK-DAVIS CORPORATION

Manufacturers of Steel Flagpoles

474 Dorchester Avenue
BOSTON, MASS.

Product

B-D EASY ACCESS POLE, Tubular Steel or Wood (patents pending).

For Precast Concrete Stairs, see page A633.

B-D Easy Access Pole

Designed to overcome the difficulty of inspection and repairs to halyards, painting, etc. No more climbing the pole. One man can raise or lower the pole in a few minutes. Pole can be canted over parapet at any angle desired. The saving in one year's inspection, repairs and painting will offset the additional cost of B-D Pole over the ordinary pole.

Send in your construction plans and we will detail your flagpole supports.

Anchorage

Base plate and braces are integral and anchored securely to roof beams; the base plate being galvanized so that flashing can be readily soldered to it. This gives a tight roof and does away with all the slipshod bracing ordinarily used.

B-D Poles are constructed of steel pipe in graduating sizes according to length of pole, each length being

shrunk into the next largest size and then welded to make an absolutely watertight joint. Wood pole can be used.

Lengths

Poles are carried in stock in lengths of 20, 25, 30, 35 and 40 ft. and can be shipped in two days. Other lengths are made to order.

Specification Form

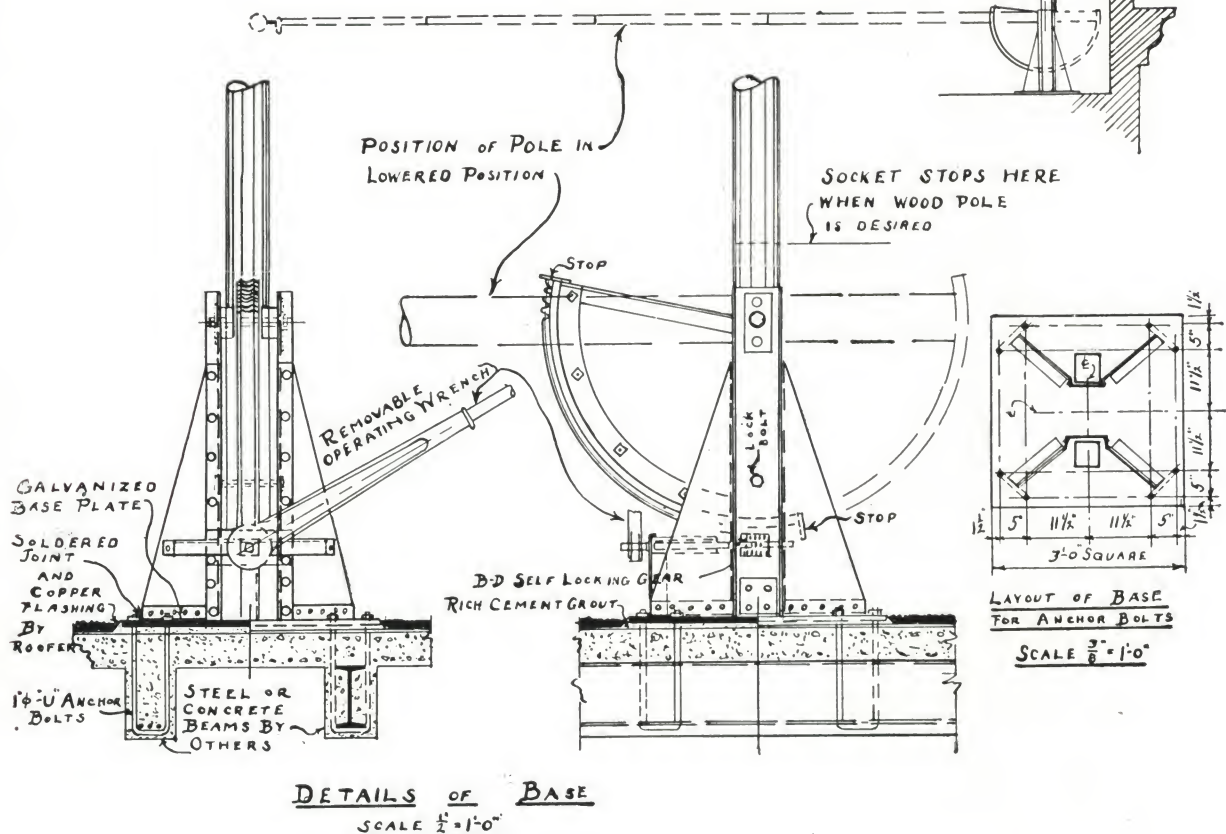
Furnish and erect B-D Easy Access Vertical [canted degrees] Steel Flagpole high, equipped with 8-in. Gilded Ball and Non-fouling Ball Bearing Swivel Top, Halyards, Cleat and Hoisting Wrench, manufactured by BABCOCK-DAVIS CORPORATION, 474 Dorchester Avenue, Boston, Mass.

GILDED BALL
NON FOULING TOP
B-D TYPE

HEMP OR
COPPER
HALYARD

STEEL OR
WOOD POLE

3'-0" MIN.



ELMER E. CARR

Manufacturer of the Carr Tilting Flag Staff

228 North La Salle Street

CHICAGO, ILL.

TELEPHONE
FRANKLIN 5320

Advantages

The Carr Tilting Flag Staff is designed to overcome the objections to the rigid, fixed pole. It is a recognized building accessory and is in use throughout the United States.

When it is desired to bring the pole to a horizontal position for any purpose, the key and locking bar are removed and pressure exerted with the foot against the counterweight to start the pole from the vertical; then the pole is grasped with the hand and pulled over.

The strains encountered in service cause an upward pull on the holding-down bolts instead of the pull-and-tug effect met with when ordinary flag poles are anchored with structural shapes or other means of bracing.

This is conceded to be a valuable feature.

Construction

Each unit is complete, ready for foundation. The pole is made up of suitable lengths of tubing with joints welded, and is mounted in a strong Tilting fixture, adequately counterweighted so that it can be brought to a horizontal position with little effort.

The pole trimmings consist of a seamless copper ball covered with gold leaf, a truck with two pulleys, a brass nipple for connecting ball to truck, a half-yard of good quality provided with two snap hooks, and a cleat.

When the pole is in an upright position it is securely locked between the supporting brackets with a steel bar and key. The side standards serve as the bracing or supporting structure, the parts connected to form a rigid base. This, when fastened to the holding-down bolts, makes a fixed and rigid anchorage. These bolts are embedded in the concrete roof slab or are otherwise provided for attaching the flag pole base.

Sizes

- No. 0—20 ft., for buildings 1 to 3 stories.
- No. 1—25 ft., for buildings up to 10 stories.
- No. 2—32½ ft., for buildings as high as 16 stories.
- No. 3—40 ft., for buildings 12 to 24 stories, or higher.

Erection

Erecting a Carr Tilting Flag Staff is a simple and inexpensive procedure, no gin pole being necessary. After the supporting castings are set, with the pole socket castings in place and shored in a horizontal position, the pole is inserted and bolted, the counterweights bolted on, the trimmings attached to the top of the pole, and the shoring then removed and the pole raised to a vertical position.

With the material at the building before facilities for taking it to the roof are removed, a minimum of expense is incurred, the time of two or three men, according to the size of the unit, being all that is necessary for a period of one and one-half to two hours to complete the erection.

Service

The manufacturer will co-operate in planning settings to suit various building requirements, and to architects and engineers will furnish, on request, drawings for their office records.

Catalogue

Catalogue and quotations on request.

A Few Recent Installations

Division Street School, South Bend, Ind.
Acacia Mutual Life Association, Washington, D. C.
Cincinnati Chamber of Commerce, Cincinnati, Ohio
Cincinnati, Burlington & Quincy Passenger Station, Lincoln, Neb.
Pittsfield Building, Chicago, Ill.
Michigan Central Terminal Station, Detroit, Mich.
Federal Reserve Bank, Detroit, Mich.
Hynde & Dauch Paper Co., Sandusky, Ohio
National Press Club, Washington, D. C.
International Harvester Company of America, Des Moines, Iowa
Builders Building, Chicago, Ill.
Wisconsin National Life Insurance Co., Oshkosh, Wis.
Sycamore Grade School, Sycamore, Ill.
Ridgely-Farmers Bank, Springfield, Ill.
Union State Bank, Omaha, Neb.
Masonic Temple, Elizabeth, N. J.
Bay Ridge Savings Bank, Brooklyn, N. Y. (2 buildings)
Citizens National Bank, Latrobe, Pa.
Baltimore & Ohio Railroad Warehouse, Philadelphia, Pa.
Detroit Hotel, Detroit, Mich.
Newport Finance Corporation, Newport, Ky.
Martha Washington Hospital, Chicago, Ill.
Ambassador Theater & Office Building, St. Louis, Mo.
Aurora National Bank, Aurora, Ill.
Palmer House, Chicago, Ill.
Westinghouse Electric & Mfg. Company, Springfield, Mass.
National Biscuit Co., Los Angeles, Cal. and Evanston, Ill.
Schroeder Hotel, Milwaukee, Wis.
Heyburn Building, Louisville, Ky.
First National Bank, Woodlawn, Pa.
First National Bank, Olyphant, Pa.
Jackson City Bank, Jackson, Mich.



Three Chicago Buildings Equipped with Tilting Poles

London Guarantee &
Accident Building

Steele-Weddes Co. Building

Bell Building

JOHN E. LINGO & SON, INC.

Manufacturers and Erectors of Tubular Steel Flagpoles and Masts

TELEPHONE
CAMDEN 487

28th and Buren Avenues
CAMDEN, N. J.

Products

SWAGED SECTIONAL FLAGPOLES, fabricated of copper bearing tubular steel pipe in three patterns for ground setting: Light, Heavy and Extra Heavy; and fabricated in two types for roof setting: Heavy and Extra Heavy.

CONTINUOUS TAPER WELDED FLAGPOLES, made in either steel or bronze, with smooth exterior surface, tapered conically or with entasis; resemble in contour the appearance of wooden flagpoles and have no visible joints throughout.

Also Tubular Steel Masts and Booms, Radio Masts and Topmasts, Trolley and Transmission Poles.

General

Our swaged sectional poles are designed to withstand wind stresses up to 90 miles per hour with a conservative bending resistance. They are constructed of copper bearing tubular steel pipe with the joints shop shrunk and swaged without the use of bolts, pins, rivets, screw couplings or lead calking. Every pole, except the continuous taper welded poles, is shipped in one or more knocked down sections and assembled on the ground by means of our field joints. Each section may contain two or more pieces to produce the proper reduction.

Specification "A" for Swaged Sectional Copper Bearing Tubular Steel Flagpoles for Ground Setting or Roof Setting—with Standard Fittings

For Ground Set Poles—Furnish and erect flagpole complete with all standard fittings as listed below, as made by JOHN E. LINGO & SON, INC., Camden, N. J., and build concrete foundation as shown in their drawings No. B5 and B11. Pole to be ground set [Light] [Heavy] [Extra Heavy] pattern with butt x above ground. After erection apply over the shop coat of red lead and oil one coat of white lead and oil followed by a finishing coat of white pole enamel.

For Roof Set Poles—Furnish and erect flagpole complete with all standard fittings as listed below, as made by JOHN E. LINGO & SON, INC., Camden, N. J. Pole to be roof set [Heavy] [Extra Heavy] type with butt x above roof (parapet or brace line). After erection apply over the shop coat of red lead and oil one coat of white lead and oil followed by a finishing coat of white pole enamel.

Flagpole—To be fabricated in sections of standard full weight copper bearing tubular steel pipe of diameters, thicknesses, lengths and joints as detailed by JOHN E. LINGO & SON, INC., for this type pole. Shop joints to be swaged, shrunk and calked steel to steel. Field joints to be calked

steel to steel, airtight and watertight to prevent interior corrosion and deterioration. All joints to be constructed without the use of bolts, pins, rivets, screw couplings or lead calking.

Ball—To be as indicated on detail drawing No. B5 for ground set poles (or to suit height of building if for roof set poles). To be constructed of 20-oz. copper, covered with Hastings XXXX gold leaf over three coats of Galvanum and one coat of waterproof size. Ball to be fastened to truck with $\frac{3}{4}$ -in. seamless brass tube and $\frac{1}{2}$ -in. diameter galvanized rod.

Truck—To be "Lingo" standard ball bearing revolving truck, cast iron body galvanized, revolving on manganese bronze spindle, with top and bottom ball races, for twenty-six $\frac{1}{4}$ -in. diameter bronze balls each; truck to be fitted with two 2 $\frac{1}{2}$ -in. diameter bronze roller bushed sheaves and $\frac{3}{8}$ -in. diameter bronze pins.

Halyards—To be $\frac{3}{8}$ -in. diameter U. S. standard manila bolt rope with bronze swivel snaps, at each end for securing to flag. Provide double set of halyards.

Cleats—To be two 9-in. cast iron galvanized, and tapped to pole with two $\frac{1}{2}$ -in. galvanized flat head stove bolts.

Ground Protector—To be copper bearing steel, 18 in. long, extending 12 in. above and 6 in. below the grade. Shall be shrunk to the pole, calked on the upper edge and electric welded on the lower edge to the flagpole.

Specification "B" for Roof Poles Penetrating Roof to Loft Floor

Omit first and last paragraphs of specification "A" and add the following fittings: *Roof Tube* (if concrete slab), or *Guide Flange* (if steel or wood roof), of size to suit flagpole butt diameter as previously mentioned, to be fastened to roof construction and calked steel to steel after roof flashing has been installed.

Flash Collar of copper bearing steel to be provided for proper means of making a watertight connection and shall be placed on the flagpole at the height indicated and calked steel to steel after roof flashing has been installed. *Pole Socket and Plate* to be provided of size to suit flagpole and secured with a bolt and bearing plate fastened to concrete [wood] [steel] construction as indicated on JOHN E. LINGO & SON, INC. drawing No. B5.

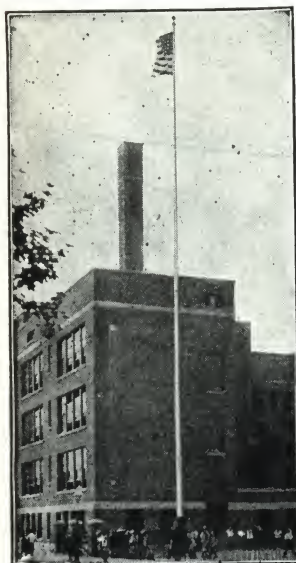
Specification "C" for Roof Poles Not Penetrating Roof

Omit first and last paragraphs of Specification "A" and first paragraph of Specification "B" and provide suitable number of *Turnbuckle* [Telescope] *Braces* to be of sufficient length and sizes as detailed on JOHN E. LINGO & SON, INC., drawing No. B5. Braces to be made of copper bearing tubular steel with suitable anchors and brace collar. *Brace Collar* to be calked to flagpole after erection at the proper height to rigidly support the pole.

All the necessary drilling of steel (or wood) beams (or placing of anchors in concrete) to be located in accordance with JOHN E. LINGO & SON, INC., detail drawings to be submitted to the architect for approval.

Catalogue

A 28-page Architects' Guide and General Catalogue containing complete details, and full information gladly mailed upon request.



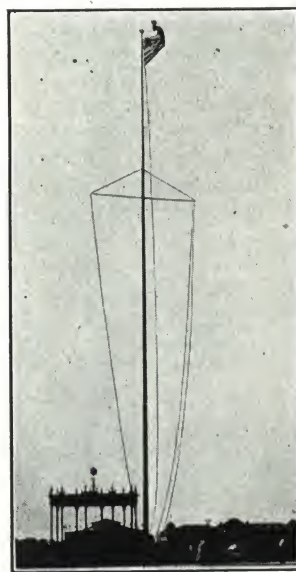
90x99-ft. Heavy Pattern
Flagpole

One of the 185 manufactured and erected for the Philadelphia School Board



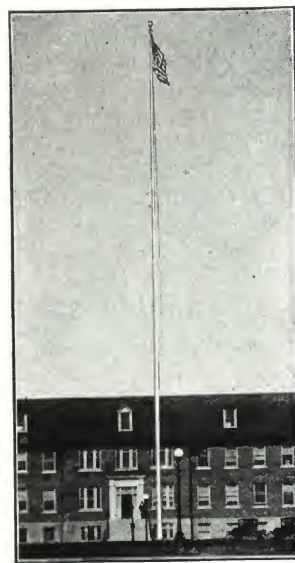
81x91-ft. Special Extra
Heavy Pattern Flagpole

Strong Memorial Hospital,
Rochester, N. Y.



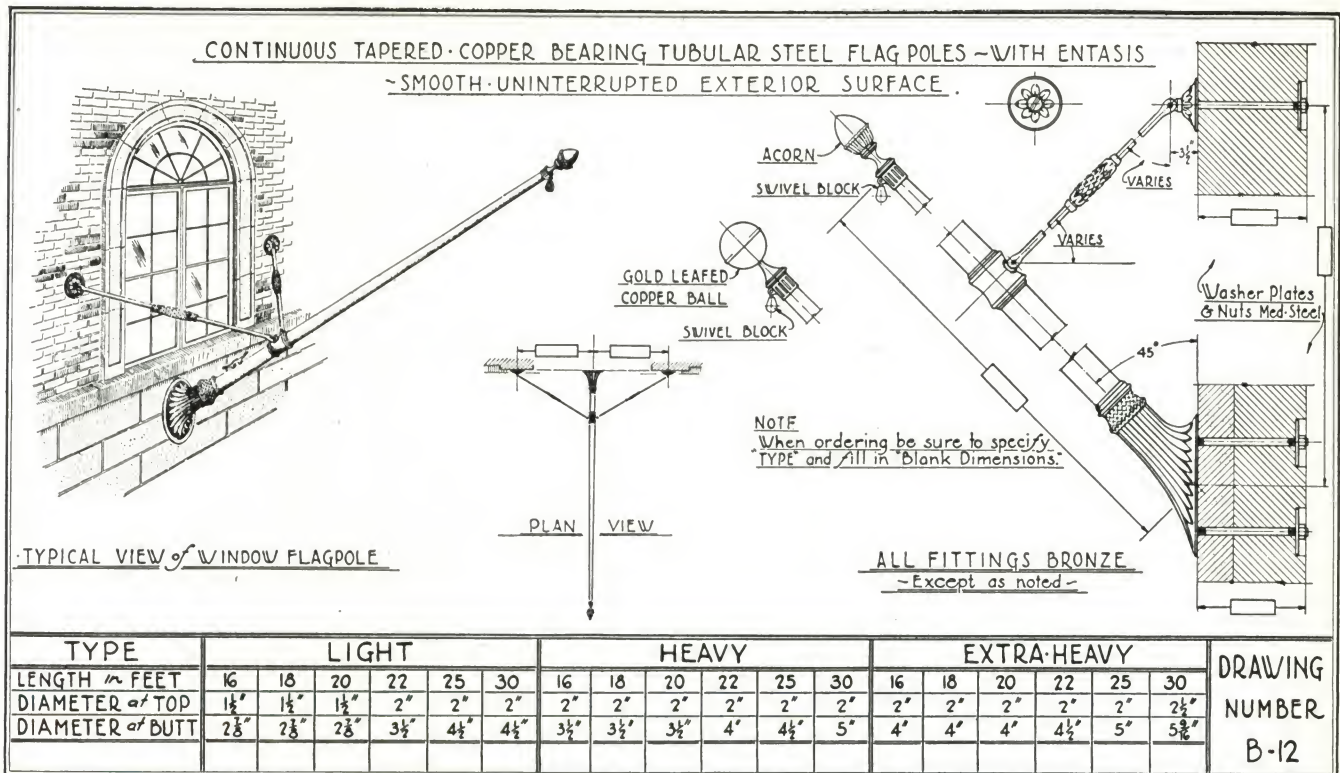
150x162-ft. Heavy Pattern
Flagpole

Sesqui-Centennial, Philadel-
phia, Pa.



80x88-ft. Heavy Pattern
Flagpole

U. S. Veterans' Bureau Hos-
pital, Battle Creek, Mich.



Small Continuous Taper Welded Outrigger Flagpoles

Made in either *steel* or *bronze* and are suitable for banks, office buildings, etc., where it is desirable to fly a flag at lower levels than a flagpole located on the roof. These poles are extended out from the face of the building at an angle of 45 degrees above the horizontal plane and vary in length from 16 to 30 ft. The minimum top diameter is 1½ in. with a wall thickness of approximately ⅜ in. increasing downward to the butt. They can be tapered conically or with entasis as selected by the architect. For details see drawing B-12 above.

Continuous Taper Welded Flagpoles for Ground Setting or Roof Setting

Especially designed for monuments, plazas and all other buildings of exceptional architectural value. The poles are made in either *steel* or *bronze* with a smooth exterior surface throughout and tapered conically or with entasis. They resemble in contour the appearance of the wooden flagpoles and have no visible joints throughout. Ground set poles and roof set poles of this construction are not standardized, but can be proportioned to any entasis as selected by the architect. The wall thickness of these flagpoles is ¼ to ⅝ in. at the top and the thickness increases downward to the butt. These poles are made with as

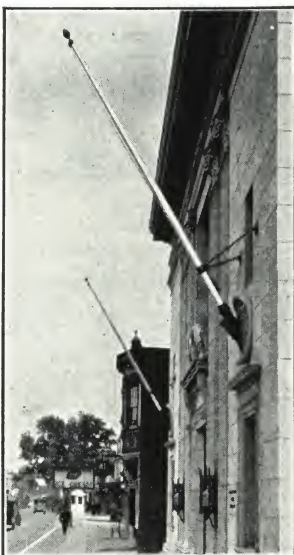
small as a 3½-in. top diameter and we suggest the following butt diameters:

Visible height of pole ... ft.	30	40	50	60	70	80	90	100
Advisable minimum butt in.	7½	8½	9½	10½	11½	12½	14	15

It is advisable and economical to design the lowermost one-third of the visible height cylindrically and to an outside diameter of standard wrought steel pipe as given in the above table, and confine the taper to the remaining visible height.

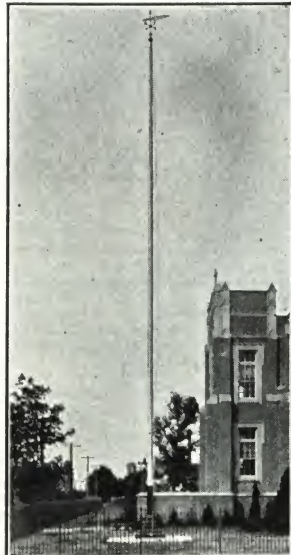
Partial List of Recent Installations

Madison Square Garden, New York, N. Y. (twenty 50-ft. heavy type roof poles)
 Delaware River Bridge, Philadelphia and Camden (four 75-ft. taper welded poles, 18-in. butt)
 Massachusetts Mutual Life Building, Springfield, Mass. (80½-ft. taper welded pole, 14 in. butt)
 Canal Bank, New Orleans, La. (90-ft. heavy type roof pole)
 The White House, Washington, D. C. (41-ft. taper welded pole and over 100 other Government installations in various States)
 Southwestern Bell Telephone Building, St. Louis, Mo. (122-ft. extra heavy roof pole and over 50 other Bell Telephone installations in various States)



Two 16-ft. Extra Heavy Continuous Taper Welded Outrigger Poles

4-in. butt x 2-in. top. Collingswood Trust Co., Collingswood, N. J.



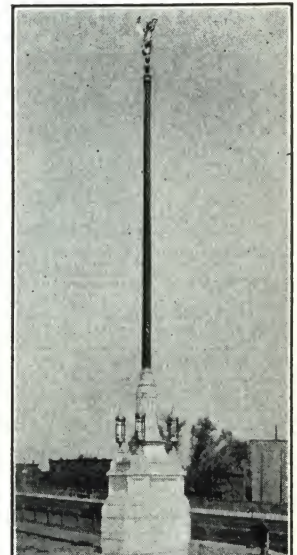
60-ft. above Grade Continuous Taper Welded Pole

7½-in. butt x 3½-in. top. Parochial School, Riverside, N. J.



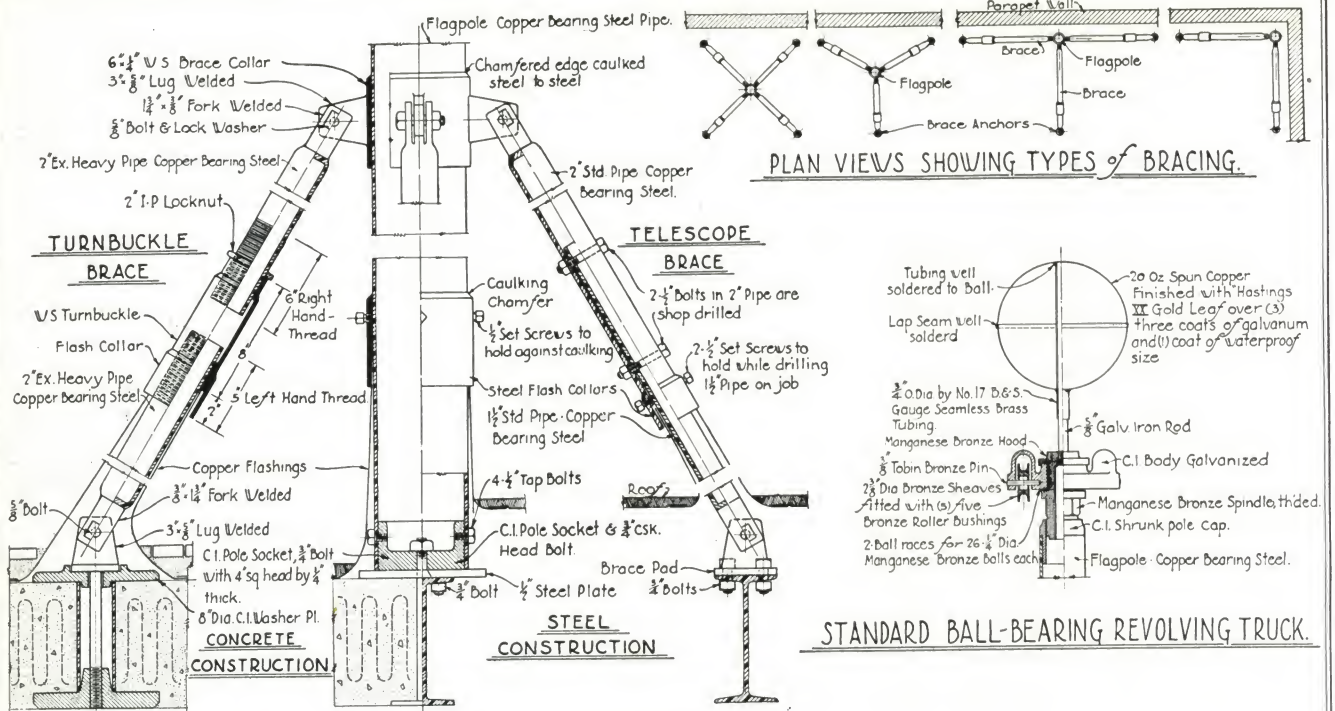
80-ft. Over-all Continuous Taper Welded Pole

14-in. butt x 5-in. top. Massachusetts Mutual Life Insurance Building, Springfield, Mass.

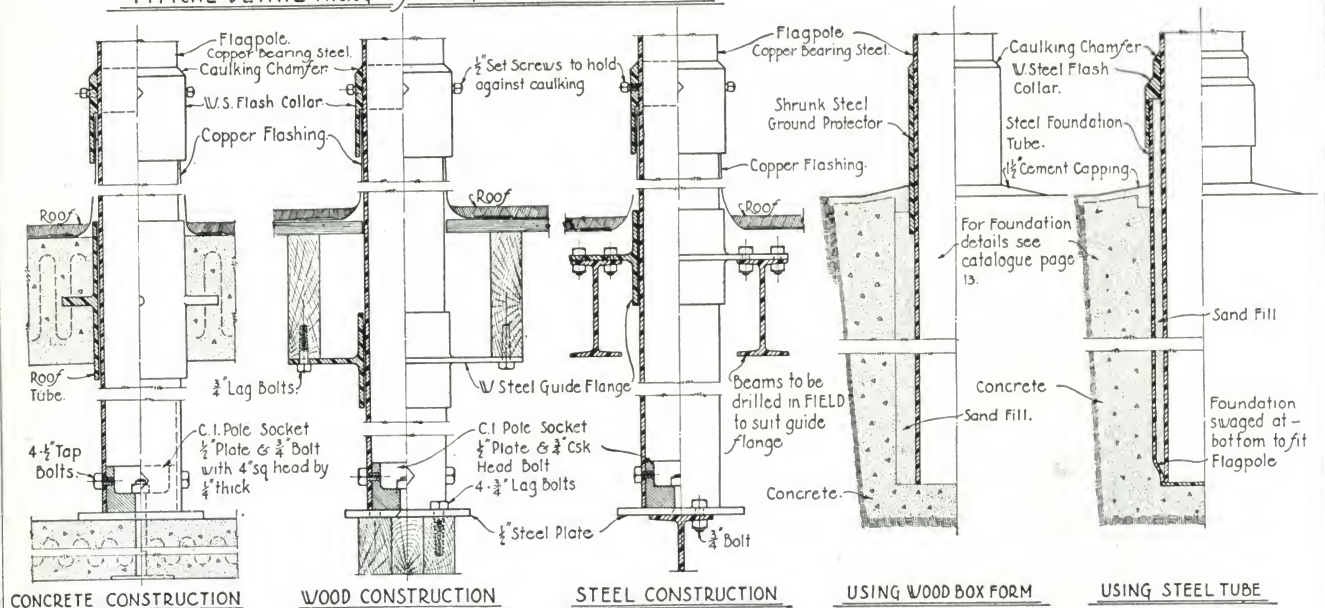


75-ft. above Grade Continuous Taper Welded Pole

18-in. butt x 12-in. top. One of four installations at the Delaware River Bridge Approaches



TYPICAL DETAIL ARRGT OF FLAGPOLES ABOVE ROOFS

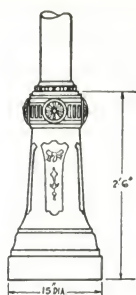


TYPICAL DETAIL ARRGT OF FLAGPOLES PASSING THRU ROOFS.

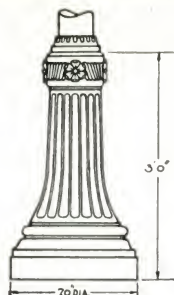
FLAGPOLES for GROUND SETTING

REMARKS	FLAGPOLES <i>for</i> ROOF SETTING												FLAGPOLES <i>for</i> GROUND SETTING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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DIA. <i>of</i> BUTT	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"	7 1/2"	8"	8 1/2"	9"	10"	10 1/2"	11"	11 1/2"	12"	12 1/2"	13"	13 1/2"	14"	14 1/2"	15"	15 1/2"	16"	16 1/2"	17"	17 1/2"	18"	18 1/2"	19"	19 1/2"	20"	20 1/2"	21"	21 1/2"	22"	22 1/2"	23"	23 1/2"	24"	24 1/2"	25"	25 1/2"	26"	26 1/2"	27"	27 1/2"	28"	28 1/2"	29"	29 1/2"	30"																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
DIA. <i>of</i> TOP	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"	4 1/2"	4 3/4"	5"	5 1/4"	5 1/2"	5 3/4"	6"	6 1/4"	6 1/2"	6 3/4"	7"	7 1/4"	7 1/2"	7 3/4"	8"	8 1/4"	8 1/2"	8 3/4"	9"	9 1/4"	9 1/2"	9 3/4"	10"	10 1/4"	10 1/2"	10 3/4"	11"	11 1/4"	11 1/2"	11 3/4"	12"	12 1/4"	12 1/2"	12 3/4"	13"	13 1/4"	13 1/2"	13 3/4"	14"	14 1/4"	14 1/2"	14 3/4"	15"	15 1/4"	15 1/2"	15 3/4"	16"	16 1/4"	16 1/2"	16 3/4"	17"	17 1/4"	17 1/2"	17 3/4"	18"	18 1/4"	18 1/2"	18 3/4"	19"	19 1/4"	19 1/2"	19 3/4"	20"	20 1/4"	20 1/2"	20 3/4"	21"	21 1/4"	21 1/2"	21 3/4"	22"	22 1/4"	22 1/2"	22 3/4"	23"	23 1/4"	23 1/2"	23 3/4"	24"	24 1/4"	24 1/2"	24 3/4"	25"	25 1/4"	25 1/2"	25 3/4"	26"	26 1/4"	26 1/2"	26 3/4"	27"	27 1/4"	27 1/2"	27 3/4"	28"	28 1/4"	28 1/2"	28 3/4"	29"	29 1/4"	29 1/2"	29 3/4"	30"	30 1/4"	30 1/2"	30 3/4"	31"	31 1/4"	31 1/2"	31 3/4"	32"	32 1/4"	32 1/2"	32 3/4"	33"	33 1/4"	33 1/2"	33 3/4"	34"	34 1/4"	34 1/2"	34 3/4"	35"	35 1/4"	35 1/2"	35 3/4"	36"	36 1/4"	36 1/2"	36 3/4"	37"	37 1/4"	37 1/2"	37 3/4"	38"	38 1/4"	38 1/2"	38 3/4"	39"	39 1/4"	39 1/2"	39 3/4"	40"	40 1/4"	40 1/2"	40 3/4"	41"	41 1/4"	41 1/2"	41 3/4"	42"	42 1/4"	42 1/2"	42 3/4"	43"	43 1/4"	43 1/2"	43 3/4"	44"	44 1/4"	44 1/2"	44 3/4"	45"	45 1/4"	45 1/2"	45 3/4"	46"	46 1/4"	46 1/2"	46 3/4"	47"	47 1/4"	47 1/2"	47 3/4"	48"	48 1/4"	48 1/2"	48 3/4"	49"	49 1/4"	49 1/2"	49 3/4"	50"	50 1/4"	50 1/2"	50 3/4"	51"	51 1/4"	51 1/2"	51 3/4"	52"	52 1/4"	52 1/2"	52 3/4"	53"	53 1/4"	53 1/2"	53 3/4"	54"	54 1/4"	54 1/2"	54 3/4"	55"	55 1/4"	55 1/2"	55 3/4"	56"	56 1/4"	56 1/2"	56 3/4"	57"	57 1/4"	57 1/2"	57 3/4"	58"	58 1/4"	58 1/2"	58 3/4"	59"	59 1/4"	59 1/2"	59 3/4"	60"	60 1/4"	60 1/2"	60 3/4"	61"	61 1/4"	61 1/2"	61 3/4"	62"	62 1/4"	62 1/2"	62 3/4"	63"	63 1/4"	63 1/2"	63 3/4"	64"	64 1/4"	64 1/2"	64 3/4"	65"	65 1/4"	65 1/2"	65 3/4"	66"	66 1/4"	66 1/2"	66 3/4"	67"	67 1/4"	67 1/2"	67 3/4"	68"	68 1/4"	68 1/2"	68 3/4"	69"	69 1/4"	69 1/2"	69 3/4"	70"	70 1/4"	70 1/2"	70 3/4"	71"	71 1/4"	71 1/2"	71 3/4"	72"	72 1/4"	72 1/2"	72 3/4"	73"	73 1/4"	73 1/2"	73 3/4"	74"	74 1/4"	74 1/2"	74 3/4"	75"	75 1/4"	75 1/2"	75 3/4"	76"	76 1/4"	76 1/2"	76 3/4"	77"	77 1/4"	77 1/2"	77 3/4"	78"	78 1/4"	78 1/2"	78 3/4"	79"	79 1/4"	79 1/2"	79 3/4"	80"	80 1/4"	80 1/2"	80 3/4"	81"	81 1/4"	81 1/2"	81 3/4"	82"	82 1/4"	82 1/2"	82 3/4"	83"	83 1/4"	83 1/2"	83 3/4"	84"	84 1/4"	84 1/2"	84 3/4"	85"	85 1/4"	85 1/2"	85 3/4"	86"	86 1/4"	86 1/2"	86 3/4"	87"	87 1/4"	87 1/2"	87 3/4"	88"	88 1/4"	88 1/2"	88 3/4"	89"	89 1/4"	89 1/2"	89 3/4"	90"	90 1/4"	90 1/2"	90 3/4"	91"	91 1/4"	91 1/2"	91 3/4"	92"	92 1/4"	92 1/2"	92 3/4"	93"	93 1/4"	93 1/2"	93 3/4"	94"	94 1/4"	94 1/2"	94 3/4"	95"	95 1/4"	95 1/2"	95 3/4"	96"	96 1/4"	96 1/2"	96 3/4"	97"	97 1/4"	97 1/2"	97 3/4"	98"	98 1/4"	98 1/2"	98 3/4"	99"	99 1/4"	99 1/2"	99 3/4"	100"	100 1/4"	100 1/2"	100 3/4"	101"	101 1/4"	101 1/2"	101 3/4"	102"	102 1/4"	102 1/2"	102 3/4"	103"	103 1/4"	103 1/2"	103 3/4"	104"	104 1/4"	104 1/2"	104 3/4"	105"	105 1/4"	105 1/2"	105 3/4"	106"	106 1/4"	106 1/2"	106 3/4"	107"	107 1/4"	107 1/2"	107 3/4"	108"	108 1/4"	108 1/2"	108 3/4"	109"	109 1/4"	109 1/2"	109 3/4"	110"	110 1/4"	110 1/2"	110 3/4"	111"	111 1/4"	111 1/2"	111 3/4"	112"	112 1/4"	112 1/2"	112 3/4"	113"	113 1/4"	113 1/2"	113 3/4"	114"	114 1/4"	114 1/2"	114 3/4"	115"	115 1/4"	115 1/2"	115 3/4"	116"	116 1/4"	116 1/2"	116 3/4"	117"	117 1/4"	117 1/2"	117 3/4"	118"	118 1/4"	118 1/2"	118 3/4"	119"	119 1/4"	119 1/2"	119 3/4"	120"	120 1/4"	120 1/2"	120 3/4"	121"	121 1/4"	121 1/2"	121 3/4"	122"	122 1/4"	122 1/2"	122 3/4"	123"	123 1/4"	123 1/2"	123 3/4"	124"	124 1/4"	124 1/2"	124 3/4"	125"	125 1/4"	125 1/2"	125 3/4"	126"	126 1/4"	126 1/2"	126 3/4"	127"	127 1/4"	127 1/2"	127 3/4"	128"	128 1/4"	128 1/2"	128 3/4"	129"	129 1/4"	129 1/2"	129 3/4"	130"	130 1/4"	130 1/2"	130 3/4"	131"	131 1/4"	131 1/2"	131 3/4"	132"	132 1/4"	132 1/2"	132 3/4"	133"	133 1/4"	133 1/2"	133 3/4"	134"	134 1/4"	134 1/2"	134 3/4"	135"	135 1/4"	135 1/2"	135 3/4"	136"	136 1/4"	136 1/2"	136 3/4"	137"	137 1/4"	137 1/2"	137 3/4"	138"	138 1/4"	138 1/2"	138 3/4"	139"	139 1/4"	139 1/2"	139 3/4"	140"	140 1/4"	140 1/2"	140 3/4"	141"	141 1/4"	141 1/2"	141 3/4"	142"	142 1/4"	142 1/2"	142 3/4"	143"	143 1/4"	143 1/2"	143 3/4"	144"	144 1/4"	144 1/2"	144 3/4"	145"	145 1/4"	145 1/2"	145 3/4"	146"	146 1/4"	146 1/2"	146 3/4"	147"	147 1/4"	147 1/2"	147 3/4"	148"	148 1/4"	148 1/2"	148 3/4"	149"	149 1/4"	149 1/2"	149 3/4"	150"	150 1/4"	150 1/2"	150 3/4"	151"	151 1/4"	151 1/2"	151 3/4"	152"	152 1/4"	152 1/2"	152 3/4"	153"	153 1/4"	153 1/2"	153 3/4"	154"	154 1/4"	154 1/2"	154 3/4"	155"	155 1/4"	155 1/2"	155 3/4"	156"	156 1/4"	156 1/2"	156 3/4"	157"	157 1/4"	157 1/2"	157 3/4"	158"	158 1/4"	158 1/2"	158 3/4"	159"	159 1/4"	159 1/2"	159 3/4"	160"	160 1/4"	160 1/2"	160 3/4"	161"	161 1/4"	161 1/2"	161 3/4"	162"	162 1/4"	162 1/2"	162 3/4"	163"	163 1/4"	163 1/2"	163 3/4"	164"	164 1/4"	164 1/2"	164 3/4"	165"	165 1/4"	165 1/2"	165 3/4"	166"	166 1/4"	166 1/2"	166 3/4"	167"	167 1/4"	167 1/2"	167 3/4"	168"	168 1/4"	168 1/2"	168 3/4"	169"	169 1/4"	169 1/2"	169 3/4"	170"	170 1/4"	170 1/2"	170 3/4"	171"	171 1/4"	171 1/2"	171 3/4"	172"	172 1/4"	172 1/2"	172 3/4"	173"	173 1/4"	173 1/2"	173 3/4"	174"	174 1/4"	174 1/2"	174 3/4"	175"	175 1/4"	175 1/2"	175 3/4"	176"	176 1/4"	176 1/2"	176 3/4"	177"	177 1/4"	177 1/2"	177 3/4"	178"	178 1/4"	178 1/2"	178 3/4"	179"	179 1/4"	179 1/2"	179 3/4"	180"	180 1/4"	180 1/2"	180 3/4"	181"	181 1/4"	181 1/2"	181 3/4"	182"	182 1/4"	182 1/2"	182 3/4"	183"	183 1/4"	183 1/2"	183 3/4"	184"	184 1/4"	184 1/2"	184 3/4"	185"	185 1/4"	185 1/2"	185 3/4"	186"	186 1/4"	186 1/2"	186 3/4"	187"	187 1/4"	187 1/2"	187 3/4"	188"	188 1/4"	188 1/2"	188 3/4"	189"	189 1/4"	189 1/2"	189 3/4"	190"	190 1/4"	190 1/2"	190 3/4"	191"	191 1/4"	191 1/2"	191 3/4"	192"	192 1/4"	192 1/2"	192 3/4"	193"	193 1/4"	193 1/2"	193 3/4"	194"	194 1/4"	194 1/2"	194 3/4"	195"	195 1/4"	195 1/2"	195 3/4"	196"	196 1/4"	196 1/2"	196 3/4"	197"	197 1/4"	197 1/2"	197 3/4"	198"	198 1/4"	198 1/2"	198 3/4"	199"	199 1/4"	199 1/2"	199 3/4"	200"	200 1/4"	200 1/2"	200 3/4"	201"	201 1/4"	201 1/2"	201 3/4"	202"	202 1/4"	202 1/2"	202 3/4"	203"	203 1/4"	203 1/2"	203 3/4"	204"	204 1/4"	204 1/2"	204 3/4"	205"	205 1/4"	205 1/2"	205 3/4"	206"	206 1/4"	206 1/2"	206 3/4"	207"	207 1/4"	207 1/2"	207 3/4"	208"	208 1/4"	208 1/2"	208 3/4"	209"	209 1/4"	209 1/2"	209 3/4"	210"	210 1/4"	210 1/2"	210 3/4"	211"	211 1/4"	211 1/2"	211 3/4"	212"	212 1/4"	212 1/2"	212 3/4"	213"	213 1/4"	213 1/2"	213 3/4"	214"	214 1/4"	214 1/2"	214 3/4"	215"	215 1/4"	215 1/2"	215 3/4"	216"	216 1/4"	216 1/2"	216 3/4"	217"	217 1/4"	217 1/2"	217 3/4"	218"	218 1/4"	218 1/2"	218 3/4"	219"	219 1/4"	219 1/2"	219 3/4"	220"	220 1/4"	220 1/2"	220 3/4"	221"	221 1/4"	221 1/2"	221 3/4"	222"	222 1/4"	222 1/2"	222 3/4"	223"	223 1/4"	223 1/2"	223 3/4"	224"	224 1/4"	224 1/2"	224 3/4"	225"	225 1/4"	225 1/2"	225 3/4"	226"	226 1/4"	226 1/2"	226 3/4"	227"	227 1/4"	227 1/2"	227 3/4"	228"	228 1/4"	228 1/2"	228 3/4"	229"	229 1/4"	229 1/2"	229 3/4"	230"	230 1/4"	230 1/2"	230 3/4"	231"	231 1/4"	231 1/2"	231 3/4"	232"	232 1/4"	232 1/2"	232 3/4"	233"	233 1/4"	233 1/2"	233 3/4"	234"	234 1/4"	234 1/2"	234 3/4"	235"	235 1/4"	235 1/2"	235 3/4"	236"	236 1/4"	236 1/2"	236 3/4"	237"	237 1/4"	237 1/2"	237 3/4"	238"	238 1/4"	238 1/2"	238 3/4"	239"	239 1/4"	239 1/2"	239 3/4"	240"	240 1/4"	240 1/2"	240 3/4"	241"	241 1/4"	241 1/2"	241 3/4"	242"	242 1/4"	242 1/2"	242 3/4"	243"	243 1/4"	243 1/2"	243 3/4"	244"	244 1/4"	244 1/2"	244 3/4"	245"	245 1/4"	245 1/2"	245 3/4"	246"	246 1/4"	246 1/2"	246 3/4"	247"	247 1/4"	247 1/2"	247 3/4"	248"	248 1/4"	248 1/2"	248 3/4"	249"	249 1/4"	249 1/2"	249 3/4"	250"	250 1/4"	250 1/2"	250 3/4"	251"	251 1/4"	251 1/2"	251 3/4"	252"	252 1/4"	252 1/2"	252 3/4"	253"	253 1/4"	253 1/2"	253 3/4"	254"	254 1/4"	254 1/2"	254 3/4"	255"	255 1/4"	255 1/2"	255 3/4"	256"	256 1/4"	256 1/2"	256 3/4"	257"	257 1/4"	257 1/2"	257 3/4"	258"	258 1/4"	258 1/2"	258 3/4"	259"	259 1/4"	259 1/2"	259 3/4"	260"	260 1/4"	260 1/2"	260 3/4"	261"	261 1/4"	261 1/2"	261 3/4"	262"	262 1/4"	262 1/2"	262 3/4"	263"	263 1/4"	263 1/2"	263 3/4"	264"	264 1/4"	264 1/2"	264 3/4"	265"	265 1/4"	265 1/2"	265 3/4"	266"	266 1/4"	266 1/2"	266 3/4"	267"	267 1/4"	267 1/2"	267 3/4"	268"	268 1/4"	268 1/2"

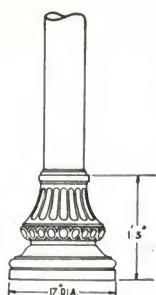
DRAWING
NO. B-5JOHN E. LINGO & SON TUBULAR STEEL FLAG POLES
CAMDEN, NEW JERSEYSCALE
1"=1FOOT

**Design No. 2106**

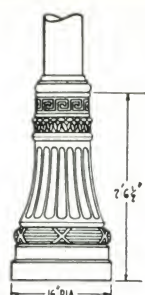
Suitable for:
 Light Pattern
 17'x20' 25'x28½'
 33'x37' 41'x45½'
 Heavy Pattern
 20'x23' 25'x28½'
 Extra Heavy Pattern
 25'x28½'

**Design No. 2105**

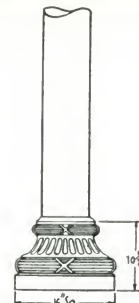
Suitable for:
 Light Pattern
 25'x28½' 33'x37'
 41'x45½'
 Heavy Pattern
 25'x28½' 30'x33½'
 Extra Heavy Pattern
 25'x28½'

**Design No. 2107**

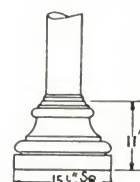
Suitable for:
 Light Pattern
 33'x37' 41'x45½'
 49½'x54' 57½'x62½'
 Heavy Pattern
 30'x33½' 40'x44'
 50'x55'
 Extra Heavy Pattern
 25'x28½' 30'x33½'
 35'x39'

**Design No. 2104**

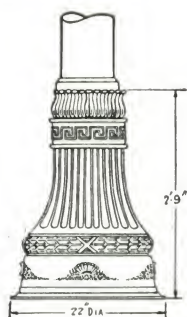
Suitable for:
 Light Pattern
 33'x37' 41'x45½'
 49½'x54' 57½'x62½'
 Heavy Pattern
 30'x33½' 40'x44'
 50'x55'
 Extra Heavy Pattern
 25'x28½' 30'x33½'
 35'x39'

**Design No. 2108**

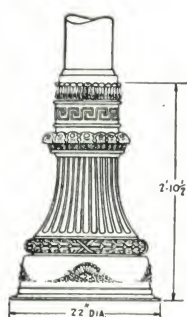
Suitable for:
 Light Pattern
 41'x45½' 49½'x54'
 57½'x62½' 65½'x71½'
 Heavy Pattern
 40'x44' 50'x55'
 60'x66'
 Extra Heavy Pattern
 30'x33½' 35'x39'
 40'x45'

**Design No. 1970**

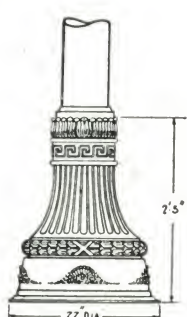
Suitable for:
 Light Pattern
 41'x45½' 49½'x54'
 Heavy Pattern
 30'x33½' 40'x44'
 Extra Heavy Pattern
 25'x28½' 30'x33½'

**Design No. 2101**

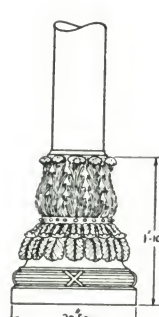
Suitable for:
 Light Pattern
 57½'x62½' 65½'x71½'
 73'x79' 80'x87'
 Heavy Pattern
 50'x55' 60'x66'
 70'x77'
 Extra Heavy Pattern
 35'x39' 40'x45'
 47'x53'

**Design No. 2103**

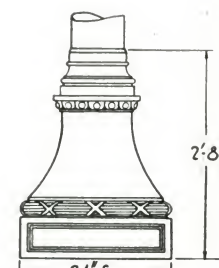
Suitable for:
 Light Pattern
 41'x45½' 49½'x54'
 57½'x62½' 65½'x71½'
 Heavy Pattern
 40'x44' 50'x55'
 60'x66'
 Extra Heavy Pattern
 30'x33½' 35'x39'
 40'x45'

**Design No. 2102**

Suitable for:
 Light Pattern
 41'x45½' 49½'x54'
 57½'x62½' 65½'x71½'
 Heavy Pattern
 40'x44' 50'x55'
 60'x66'
 Extra Heavy Pattern
 30'x33½' 35'x39'
 40'x45'

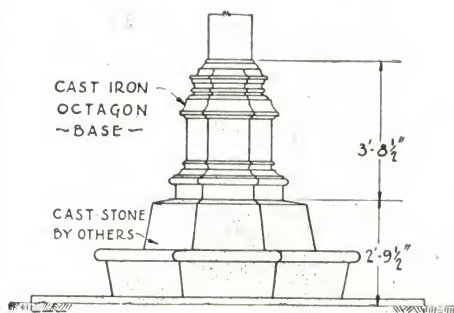
**Design No. 2109**

Suitable for:
 Light Pattern
 57½'x62½' 65½'x71½'
 73'x79' 80'x87'
 Heavy Pattern
 50'x55' 60'x66'
 70'x77'
 Extra Heavy Pattern
 35'x39' 40'x45'
 47'x53'

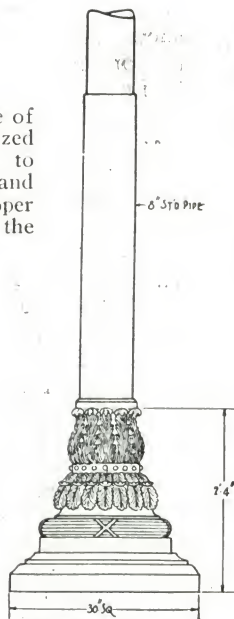
**Design No. 1902**

Suitable for:
 Light Pattern
 73'x79' 90'x98' 80'x87'
 Heavy Pattern
 60'x66' 70'x77'
 75'x82½'
 Extra Heavy Pattern
 40'x45' 47'x53'
 55'x61'

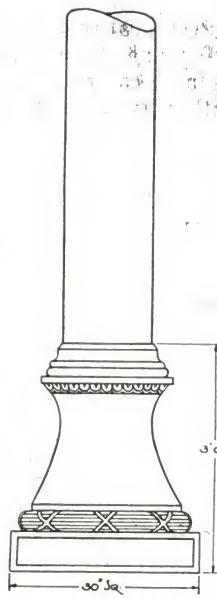
We carry in stock a complete line of flagpole bases in painted and galvanized cast iron. Bronze flagpole bases to order. A ring collar is cast separate and furnished with the base to make a proper "joint" between the flagpole and the collar for hot lead calking.

**Design No. 1990**

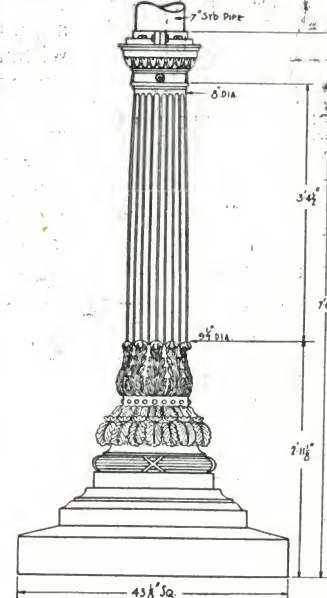
Suitable for poles with butt diameters from 12¾ in. to 15 in.

**Design No. 2110**

Suitable for:
 Light Pattern
 65½'x71½' 73'x79'
 80'x87'
 Heavy Pattern
 60'x66' 70'x77'
 Extra Heavy Pattern
 47'x53'

**Design No. 1999**

Suitable for:
 Light Pattern
 90'x98' 100'x108'
 Heavy Pattern
 75'x82½' 80'x88'
 90'x99' 100'x110'
 Extra Heavy Pattern
 125'x137'
 85'x93'

**Design No. 2121**

Suitable for:
 Light Pattern
 73'x79' 90'x98' 80'x87'
 Heavy Pattern
 60'x66' 70'x77'
 Extra Heavy Pattern
 40'x45'

NO SCALE

JOHN E. LINGO & SON TUBULAR STEEL FLAG POLES
 CAMDEN, NEW JERSEY

DRAWING
 NO. B-6

THE POLE & TUBE WORKS, INC.

SUCCESSORS TO "POLE DEPARTMENT" JOHN SIMMONS COMPANY, NEW YORK CITY

TELEPHONE
WAVERLY 3808

Avenue D and Murray Street
NEWARK, N. J.

CABLE
"POLETUBE"

OUR PRODUCT DISTRIBUTED BY

CALIFORNIA: SAN FRANCISCO—H. M. HOLWAY, Agent DISTRICT OF COLUMBIA: WASHINGTON—JOHN B. BARRETT, Agent, Rust Building

Two Types of Poles

Two distinct types of poles, dissimilar in construction and greatly varying in cost, are available. To avoid confusion and unfair bidding they should be distinctly specified as either Steel Tubular Poles or as Taper Welded Poles as may be the case. Terms such as Taper Poles with Welded Joints or Taper Welded Steel are ambiguous.

(Taper Welded Poles are described under separate heading further on).

Steel Tubular Poles

The usual, commercial Steel Tubular Poles are graduated (not actually tapered) by joining consecutive, diminishing diameters of standard steel pipe; the joints being either *shop* type, swaged, telescoped and shrunk, or of the *field* type, similarly swaged; to be telescoped in the field. Field joints are inevitable for transportation of poles in excess of railroad car lengths and for economical trucking. The field joints are self-aligning (conical rest collar), without pins, bolts, lead, cements and calked steel to steel with only a hand hammer and a common plumber's calking tool.

In all our steel tubular poles the following *outside diameters* of pipe in consecutive rotation (without skipping any one size) are employed as follows:

TABLE "A." OUTSIDE DIAMETERS OF PIPE

16, 15, 14, 12 $\frac{3}{4}$, 11 $\frac{3}{4}$, 10 $\frac{3}{4}$, 9 $\frac{3}{4}$, 8 $\frac{3}{4}$, 7 $\frac{3}{4}$, 6 $\frac{3}{4}$, 5 $\frac{3}{4}$, 5, 4 $\frac{1}{2}$, 4, 3 $\frac{1}{2}$, 2 $\frac{3}{4}$, 2 $\frac{1}{2}$, and 1 $\frac{1}{2}$ in.
--

Standard Poles—For ground or roof setting.

The bending resistance at the uppermost support (brace collar or roof tube or ground line) is calculated to a formula accepted in conservative engineering and all building departments.

The following table gives the safe diameter (bend-resistance) for standard tubular poles at their *uppermost* support:

TABLE "B." SIZES OF STANDARD POLES

Exposed or unsupported height of pole—ft.	15	20	25	30	40	50	60	70	75	80	90	100	125
Standard diameter at uppermost support—in.	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{5}{8}$	6 $\frac{5}{8}$	7 $\frac{5}{8}$	8 $\frac{5}{8}$	9 $\frac{5}{8}$	10 $\frac{5}{8}$	11 $\frac{5}{8}$	12 $\frac{5}{8}$	14
Tip diameter—in.	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$

Light Pattern Poles—Lighter than Standard and designed for ground setting *only*, therefore subject to lesser stresses of handling.

TABLE "C." LIGHT PATTERN POLES

*Height above ground—ft.	17	25	33	41	49 $\frac{1}{2}$	57 $\frac{1}{2}$	65 $\frac{1}{2}$	73	80	90	100
Light Pattern diameter at ground—in.	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{5}{8}$	6 $\frac{5}{8}$	7 $\frac{5}{8}$	8 $\frac{5}{8}$	9 $\frac{5}{8}$	10 $\frac{5}{8}$	12 $\frac{5}{8}$
Diameter at tip—in.	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{8}$

*Not alterable in this type.

For full specification of light pattern and standard poles fully trimmed for ground setting see catalogue page two in A.I.A.14F folder in your file or sent on request.

Extra Heavy Poles—Made to meet the demand for poles of larger than Standard diameter to resemble proportions of wooden poles.

TABLE "D." EXTRA HEAVY POLES

*Unsupported or exposed height—not less than—ft.	20	25	30	35	43	51	59	67	75
Extra Heavy pole, diameter—in.	5	5 $\frac{5}{8}$	6 $\frac{5}{8}$	7 $\frac{5}{8}$	8 $\frac{5}{8}$	9 $\frac{5}{8}$	10 $\frac{5}{8}$	11 $\frac{5}{8}$	12 $\frac{5}{8}$
Practical tip, diameter—in.	2 $\frac{3}{8}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$

*Keep above this minimum height to avoid an unreasonable multitude of joints.

Additional Butts—All steel tubular poles are standardized on the basis of their exposed or unsupported height, to which we add necessary *additional butt* to meet requirements. Thus a pole 45 ft. above roof braced 5 ft. up should be specified as a standard steel tubular pole 40x45 ft. (5 $\frac{5}{8}$ -in. diameter). A pole 70 ft. above roof and set on top floor 10 ft. below roof should be specified as 70x80 ft. (8 $\frac{5}{8}$ -in. diameter). A call for a 30-ft. pole would result in a 5-in. diameter, but if braced above roof can be specified as 25x30 ft. (4 $\frac{1}{2}$ in. diameter).

Taper Welded Poles

These are an artcraft product, welded up from rolled plates; are actually *tapered* either conically or with the Venetian entasis, have a perfectly smooth exterior surface unbroken by visible joints.

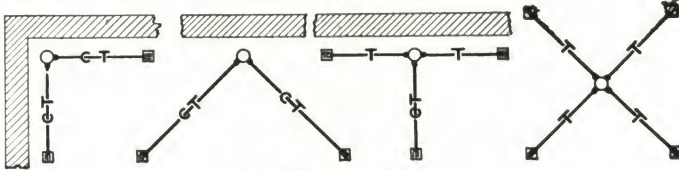
The tip diameter is limited to a minimum of 4 $\frac{3}{4}$ in. while the largest visible diameter can be chosen from any of these given for steel tubular poles (see Table "A"); but must be proportionate to the selected tip and the visible height by assuming a taper of from $\frac{1}{8}$ to $\frac{1}{4}$ in. per foot of exposure and then compromising to the nearest Table "A" diameter.

The majority of architects prefer the Venetian entasis. This curve leaves the lower one-fifth to two-fifths of the visible height almost cylindrical, therefore we employ pipe for this portion, and the more costly taper construction to the balance of the height. We suggest that architects so visualize this type of pole and preferably consult us before specifying.

Taper welded poles have been used occasionally on roofs of buildings of outstanding prominence (Morrison Hotel; Chicago Tribune Tower; A. T. & T. Building, New York; Newark Chamber of Commerce; and twenty or more others) but are more usually accepted for flag pole monuments. The taper portion of these poles in steel costs approximately \$16.00 to \$20.00 per running foot.

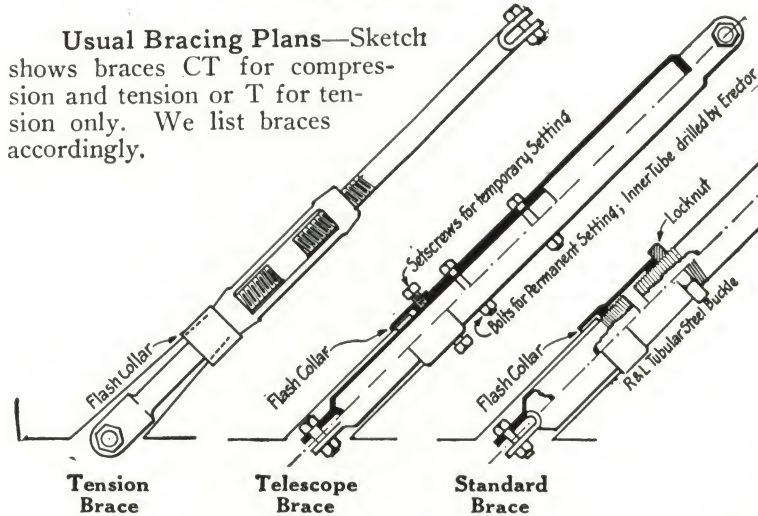
Bronze Poles—Taper welded poles are also produced by us now in *bronze* at reasonable prices, considering their evident imperishability without painting.

Customary Pole Supports and Fittings



Usual Bracing Plans

Usual Bracing Plans—Sketch shows braces CT for compression and tension or T for tension only. We list braces accordingly.



Braces—Three types of braces are available as illustrated.

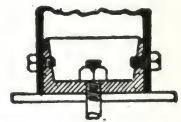
Typical Brace Collar—Calked to pole prevents corrosion unavoidable with the old style of forged and bolted clamp bands.

Bottom Forks—Bottom forks of all braces fitted to various brace anchors, as shown in illustrations.

Suggestion—In the interest of efficiency, installation and simplicity of specification we suggest that you call upon us for proposal of "Standard Construction" which we will gladly submit *without obligation on your part*.

We will invariably suggest bracing best suited to your individual project and yet the least costly. Injudicious selection of braces frequently causes unreasonable costs without adequate superiority of installation. Ask us first—then specify, and avoid costly, sometimes irreparable errors.

Pole Socket and Rest Plate—See Brace Anchors for various forms of securing to various types of roof structures.



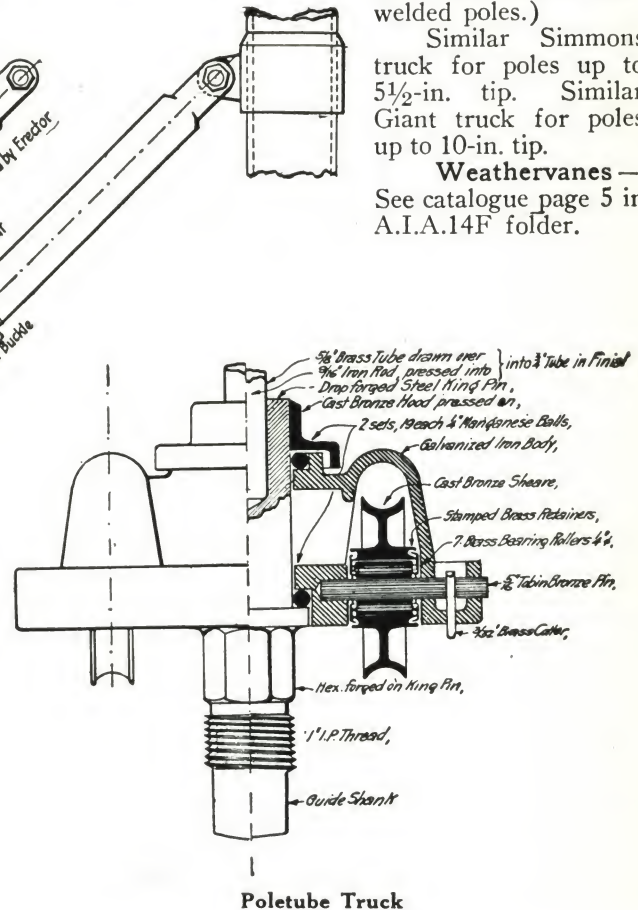
Customary Pole Trimmings

Gilt Ball Finials—20-oz. spun copper and finished in 23-kt. gold leaf over weatherproof sizing, mounted on $\frac{3}{4}$ -in. brass tube. Stock sizes: 4, 5, 6, 8, 10, 12, 14, 16, 18 and 24 in.

Trucks—Poletube truck for poles up to $3\frac{1}{2}$ -in. tip (not applicable to taper welded poles.)

Similar Simmons truck for poles up to $5\frac{1}{2}$ -in. tip. Similar Giant truck for poles up to 10-in. tip.

Weather vanes—See catalogue page 5 in A.I.A.14F folder.



Poletube Truck

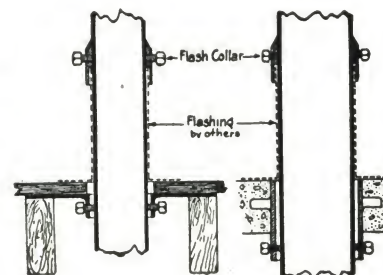
Cleats—9-in. galvanized, attached to poles with two $\frac{5}{16}$ -in. cap screws.

Halyards— $\frac{3}{8}$ -in. diameter bolt rope or Silver Lake No. 10. We furnish no metallic (wire rope or chain) halyards under any circumstances, because they are impractical, dangerous and injurious to the pole.

Cleat Covers, Flash Collars—See catalogue page 5 and 8, in your folder A.I.A.14F.

Guide Flange

For wood or steel roof construction. Can be screwed either to bottom or top of rafters.



Roof Tube

For concrete roof construction. Can be moulded into new concrete roofs or grouted into existing ones. One inch larger than pole diameter.

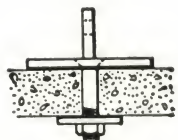


Fig. C-20-4
Moulded into New
Concrete Roof

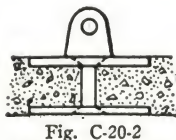


Fig. C-20-2
Moulded into New
Concrete Roof

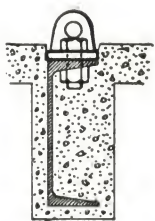


Fig. S-11-2
For Steel or Steel-
Concrete Roof



Fig. C-20-1
Moulded into New
Concrete Roof
Brace Anchors

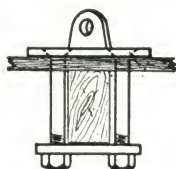
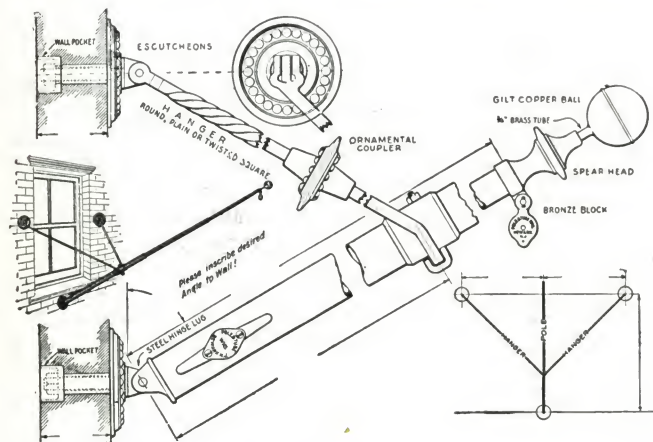


Fig. W-2-4
Bolted in Wood
Roof Rafter

Window and Outrigger Poles

Steel poles of tubular construction, as well as Continuous Taper Welded poles, have been largely adopted as window or outrigger poles. They offer the advantages of our *hinged* construction, which permits righting the poles for repainting or repairs at a minimum cost. It avoids the risk of climbing out and saves the expense



WINDOW POLES—TUBULAR STEEL CONSTRUCTION
(TELESCOPED JOINTS)

Length, ft.	Light diameters	Medium diameters, in.	Heavy diameter, in.
12	2 3/8 x 1 7/8	.....	2 7/8 x 2 3/8
14	2 7/8 x 1 7/8	.....	3 1/2 x 2 3/8
16	2 7/8 x 1 7/8	3 1/2 x 2 3/8	4 x 2 7/8
18	2 7/8 x 1 7/8	3 1/2 x 2 3/8	4 x 2 7/8
20	2 7/8 x 1 7/8	3 1/2 x 2 3/8	4 x 2 7/8
22	3 1/2 x 2 3/8	4 x 2 7/8	4 1/2 x 2 7/8
25	4 1/2 x 2 3/8	4 1/2 x 2 7/8	5 x 2 7/8
30	4 1/2 x 2 3/8	5 x 2 7/8	5 1/8 x 2 7/8

of scaffolding or dismantling, or the expensive operation with a boatswain's chair swung from the roof. Window poles are fitted with a special shackled, heavy cast bronze block (the usual truck is impracticable).

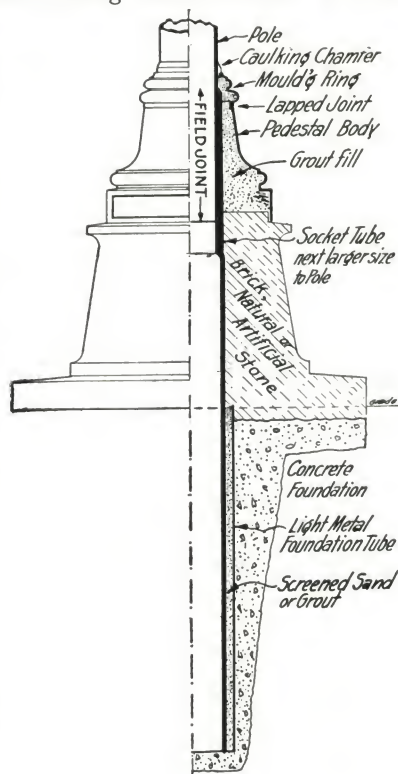
These poles are galvanized all over after fabrication.

Ask for plates WP-50a and WP-5a.

Monument Flag Pole Construction—Practical for flag pole monuments facilitating erection and protecting against corrosion and damage by freezing, vibration, etc.

Pole Pedestals

We have Patterns for a variety for iron or bronze castings; ask for circular.



Taper Welded Steel Flag Pole—War Memorial at Plainfield, N. J.

HELMLE & CORBETT, Architects
GAETANO CECERE, Sculptor
L. L. MANNING & SON, Contractors
MOREHOUSE CO., Bronze Founders
80 ft. above grade, 16-in. butt x 5-in. tip, entasis taper

Typical Installation Plates

Consult "Typical Installation Plates" in your folder A.I.A.14F sent (or yours for the asking).

Service

If you will send us a rough sketch showing setting conditions we will gladly submit suggestions for installations, saving your time and assuring first class work and lowest consistent prices.

ÆOLUS DICKINSON

INDUSTRIAL DIVISION PAUL DICKINSON, INCORPORATED

Scuppers, Exhaust Heads and Roof Drains

TELEPHONE

LAFAYETTE 1862, 1863

3324-3354 South Artesian Avenue

CHICAGO, ILL.

Products

DICKINSON CAST IRON SCUPPERS.

DICKINSON CAST IRON ROOF DRAINS

DICKINSON CAST IRON EXHAUST HEADS.

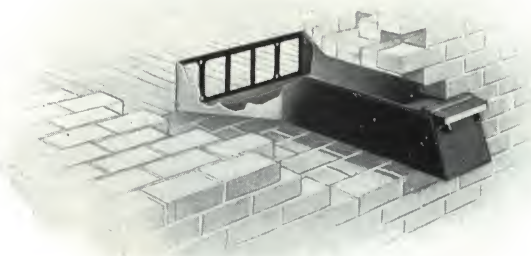
For "Æolus" Ventilators and Dickinson Floor Vents, Mushroom Type, see page A522.

Dickinson Cast Iron Scuppers

Reduce insurance rates 2% to 5% on contents of buildings to which applied.

They are constructed of light gray cast iron and are simple, effective, durable and easily installed.

The portion which protrudes beyond the wall is covered by a hinged flap which is held in place by a hinge pin of bronze to prevent corrosion and consequent sticking.



Cast Iron Scupper

Inside grating prevents clogging with papers, etc.
Outside grating prevents birds from building nests to block the purpose of the scupper

Size—Underwriters' requirements call for 15 sq. in. for each 1000 sq. ft. drained. Dickinson scuppers have a capacity of 16 sq. in. at the smallest point. The outside or smaller end is 4x4 in.

List Price—Dickinson scuppers may be had for the following thicknesses of wall:

9-in. wall.....	\$3.30
13-in. wall.....	4.40
17-in. wall.....	5.50
22-in. wall.....	6.60
24-in. wall.....	7.70

Prices are f.o.b. Chicago.

Specifications—Furnish and install where shown on plans gray cast iron scuppers which are to have outlet of 4x4 in., as manufactured by Æolus Dickinson, 3324-3354 South Artesian Ave., Chicago, Ill. Inlet to have a protective grating and outside to have a flap hinged on a bronze pin. The bottom edge of the inside end shall be set at the level of the floor or slightly below it so that water will drain clear. Scuppers must have a pitch of from 2 to 2½ in. to the foot. Upon completion of the building and before being turned over to the owners, the contractor shall see that all scuppers are clear of all material, are clean and that the hinged flap moves freely and is in perfect working order.

Dickinson Cast Iron Roof Drains

Constructed of light gray cast iron.

All sizes for threaded and cast iron pipe.

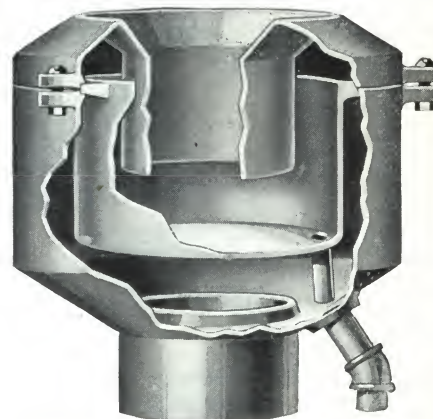


Cast Iron Roof Drain

Top: 12 in. square, 6 in. high.
Bottom section: 16½ in. square, 4 in. deep.
Roofing felt is brought over flange

Dickinson Cast Iron Exhaust Heads

Dickinson exhaust heads are the only make constructed entirely of cast iron. They are simple in design, yet none the less effective in operation. On entering the head the gradually expanding steam strikes the concave surface of an inner shell which quickly reverses its direction. Then the steam flows upward along the sides until it strikes the top, where it is again deflected and is permitted to exhaust into the outside air. Constantly impinged against these inner surfaces, the particles of oil and water are separated from the steam vapor leaving nothing but the dry vapor to escape.



Phantom View All-cast-iron Exhaust Head

DICKINSON EXHAUST HEAD

Pipe sizes, in.	Weight, lb.	Drain opening, in.	List price	Pipe sizes, in.	Weight, lb.	Drain opening, in.	List price
1 and 1½	15	¾	\$20.00	8	174	1½	\$90.00
2 and 2½	21	1	25.00	10	241	2	125.00
3 and 3½	35	1	30.00	12	325	2½	150.00
4 and 4½	48	1	40.00	14	475	2½	200.00
5	100	1½	50.00	16	650	3	250.00
6	120	1½	60.00	18	900	3	300.00
7	154	1½	75.00	20	1100	3½	360.00

Information

Further information, prices, etc., gladly supplied on request.

WATERTITE DRAIN & SCUPPER CO., INC.

Windproof Hooded Scuppers

243 East 44th Street, NEW YORK, N. Y.

AGENTS

BALTIMORE, MD., McNEILL ORNAMENTAL IRON & CONSTRUCTION Co.,
460 East Cross Street
BUFFALO, N. Y., JAMES M. HAWKINS, 705 Ellicott Square
CAMBRIDGE, MASS., BAY STATE BUILDERS' SUPPLY Co., 50 Lansdowne
Street
CEDAR RAPIDS, IOWA, BUILDERS' MATERIAL Co., 601 South Third
Street
CHARLOTTE, N. C., T. L. TALBERT IRON & STEEL Co.
CHICAGO, ILL., J. NORMAN JENSEN, 343 South Dearborn Street
CINCINNATI, OHIO, CALVIN C. HUENEFFELD, 310 Southern Ohio Bank
Building
CLEVELAND, OHIO, R. L. QUEISSER Co., Schofield Building
DALLAS, TEX., W. A. SEDWICK Co., 2916 Maple Avenue
DETROIT, MICH., REINDEL & REINDEL, 1115 Francis Palms Building
HOUSTON, TEX., JOHN C. MITCHELL SALES AGENCY, 304 Stewart
Building
INDIANAPOLIS, IND., VAN CAMP HARDWARE & IRON Co.
KANSAS CITY, MO., BUILDERS MATERIAL SUPPLY Co., Continental
Building

UTICA, N. Y., AMERICAN

LOS ANGELES, CAL., CALIFORNIA GLASS Co., 510 Commercial Street
LOUISVILLE, KY., F. W. MAURY, 128 East Main Street
MILWAUKEE, WIS., BUILDERS SUPPLY Co., 139 Oneida Street
MINNEAPOLIS, MINN., THE REED Co., 253 Plymouth Building
NEW ORLEANS, LA., HERBERT S. HILLER, 610 South Peters Street
NORFOLK, VA., S. H. HODGES, 721 Citizens Bank Building
PHILADELPHIA, PA., PENN BUILDING SPECIALTIES Co., 1814 Ludlow
Street
PITTSBURGH, PA., WALTER BOSWELL Co., 1522 Oliver Building
READING, PA., DANIEL F. YOST, 312 Baer Building
RICHMOND, VA., EARNEST BROS., 805 East Franklin Street
ROCHESTER, N. Y., AMERICAN CLAY & CEMENT CORPORATION,
ST. LOUIS, MO., SCHURK IRON WORKS, 5425 Manchester Avenue
SALT LAKE CITY, UTAH, HAWLEY-RICHARDSON-WILLIAMS Co., Dooley
Building
SAN FRANCISCO, CAL., PRICE-TELZ Co., 683 Howard Street
SEATTLE, WASH., TOURTELLOTTE-BRADLEY, INC., 314 Seneca Street
SYRACUSE, N. Y., PARAGON PLASTER Co.
TOLEDO, OHIO, HENRY J. CONLON, 223 Michigan Street
HARD WALL PLASTER Co.

Purpose of Scuppers

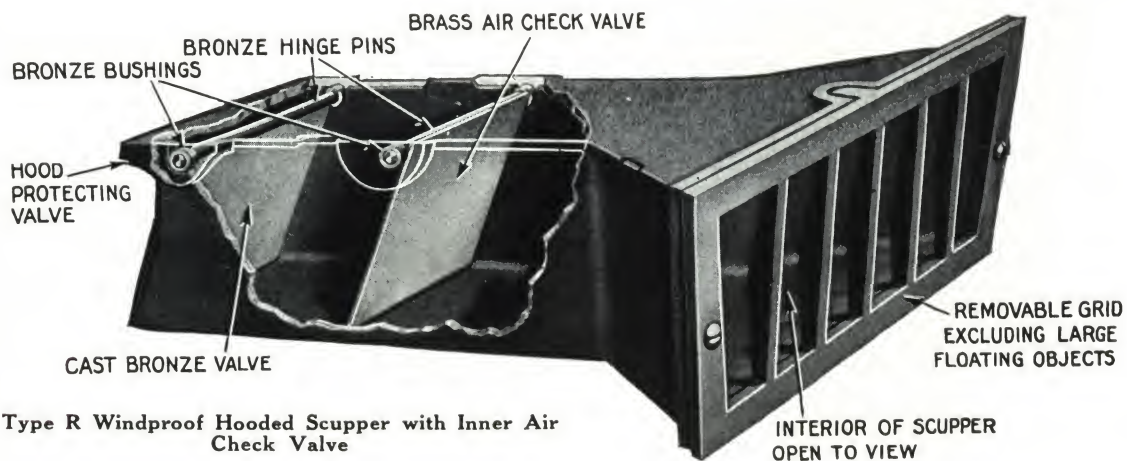
It is a well-known fact that water damage often exceeds the fire damage and also causes large losses through disruption of business. A small fire on an upper floor may cause enormous damage to goods, machinery, etc., by flooding the floors below. Scuppers allow this water to escape outside the building and save this enormous and unnecessary loss.

Underwriters recommend the use of scuppers (especially in sprinklered buildings) and the insurance rate for both owner and tenants is favorably affected by their use.

Construction of Type R Scupper

Windproof Valve—To exclude cold air, a heavy cast bronze valve is hung in bronze bushings overlapping the outer end of the scupper.

The locating of the valve in this manner provides for its free action, which cannot be expected from a valve recessed in the scupper mouth subject to clogging by incrustations of dirt or sealing by ice or sleet. As the scupper is an emergency device it must be ready to function at all times, else it is useless.



Important Installations

Please note that our scuppers were selected by Government architects and used in the two largest army base depots ever built, at Brooklyn and New Orleans. Also used in other important Government work.

Underwriters' Approval Is Your Guarantee

Our scuppers have been tested, approved and listed as standard by the Chicago Laboratories of the National Board of Fire Underwriters. This secures their acceptance by all local exchanges and the maximum allowance in the rate.

As the scupper is an emergency device it must be ready to function at all times and it would be folly to install a cheaply made scupper that through rust, corrosion or incrustations of dirt, or sealing by ice in winter, would fail to function through any defect of design or construction.

Hood—A small hood protects the valve from being clogged by mortar during construction, and from dirt and ice.

If desired, we can furnish the "complete hood," shown here, enclosing the valve on three sides. This form is favored by New England Underwriters, as giving greater protection to the valve.



Grid—The grid protecting the inlet is removable, being secured by two brass setscrews.

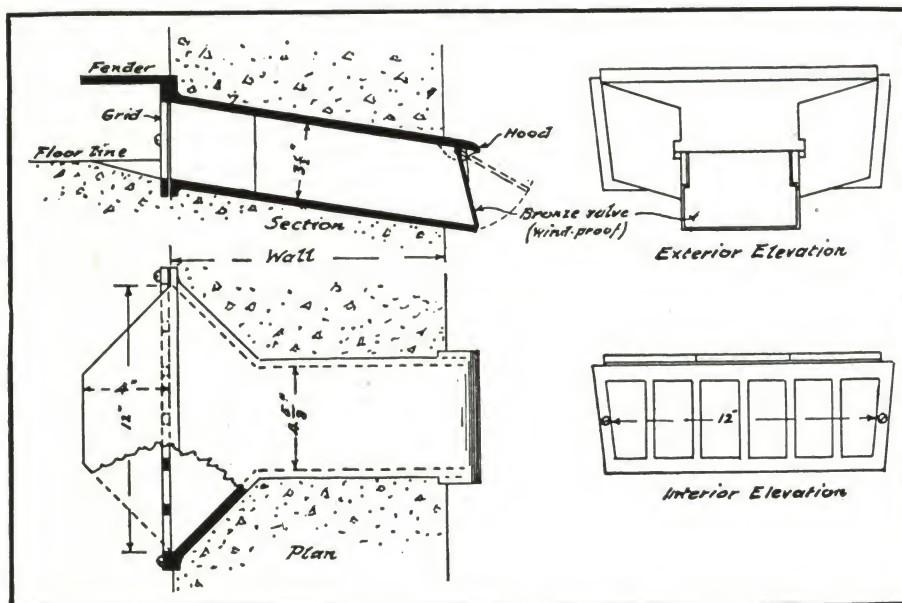
Fender—The fender projecting 4 in. into the room is designed to prevent storing goods against the inlet of the scupper. Fender can be omitted, if desired.

Pitch—Our scupper has a downward pitch of 2 in. to the foot, providing a good head of water to open the valve.

Discharge Capacity—Tests made by Underwriters' Laboratories developed that our scupper will discharge 60 gallons per minute under 1-in. head of water on the floor and 100 gallons per minute under 3-in. head.

Necessity of Bronze Fittings—As the scuppers may not be called into use until years after they have been installed it is necessary that the valve be of a material not subject to rust—ours are of bronze hung in bronze bushings.

have a cast bronze gravity valve overlapping the end of the scupper (not recessed). Valve shall be hung in bronze or brass bushings. Above the inlet there shall be a cast iron fender extending 4 in. into the room (can be omitted if floors are not for storage purposes). All iron parts shall have one coat protective paint (or be galvanized) before shipping. Scuppers shall have the approval of the National Board of Fire Underwriters and be included in their list of Approved Mechanical Devices. All as manufactured by the WATERTITE DRAIN & SCUPPER Co., Inc., 243 East 44th Street, New York, N. Y.



Type R Scupper with Fender

Tested, approved and listed as standard by the National Board of Fire Underwriters

Variation of Type R Scupper—The illustration on preceding page shows a Type R scupper having a secondary brass air check valve placed in the neck of the scupper, an additional security against the entrance of cold air. No fender is shown in this cut but can be provided if desired. The air check adds but one dollar to the cost of the scupper.

Number Required

In sprinklered buildings, it is advisable to provide one scupper to every 500 sq. ft. of floor surface. In unsprinklered buildings one to every 1000 sq. ft.

Scuppers are usually placed in the curtain walls below the windows.

Sizes and Prices

The scuppers are made for any thickness of wall and prices will be quoted on application. State thickness of wall and type of scupper required, also number required.

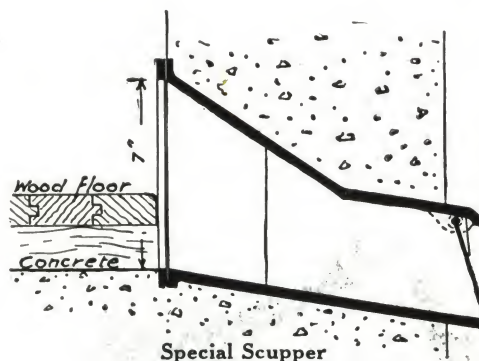
Specification for Type R (Approved) Scuppers

Furnish and set in exterior walls, where indicated, cast iron scuppers with inlet not less than 12 in. wide, outlet to have an area of not less than 16 sq. in.; outlet to

Set the scuppers about 1 in. below the finished floor line. Grade a channel to it in the cement finish of the floor.

For Wood Floors on Cement

The illustration shows a special scupper made for wood floors laid on sleepers bedded in the cement slab. The inlet is 7 in. high and the bottom of the scupper is set flush with the cement floor to take off any water that might seep through the wood floor.



Special Scupper
For wood floors on concrete slab

A Partial List of Recent Installations

Kelly Springfield Tire Co., Cumberland, Md.
Columbia Graphophone Co., Baltimore, Md.
American Can Co., Honolulu, T. H.
Studebaker Body Co., South Bend, Ind.
International Harvester Co., Chicago, Ill.
Endicott Johnson Corp., Endicott, N. Y.
Stanley Works, New Britain, Conn.
James Butler Warehouse, Long Island City, N. Y.
Diamond Match Co., Oshkosh, Wis.
Eastman Kodak Co., Rochester, N. Y.
Standard Oil Co., Buffalo, N. Y.
Westinghouse Lamp Co., Bloomfield, N. J.
U. S. Army Supply Base, Brooklyn, N. Y.
U. S. Army Supply Depot, New Orleans, La.
U. S. Aircraft Storehouse, Philadelphia, Pa.
United Drug Co., Boston, Mass.
Winchester Repeating Arms Co., New Haven, Conn.

American Cigar Co. Factory, Hartford, Conn.
Bagby Furniture Co. Building, Baltimore, Md.
Harris Bros. Mill, Paterson, N. J.
Oliver Chilled Plow Works, South Bend, Ind.
B. F. Goodrich Co., Akron, Ohio
R. H. Macy Co. Warehouse, New York, N. Y.
Knitwear Factory, Brooklyn, N. Y.
Illuminating Building, Cleveland, Ohio
Gulf Refining Co., Philadelphia, Pa.
Westinghouse Air Brake Co., Wilmerding, Pa.
Westinghouse Electric Co., Sharon, Pa.
American Thread Co., Dalton, Ga.
Aluminum Co. of America, Oakland, Cal.
General Electric Building, Cincinnati, Ohio
American Can Co., Hoopston, Ill.
Eagle Lock Co., Terryville Sta., Conn.
Atlantic & Pacific Building, Philadelphia, Pa.

WINDSHIELD SCUPPER COMPANY

Sole Manufacturers of Windshield Scuppers

16 Warren Street, NEW YORK, N. Y.

SALES REPRESENTATIVES

ATLANTA, GA., R. C. LIEB Co., 340 Whitehall Street
BALTIMORE, MD., EDWIN CUGLE, 1707 Park Avenue
BOSTON, MASS., E. A. SIMPSON, 88 Broad Street
CHICAGO, ILL., W. L. HARRISON, Room 1148, 228 No. LaSalle Street
CLEVELAND, OHIO, DUPLEX HANGER Co., 1270 East 53rd Street
DETROIT, MICH., L. T. OLLESHEIMER, 606 Marquette Building
GREENSBORO, N. C., J. D. WILKINS, 204 West Lee Street
HARTFORD, CONN., BIDWELL HARDWARE Co., 1293 Main Street
HOUSTON, TEX., ROBERT VOIGTLANDER, 1612 Miller Street
INDIANAPOLIS, IND., HOOSIER STEEL & WIRE Co., 2230 Almont Street
KANSAS CITY, MO., C. A. BROCKETT CEMENT Co., 2035 East 19th Street
LOS ANGELES, CAL., E. R. KUNS Co., Inc., 708 Towne Avenue

MILWAUKEE, WIS., GROSS HARDWARE & SUPPLY Co., 216 Third Street
NASHVILLE, TENN., GEO. W. RUTH & Co., 151 Fourth Avenue, No. Street
NEW ORLEANS, LA., NACHARY BUILDERS SUPPLY Co., 802 Perdido Street
PHILADELPHIA, PA., KAHN PRODUCTS Co., 2216 West Columbia Avenue
PITTSBURGH, PA., FORT PITT HARDWARE Co., 807 Liberty Avenue
RICHMOND, VA., CONSTRUCTION SUPPLY Co., Arlington Road at North Boulevard
ST. LOUIS, MO., F. A. CAMMANN BUILDER'S SERVICE Co., 927 Century Building
ST. PAUL, MINN., HARRY A. HANSEN Co., 903 Builders Exchange
SAN FRANCISCO, CAL., M. E. HAMMOND, Pacific Building

Purpose of Windshield Scuppers

To provide a quick escape for water in case of fire, defective or overheated sprinklers, bursting pipes, etc., thereby reducing damage to a minimum.

It is a well-known fact that approximately 75% of so-called fire losses are actually caused by water, and the progressive architect or engineer can not afford to omit provision for the emergency. Aside from actual water damage, five lines of fire hose, discharging 300 gal. per minute, would strain the structure to the extent of 12,000 lb. for each minute, or 30 tons every 5 minutes the fire ensued.

Every mercantile building, such as warehouses, factories, lofts and stores, should be equipped with Windshield Scuppers.

Reduced Insurance Rates

Insurance companies, recognizing their value, allow a reduction in rates applying to both building and contents when Windshield Scuppers are installed in accordance with recommendations. This saving usually pays their entire cost in a few years. Buildings so equipped will also command a higher rental and reduce vacancies on account of the insurance saving afforded tenants.

Underwriters' and Factory Mutuals' Approval

Windshield Scuppers have been tested and approved by the Underwriters' Laboratories, Inc. at Chicago, and are listed as Standard by the National Board of Fire Underwriters. This assures acceptance by all insurance exchanges throughout the country and the maximum reduction in rates.

The Associated Factory Mutual Fire Insurance Companies have also inspected and approved this device.

Value of the Improved Windshield

Being an emergency device, it is essential that it be at all times prepared for instant duty. A scupper which permits drafts to enter is not likely to be ready when called upon, as

it has been found that employees, putting their own comfort ahead of any thought of the consequence, will stuff the scupper, thereby rendering it useless. The *windshield positively prevents drafts*. This also means a distinct saving in heat and fuel.

The Standard Type Windshield Scupper, as recently improved, is provided with a seat which insures a tight fit when windshield is closed and gives a positive clearance between the sides of the casing. The windshield is hung on a frame at the floor level, where it can be readily inspected and by the removal of two nuts can be replaced. This is an exclusive feature of the Standard Type. (See illustration.)

Underwriters' Approved Grate

The approved projecting grate prevents close stock piling and is so designed as to avoid possibility of tripping or injury to occupants. Its construction is such that a packing case, dropped from a hand truck, would be deflected.

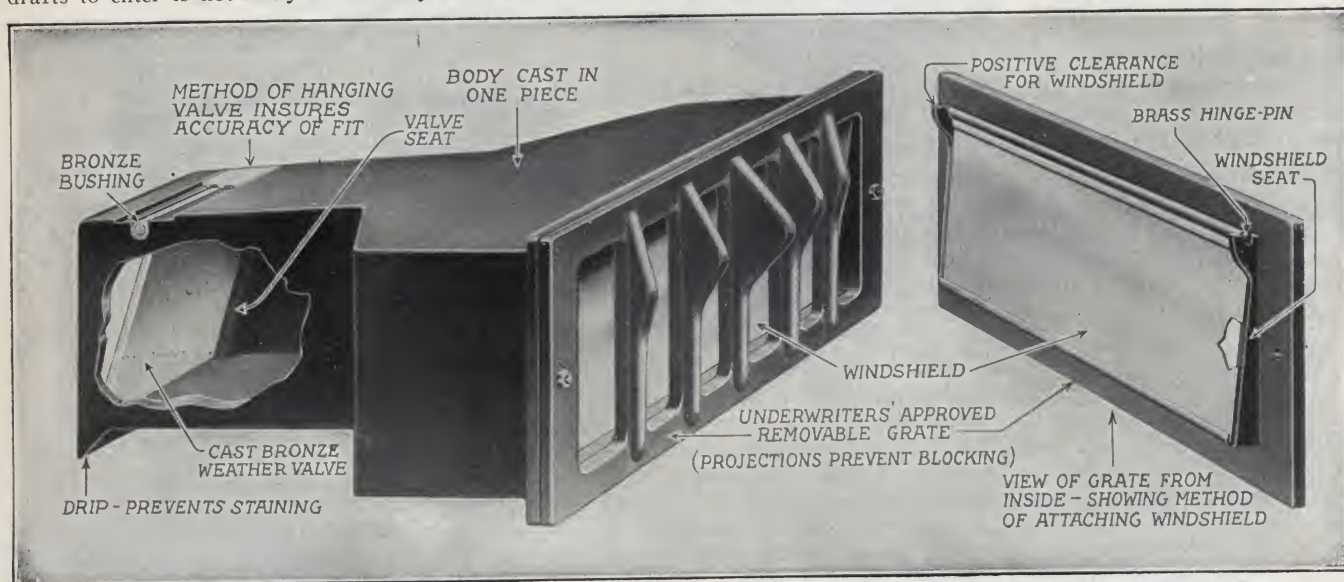
These improvements eliminate the disadvantages of the old style stock fender, which, while readily subject to breakage, can not be replaced as the attaching bolts are embedded in masonry.

Distinct Advantage of One-piece Scupper

The body of every Windshield Scupper is a solid one-piece casting. This is far superior to an assembled scupper, with the top or cover cast separately, as it is impractical to provide a tight fit, and this not infrequently permits a leakage of concrete into the scupper which clogs the valves, rendering them inoperative. The one-piece scupper assures proper setting in a complete unit, requiring no re-assembly of parts on the job by inexperienced mechanics.

Other Structural Advantages

The exterior bronze weather valve, being hung inside the housing, is afforded the maximum of protection against the elements. The method of hanging assures accuracy of fit, making it as airtight as is possible, and the bronze bushings



"Standard Type" Windshield Scupper with Underwriters' Grate, Showing How Windshield Can Be Renewed
(Patented and other patents pending)

guarantee ease of operation. It can not be blown open, as is possible with the old type door which rests on the outer end.

The drip under the outlet gives positive assurance against water flowing back under the scupper and staining the building.

Each valve is provided with a seat. It is obvious that a valve without a seat can not be windproof and still operate freely.

Only the best grade, high-silicon iron is used, producing a soft tough casting and, being $\frac{3}{8}$ in. thick, ample strength is provided to withstand undue strain or blow imposed by careless handling.

Appearance

Windshield Scuppers, having no unsightly hood at the exterior, harmonize with the architecture of the building. When located symmetrically, they provide a relief and aid the architectural scheme.

Location and Quantity Required

Windshield Scuppers are usually placed in each bay, and should be set in the wall so bottom of scupper will be 1 in. below the finished floor line. By keeping the face of the scupper parallel with the wall, proper incline toward outside will be maintained.

One Windshield Scupper should be provided for each 500 sq. ft. of floor space if the building is sprinklered, otherwise one for each 1000 sq. ft.

Sizes and Prices

Windshield Scuppers are made for walls of any thickness and can be furnished galvanized, if desired. Prices will be quoted on request by local sales representatives, or direct.

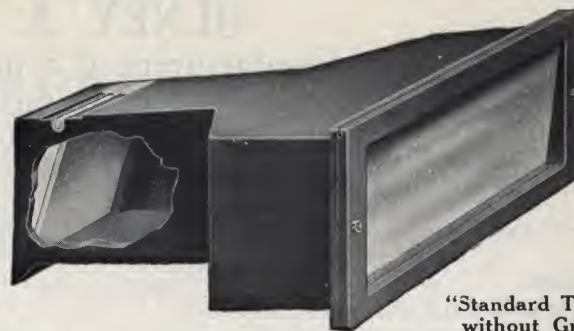
Specification for Standard Type

Provide and install, where shown in plans Standard Type (SG, S, KG or K) Windshield Scupper, of proper size for wall thickness shown. Body to be cast in one piece, $\frac{3}{8}$ in. thick, with bronze exterior weather valve, hung with bronze hinge pins and bronze bushings. To have improved, detachable (polished brass or galvanized iron) windshield hung on brass hinge pin, attached to grate or frame at entrance so that it can be replaced (and with Underwriters' Approved Projecting Grate to prevent blocking.)

(Italics denote optional features, which should conform to type selected. See Guide below.)

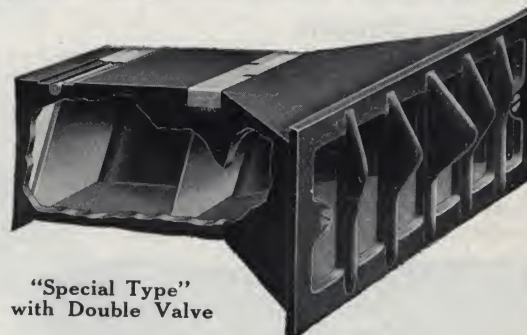
SPECIFICATION DATA

Symbol	Description	
Standard Type, Heavy $\frac{3}{8}$ in.		
"SG"	With grate	Polished, lacquered brass windshield
"S"	Without grate	
"KG"	With grate	Galvanized windshield
"K"	Without grate	
Special Type $\frac{1}{4}$ in.		
"E"	With grate	Double valve
"M"	With grate	Single valve



"Standard Type"
without Grate

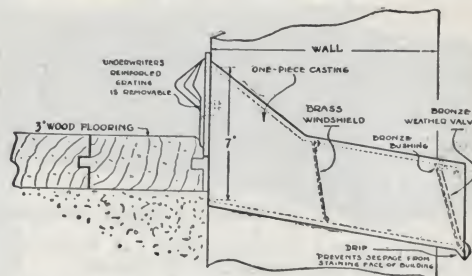
In department stores, and similar high class buildings, architects have shown a preference for the Standard type without grate, as the polished and lacquered brass windshield gives the base a finished, neat appearance, or the galvanized windshield may be painted to match the base



"Special Type"
with Double Valve

While lighter than the Standard, compares favorably in weight with any other manufacture and is priced to meet competition. The following advantages place it in a preferred position:

Cast and cored in one piece; exterior drip prevents staining; every valve provided with seat; Underwriters' approved projecting grate furnished at no additional cost, flat grate optional; exterior valve cast bronze, inner valve brass, both hung with bronze hinge pins and bronze bushings.



Type "W" for Wood Floor on Concrete

Note that removability of grate is not obstructed by flooring. Can be furnished with double or single valve

Installations

Space will not permit us to list the thousands of installations, so we name but a few of the more prominent users. Write for list of those in your locality.

American Can Co., Cincinnati, Ohio; San Francisco, Calif.;

Ogden City, Utah; Seattle, Wash.; Chicago, Ill.

J. C. Penney Co., New York, N. Y.

Standard Oil Co., Long Island City, N. Y.

B. & O. R. R. Co. Warehouses, Philadelphia and Pittsburgh, Pa.

Fisher Body Corp., Cleveland, Ohio; Detroit, Mich.

Real Silk Hosiery Co., Indianapolis, Ind.

Underwriters Building, New York, N. Y.

Cooper Dry Goods Co., Los Angeles, Calif.

Westinghouse Electric & Mfg. Co., Cincinnati, Ohio; Pittsburgh, Pa.

International Shoe Co., St. Louis, Mo.

General Electric Co., Los Angeles, Calif.; Newark, N. J.

Studebaker Buildings, South Bend, Ind.; Detroit, Mich.

Victor Talking Machine Co., Camden, N. J.

Packard Motor Co., Chicago, Ill.

Otis Elevator Co., Yonkers, N. Y.; Harrison, N. J.

Liggett & Myers Tobacco Co., Richmond, Va.

Sears, Roebuck & Co., Kansas City, Mo.

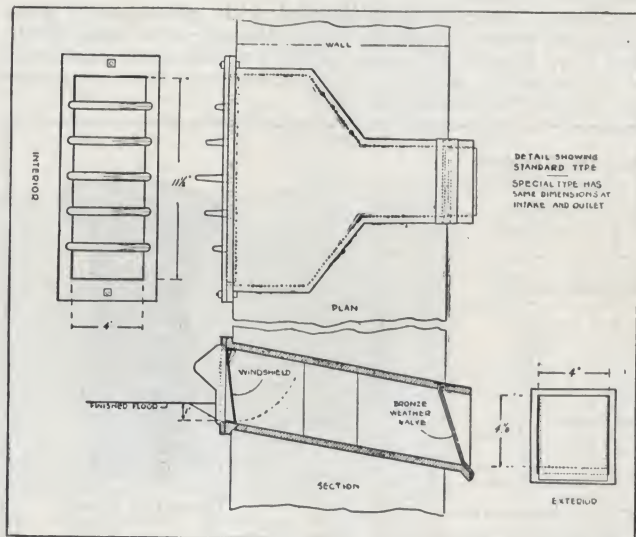
Canadian Rail & Harbor Terminal, Toronto, Ont.

Eli Lilly Co., New Orleans, La.

Southern Bell Telephone & Telegraph Co., Montgomery, Ala.

R. H. Macy & Co., New York, N. Y.

American Optical Co., Southbridge, Mass.



OLNEY J. DEAN & CO.

TELEPHONE
RANDOLPH 3600

Manufacturers of Scuppers and Concrete Inserts

137 South La Salle Street
CHICAGO, ILL.

BRANCH OFFICES

MILWAUKEE, WIS., 228 Third St.

DEALERS

MINNEAPOLIS, MINN., 732 McKnight Building

SOUTH BEND, IND. INDIANAPOLIS, IND. CEDAR RAPIDS, IOWA FORT WAYNE, IND. MOLINE, ILL. SIOUX CITY, IOWA

Products

DEAN'S CHICAGO TYPE SCUPPERS.

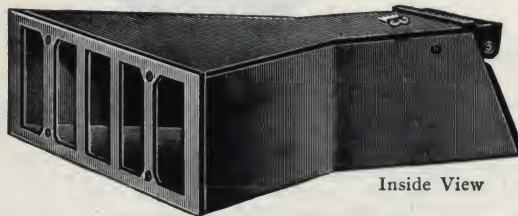
DEAN'S CONCRETE INSERTS.

Also Reinforcing Steel, Wire Mesh, Beam Wrapping, Spirals, Spacers, Griptite Sleeper Anchors.

Dean's Chicago Scuppers

Advantages—Windproof and rainproof, designed to meet the requirements of the National Board of Fire Underwriters. Reduce insurance rates 3 to 5 per cent. Initial cost low in comparison to this annual saving. Reduce water losses and interruption to business in case of fire by draining the water directly to the outside of the building. Protect goods on the floor in case of breaks in water or sprinkler system. Protect wood floors from standing water.

Therefore use scuppers in every building.



Inside View



Outside View
Dean's Chicago Scupper

Construction—Our Chicago scupper has 48-sq. in. capacity at the inlet and 16-sq. in. capacity at the outlet.

The wide inlet increases the water pressure on the flap at the outlet. This flap is hung on bronze pins at such an angle that its weight holds it snug against the walls of the scupper making it windtight and watertight, but a very small flow of water from within will open it. A small shelf projecting from the outside of the scupper protects the hinges and valve from clogging with mortar, dirt or ice. The grating within prevents clogging from the inside of the building and allows a clear inspection of the interior of the scupper at all times.

Check Valve—While the careful fitting of the outer flap makes the Chicago scupper windproof, we can, if desired, insert an additional check valve in the box.

Installation—The National Fire Protection Association

recommends under ordinary conditions, one scupper having an outlet area of 16 sq. in. to every 1000 sq. ft. of floor, or, in a building equipped with a sprinkler system, one to every 500 sq. ft. of floor. The Dean Chicago Type Scupper complies fully with this recommendation.

It is not necessary to slope the floor with a Dean scupper. If the inside end is placed well below the finished floor line and the scupper given a pitch of 2 to 12 in. outward, perfect drainage will be secured.

Specification

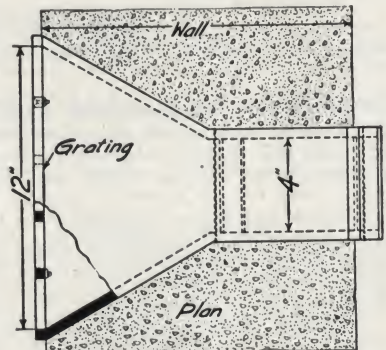
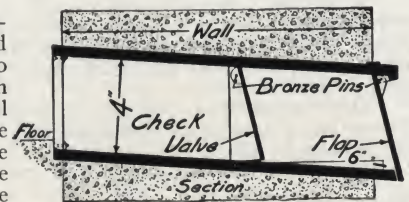
The mason contractor shall furnish and set one Dean Chicago Type Scupper in each bay of the exterior wall as shown on plans. The scuppers are to meet the recommendations of the National Board of Fire Underwriters, having well fitted and non-clogging outside flaps hung on bronze pins and removable inside gratings. They shall have inlets at least 12 in. wide and outlet areas of at least 16 sq. in. They shall be set in the masonry walls at each floor level above the ground floor as shown on details. Care must be taken in setting the scuppers to see that the pitch is not less than 2 in. in 12 in., that the lower inside edges of scuppers are set 1 in. below finished floor line, and that scuppers are set true to wall lines and are not sprung or broken during construction work.

On completion of the job, flaps must be cleaned and left in perfect working order and all exposed parts of scuppers are to be cleaned and given a heavy coat of paint.

Service

A complete stock of all sizes of scuppers is kept in the Chicago warehouse.

Chicago being centrally located with exceptionally good package car service on all railroads, delivery can be made within a few days' time to all points. This is an important consideration in regard to scuppers, as they are very often forgotten until actually needed on the job.



Section and Plan of Dean's Chicago Scupper

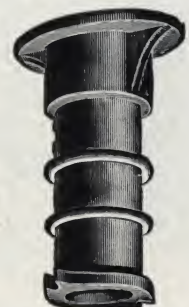


Slotted or Adjustable

DEAN'S CONCRETE INSERTS

Size bolt, in.	Allowable load, lb.	Height out to out, in.	Shipping wt. per 100, lb.
Slotted or Adjustable Inserts			
3/8	800	2	30
1/2	1500	2 1/2	47.5
5/8	2400	3 1/2	84
3/4	3600	4 1/4	130
7/8	5000	4 3/4	190
Threaded Inserts			
5/8	1200	3 3/8	75
3/4	1800	3 3/8	75

Drilling Holes in Your Concrete Is Expensive—Use Inserts



Threaded Insert

ESTABLISHED 1899

THE STEPHENSON MANUFACTURING COMPANY

Manufacturers of The Stephenson Underground Garbage Receivers

48 Farrar Street, LYNN, MASS.

ALL GOODS SOLD DIRECT FROM FACTORY

Products

"THE STEPHENSON" STANDARD UNDERGROUND GARBAGE RECEIVER; UNDERFLOOR ASH AND REFUSE RECEIVERS.

Also Underground Street Sweepings Receiver; Spiral Truss Ribbed Ash Barrel; Half-round Garbage Bucket; All-steel Ash Barrel Truck; Indoor Chemical Closets.

The Stephenson Has Many Exclusive Features

(1) **Odorless**—The Stephenson Garbage Receiver is constructed with a 2-in. air space around all sides of the inside receptacle as well as beneath it, allowing a free circulation of air at all times—thus preventing odors.

(2) **Neat**—The deep 4-in. chute extends down into the garbage receptacle absolutely preventing spilling of garbage on outside of the bucket. As all but the cover of the receiver is underground, it is practically out of sight, yet always handy.

(3) **Will Not Retain Surface Water**—The outer casing has an open frame at bottom which holds the can centered, but lets any moisture sink into the ground below. A patented feature.

(4) **Built to Last for a Generation**—Not only is the inside garbage receptacle built for long service, but the outside casing is constructed in an especially sturdy manner. The heavy galvanized iron cylinder is supported by a strong casting top and bottom, tied together with 6 heavy rods.

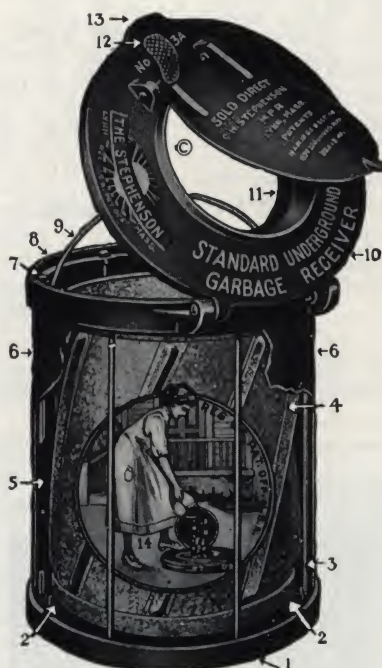
(5) **Heavy Cover Opens at Touch of Foot**—The cover of The Stephenson Garbage Receiver is of very heavy cast iron that cannot be broken even if the wheels of a cart should run over it. Impossible for dogs or cats to move, yet cover lifts easily with a slight pressure of the foot.

(6) **Cast Iron Superior to Cement**—Cement absorbs grease and moisture. The heat of the sun's rays ferments the grease, giving forth noxious odors. The action of frost on the moisture filled cement cracks it. A cement receiver is a most *unsanitary* and *impractical* garbage receptacle.



The Stephenson Standard Underground Garbage Receiver

As it appears when in the ground



The Stephenson Standard Underground Garbage Receiver
Nos. 2A and 3A

As it appears out of the ground, with casing cut open to show construction

(1) Cast-iron bottom ring with special three-point centering device.

(2) Two of the three lugs for centering bucket.

(3) One of the pipes connecting top and bottom rings.

(4) One of the eight special spiral truss ribs on The Stephenson Inside Bucket No. 3A.

(5) 2-in. ventilating space—a vital feature.

(6) Outside casing broken away to show construction of receiver with The Stephenson Spiral Truss Ribbed bucket No. 3A, 18 in. diam., 25 in. high. No. 2A bucket, without spiral truss ribs, 14 in. diam. 22 in. high.

(7) One of the twelve connecting pipe bolts.

(8) Cast iron top ring.

(9) Bail to lift out spiral bucket.

(10) Cast iron removal cover with special conical chute 14 in. diam. at top, 9 in. diam. at bottom and 4 in. deep.

(11) This deep chute prevents any chance of garbage falling outside of the bucket.

(12) Cast iron self-closing receiving cover 14 in. diam. with special foot trip and hand lift.

(13) Removal cover guarded hand lift. Very important.

(14) Receiver in the ground with maid using foot-trip, leaving both hands free to empty garbage.

Sizes

No. 2A Stephenson Standard Underground Garbage Receiver—Inside bucket 14 in. diameter, 22 in. high, capacity 12 bulk gallons. Receiver 20 in. diameter, 29 in. high over all. Weight complete, 121 lbs.

No. 3A Stephenson Standard Underground Garbage Receiver—Inside bucket 18 in. diameter, 24 in. high, with special spiral truss ribs. Capacity 23½ bulk gallons. Receiver 24 in. diameter, 31 in. high over all. Weight complete, 175 lbs.

No. 4 Stephenson Standard Underfloor Refuse Receiver—Inside bucket 18 in. diameter, 24 in. high, with special spiral truss ribs. Capacity 23½ bulk gallons. Receiver 29 in. diameter, 29 in. high over all. Weight complete, 200 lbs.

Installation

Just dig a hole about 6 in. deeper than the receiver—throw in a few broken stones as for a blind drain—set the receiver on this stone flooring and replace earth around it. The Stephenson Standard Underground Garbage Receiver is now ready to give a generation of service to the owner.

Catalogue

Catalogue and quotations upon request.

Some Recent Installations

Ludlow Jute Co., Calcutta, Ind., 12 No. 2A
Bemis Bro. Bag Co., Jackson, Tenn., 54 No. 2A,
2 No. 3A
Lawton Mills, Plainfield, Conn., 63 No. 2A
Lancaster Mills, Clinton, Mass., 56 No. 3A, 70
No. 2A
Southwestern Louisiana Institute, Lafayette, La.,
10 No. 3A
Smith College, Northampton, Mass., 25 No. 3A,
1 No. 2A
Lynn Hospital, Lynn, Mass., 12 No. 3A

Underfloor Refuse Receiver No. 4 (Flush Top)

The Stephenson Standard Underfloor Refuse Receiver is designed for use in factories, garages, basements, etc., for the storage of oily waste, sweepings and refuse. As it sets flush with floor or driveway, it takes up no valuable space.



The Stephenson Standard Underfloor Refuse Receiver

As it appears when in the ground

RECEIVADOR SALES COMPANY

418-419 Ashton Building
GRAND RAPIDS, MICH.

The Receivador

Description—The Receivador is a metal parcel receiver of two or more compartments installed in the exterior or interior walls or doors of a building. Its purpose is to receive and safeguard delivered packages in the absence or pre-occupation of the owner. Each compartment has two doors, one inside and one out, provided with a non-pickable lock and operated by the simple turn of a thumb bolt. An interlocking device makes it impossible to open both doors at the same time, thereby preventing ingress through the Receivador.

Operation—The delivery man inserts the package and turns the thumb bolt which automatically engages the interlock and prevents outside door being again opened until package is removed by way of the inside door. When the inside door is closed and the thumb bolt turned, the outside lock is automatically released, permitting door to be opened. The design of the lock makes its action reliable and unfailing.

In apartments, where deliveries are made from a central station, we can furnish Receivadors with Master Key Locks, permitting service man to make deliveries at will.

The installation of the Receivador cabinet in no way interferes with the normal operation of the door.

Construction

The standard Receivador consists of two compartments, upper and lower. The lower compartment as shown below, contains a regulation suit box, shoe box and corset box with ample room for other small parcels.

The cabinet is made of sheet steel and possesses the utmost strength and rigidity. Its parts are electrically



"The Automatic Servant"
TRADE-MARK

welded; no bolts or screws are used in its assembly. The doors are built up of two sheets of steel electrically welded together with a sheet of insulating material between. This insulation is effective against extreme heat and cold.

Sizes

For special requirements we furnish single compartment cabinets, or the number of compartments may be increased to three or more arranged either horizontally or vertically. The rigidity of multiple compartments is accomplished by welding and bolting the units together.

Where Used

The Receivador is used in service entrance doors or walls of residences and clubs, also in corridor doors or walls of apartments, clubs, etc. It is extensively specified by leading architects for the better class of homes and apartments.

Specifications

It is suggested that the following be written into the general specifications.

Receivador—Furnish and install complete and finish according to architect's directions double Steel Receivadors, manufactured by the RECEIVADOR SALES COMPANY, Grand Rapids, Mich., as shown on the plans. Where Receivadors are to be installed in a door, the door must be furnished by the contractor with the proper opening for the Receivador Cabinet.

Where Receivadors are to be installed in a wall, frames and trim must be furnished by the contractor. For door installations, stiles must be 5 in. wide. For wall installations, allow ¼ to ½-in. clearance in the rough opening.



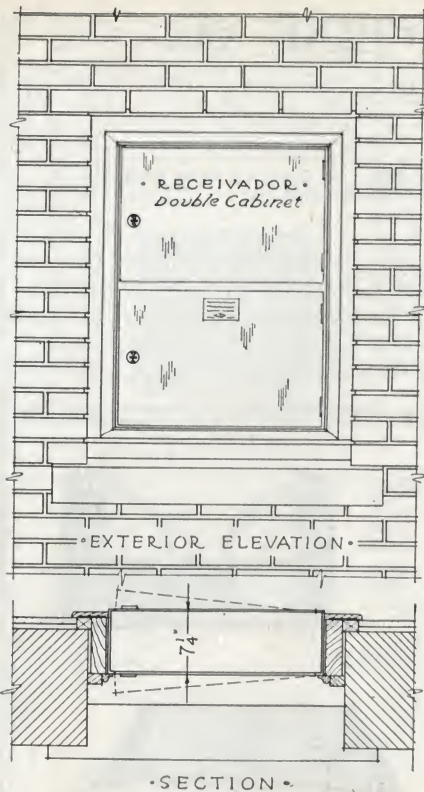
STANDARD
RECEIVADOR
CABINET

Double compartment units			Single compartment units			Size door ft. in.
No.	Wt., lb.*	Dim., in. H. x W.	No.	Wt., lb.*	Dim., in. H. x W.	
5	80	32x20	1	45	16x20	2 6
6	84	32x22	2	47	16x22	2 8
7	84	32x24	3	48	16x24	2 10
8	94	32x26	4	50	16x26	3 0

All cabinets 6 ¼ in. deep inside, 7 ¼ in. over all. Any number of compartments can be used by adding single units. *Crated.

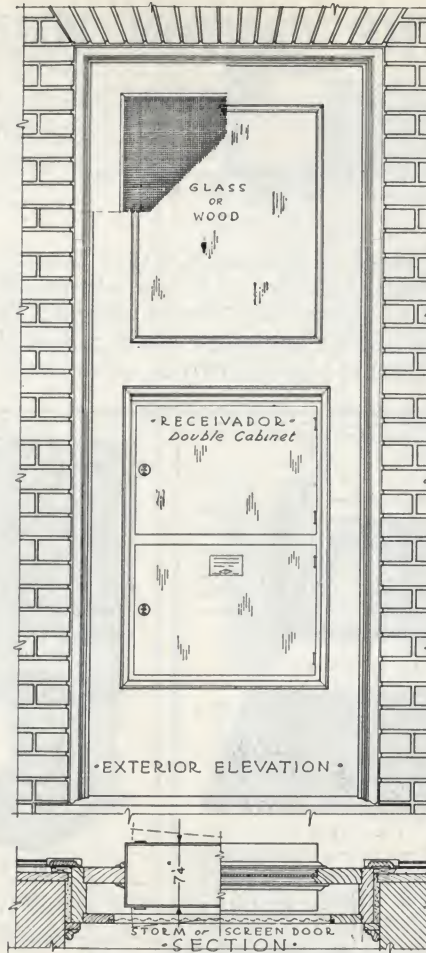
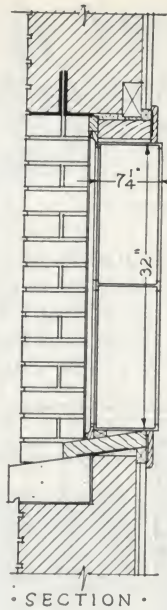


Articles Are Received Through Outside Door and Safeguarded Until Removed Through Inside Door

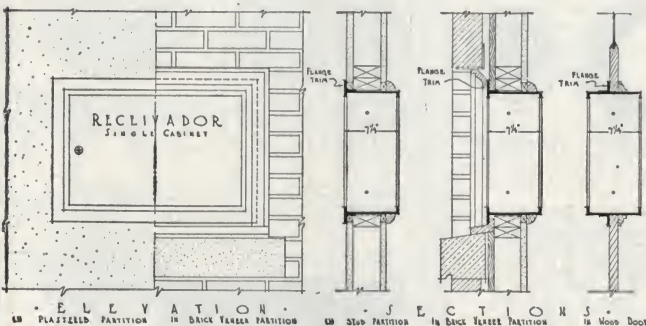


NOTES:
FRAMES TO BE MADE 1/2 INCH WIDER AND 1/4 INCH HIGHER THAN RECEIVADOR DIMENSIONS...
STANDARD FRAMES MAY BE USED...
FRAMES MUST BE SET SQUARE...

Double Receivador Cabinet in Wall of Brick Building



Double Receivador Cabinet Installed in Wood Door



Flange Trim for Receivadors

Flange trim is electrically welded to the Receivador, off center for installing in a door, or flush for wall installation.
For corridor wall installation leave proper opening and, after plastering, insert Receivador from corridor side, thus saving carpenter's time and insuring a neat, tight job. Flange trim can be supplied with all Receivadors, whether single or multiple units, at small extra cost.

Finish

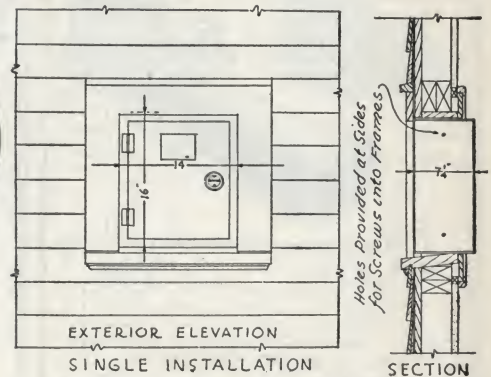
All cabinets finished with one coat best non-rust, baked olive green enamel. Special grained finishes in mahogany, walnut and quartered oak at slight extra cost.

Prominent Users

Wellington Arms Apartments, Chicago, Ill.
Westbrook Apartments, Buffalo, N. Y.
Franchette Apartments, New York, N. Y.
Shorecrest Apartments, Milwaukee, Wis.
Davies Apartments, Cincinnati, Ohio
Flamingo Hotel, Chicago, Ill.
Loutellus Apartments, Pittsburgh, Pa.
Sewell Apartments, Miami, Fla.
Fred Boylon, Grand Rapids, Mich.
C. E. Reichle & Co., Detroit, Mich.



Non-pickable Door Locks and Interlock



Receivador Junior Installed in Wall

Note: Receivador Junior fits between studding 16 in. on centers. Double installation is similar to installation of the standard type Receivador.

Receivador Junior, Style No. 21

Designed especially for moderate priced homes and apartments for receiving milk and other small packages. Same welded construction and material as the standard type with same non-pickable, automatic locks. Cheaper and more sanitary than wood. Proof against dust, vermin and storms.

Single compartment: width, 14 in.; height, 16 in.; depth through, 7 1/4 in., weight 27 lb.

Double compartment: width, 14 in.; height, 32 in.; depth through, 7 1/4 in.

THE CANTON FOUNDRY & MACHINE CO.

Manufacturers of Building Specialties
CANTON, OHIO

NEW YORK OFFICE: 101 West 31st Street
Telephone, Pennsylvania 6727, 6728

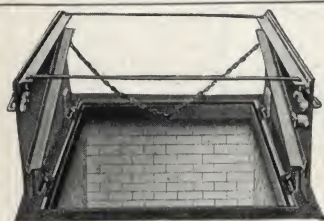
CHICAGO OFFICE: 10 South La Salle Street
Telephone, Franklin 4724

Products

SIDEWALK DOORS; COALHOLE COVERS; SIDEWALK VENTILATORS; AREA GRATINGS; ILLUMINATING IRON SIDEWALK PLATES; SIDEWALK GUTTER BOXES; CONDUCTOR CONNECTIONS; CONDUCTOR BOOTS; ASH PIT DOORS; STACK DOORS; COAL CHUTES (Foundation);

COAL DOORS; COLUMNS (Cast Iron); WHEEL GUARDS; VALVE COVERS; DRAIN COVERS; WATER METER COVERS; LAMPHOLE COVERS; CATCHBASIN COVERS; MANHOLE COVERS; STREET DRAIN BOXES; STREET CASTINGS.

For Automobile Turntables, see pages C3388-3389.

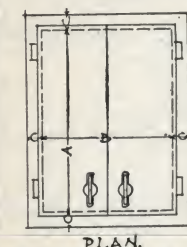


OPEN - WITH STAY ROD AND CHAIN

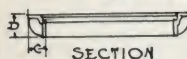
Furnished in sizes shown by the three tables on this page



CLOSED



PLAN.



SECTION

A	B	C	D	A	B	C	D
in	in	in	in	in	in	in	in
30	42	4 1/2	4	48	60	4 1/2	4
30	48	4 1/2	4	48	66	4 1/2	4
30	54	4 1/2	4	48	72	4 1/2	4
30	60	4 1/2	4	48	78	4 1/2	4
30	66	4 1/2	4	48	84	4 1/2	4
30	72	4 1/2	4	48	90	4 1/2	4
30	78	4 1/2	4	48	96	4 1/2	4
30	84	4 1/2	4	48	102	4 1/2	4
30	90	4 1/2	4	48	108	4 1/2	4
30	96	4 1/2	4	48	114	4 1/2	4
30	102	4 1/2	4	48	120	4 1/2	4
30	108	4 1/2	4	48	126	4 1/2	4
30	114	4 1/2	4	48	132	4 1/2	4
30	120	4 1/2	4	48	138	4 1/2	4
30	126	4 1/2	4	48	144	4 1/2	4
30	132	4 1/2	4	48	150	4 1/2	4
30	138	4 1/2	4	48	156	4 1/2	4
30	144	4 1/2	4	48	162	4 1/2	4
30	150	4 1/2	4	48	168	4 1/2	4
30	156	4 1/2	4	48	174	4 1/2	4
30	162	4 1/2	4	48	180	4 1/2	4
30	168	4 1/2	4	48	186	4 1/2	4
30	174	4 1/2	4	48	192	4 1/2	4
30	180	4 1/2	4	48	198	4 1/2	4
30	186	4 1/2	4	48	204	4 1/2	4
30	192	4 1/2	4	48	210	4 1/2	4
30	198	4 1/2	4	48	216	4 1/2	4
30	204	4 1/2	4	48	222	4 1/2	4
30	210	4 1/2	4	48	228	4 1/2	4
30	216	4 1/2	4	48	234	4 1/2	4
30	222	4 1/2	4	48	240	4 1/2	4
30	228	4 1/2	4	48	246	4 1/2	4
30	234	4 1/2	4	48	252	4 1/2	4
30	240	4 1/2	4	48	258	4 1/2	4
30	246	4 1/2	4	48	264	4 1/2	4
30	252	4 1/2	4	48	270	4 1/2	4
30	258	4 1/2	4	48	276	4 1/2	4
30	264	4 1/2	4	48	282	4 1/2	4
30	270	4 1/2	4	48	288	4 1/2	4
30	276	4 1/2	4	48	294	4 1/2	4
30	282	4 1/2	4	48	300	4 1/2	4
30	288	4 1/2	4	48	306	4 1/2	4
30	294	4 1/2	4	48	312	4 1/2	4
30	300	4 1/2	4	48	318	4 1/2	4
30	306	4 1/2	4	48	324	4 1/2	4
30	312	4 1/2	4	48	330	4 1/2	4
30	318	4 1/2	4	48	336	4 1/2	4
30	324	4 1/2	4	48	342	4 1/2	4
30	330	4 1/2	4	48	348	4 1/2	4
30	336	4 1/2	4	48	354	4 1/2	4
30	342	4 1/2	4	48	360	4 1/2	4
30	348	4 1/2	4	48	366	4 1/2	4
30	354	4 1/2	4	48	372	4 1/2	4
30	360	4 1/2	4	48	378	4 1/2	4
30	366	4 1/2	4	48	384	4 1/2	4
30	372	4 1/2	4	48	390	4 1/2	4
30	378	4 1/2	4	48	396	4 1/2	4
30	384	4 1/2	4	48	402	4 1/2	4
30	390	4 1/2	4	48	408	4 1/2	4
30	396	4 1/2	4	48	414	4 1/2	4
30	402	4 1/2	4	48	420	4 1/2	4
30	408	4 1/2	4	48	426	4 1/2	4
30	414	4 1/2	4	48	432	4 1/2	4
30	420	4 1/2	4	48	438	4 1/2	4
30	426	4 1/2	4	48	444	4 1/2	4
30	432	4 1/2	4	48	450	4 1/2	4
30	438	4 1/2	4	48	456	4 1/2	4
30	444	4 1/2	4	48	462	4 1/2	4
30	450	4 1/2	4	48	468	4 1/2	4
30	456	4 1/2	4	48	474	4 1/2	4
30	462	4 1/2	4	48	480	4 1/2	4
30	468	4 1/2	4	48	486	4 1/2	4
30	474	4 1/2	4	48	492	4 1/2	4
30	480	4 1/2	4	48	498	4 1/2	4
30	486	4 1/2	4	48	504	4 1/2	4
30	492	4 1/2	4	48	510	4 1/2	4
30	498	4 1/2	4	48	516	4 1/2	4
30	504	4 1/2	4	48	522	4 1/2	4
30	510	4 1/2	4	48	528	4 1/2	4
30	516	4 1/2	4	48	534	4 1/2	4
30	522	4 1/2	4	48	540	4 1/2	4
30	528	4 1/2	4	48	546	4 1/2	4
30	534	4 1/2	4	48	552	4 1/2	4
30	540	4 1/2	4	48	558	4 1/2	4
30	546	4 1/2	4	48	564	4 1/2	4
30	552	4 1/2	4	48	570	4 1/2	4
30	558	4 1/2	4	48	576	4 1/2	4
30	564	4 1/2	4	48	582	4 1/2	4
30	570	4 1/2	4	48	588	4 1/2	4
30	576	4 1/2	4	48	594	4 1/2	4
30	582	4 1/2	4	48	600	4 1/2	4
30	588	4 1/2	4	48	606	4 1/2	4
30	594	4 1/2	4	48	612	4 1/2	4
30	600	4 1/2	4	48	618	4 1/2	4
30	606	4 1/2	4	48	624	4 1/2	4
30	612	4 1/2	4	48	630	4 1/2	4
30	618	4 1/2	4	48	636	4 1/2	4
30	624	4 1/2	4	48	642	4 1/2	4
30	630	4 1/2	4	48	648	4 1/2	4
30	636	4 1/2	4	48	654	4 1/2	4
30	642	4 1/2	4	48	660	4 1/2	4
30	648	4 1/2	4	48	666	4 1/2	4
30	654	4 1/2	4	48	672	4 1/2	4
30	660	4 1/2	4	48	678	4 1/2	4
30	666	4 1/2	4	48	684	4 1/2	4
30	672	4 1/2	4	48	690	4 1/2	4
30	678	4 1/2	4	48	696	4 1/2	4
30	684	4 1/2	4	48	702	4 1/2	4
30	690	4 1/2	4	48	708	4 1/2	4
30	696	4 1/2	4	48	714	4 1/2	4
30	702	4 1/2	4	48	720	4 1/2	4
30	708	4 1/2	4	48	726	4 1/2	4
30	714	4 1/2	4	48	732	4 1/2	4
30	720	4 1/2	4	48	738	4 1/2	4
30	726	4 1/2	4	48	744	4 1/2	4
30	732	4 1/2	4	48	750	4 1/2	4
30	738	4 1/2	4	48	756	4 1/2	4
30	744	4 1/2	4	48	762	4 1/2	4
30	750	4 1/2	4	48	768	4 1/2	4
30	756	4 1/2	4	48	774	4 1/2	4
30	762	4 1/2	4	48	780	4 1/2	4
30	768	4 1/2	4	48	786	4 1/2	4
30	774	4 1/2	4	48	792	4 1/2	4
30	780	4 1/2	4	48	798	4 1/2	4
30	786	4 1/2	4	48	804	4 1/2	4
30	792	4 1/2	4	48	810	4 1/2	4
30	798	4 1/2	4	48	816	4 1/2	4
30	804	4 1/2	4	48	822	4 1/2	4
30	810	4 1/2	4	48	828	4 1/2	4
30	816	4 1/2	4	48	834	4 1/2	4
30	822	4 1/2	4	48	840	4 1/2	4
30	828	4 1/2	4	48	846	4 1/2	4
30	834	4 1/2	4	48	852	4 1/2	4
30	840	4 1/2	4	48	858	4 1/2	4
30	846	4 1/2	4	48	864	4 1/2	4
30	852	4 1/2	4	48	870	4 1/2	4
30	858	4 1/2	4	48	876	4 1/2	4
30	864	4 1/2	4	48	882	4 1/2	4
30	870	4 1/2	4	48	888	4 1/2	4
30	876	4 1/2	4	48	894	4 1/2	4
30	882	4 1/2	4	48	900	4 1/2	4
30	888	4 1/2	4	48	906	4 1/2	4
30	894	4 1/2	4	48	912	4 1/2	4
30	900	4 1/2	4	48	918	4 1/2	4
30	906	4 1/2	4	48	924	4 1/2	4
30	912	4 1/2	4	48	930	4 1/2	4
30	918	4 1/2	4	48	936	4 1/2	4
30	924	4 1/2	4	48	942	4 1/2	4
30	930	4 1/2	4	48	948	4 1/2	4
30	936	4 1/2	4	48	954	4 1/2	4
30	942	4 1/2	4	48	960	4 1/2	4
30	948	4 1/2	4	48	966	4 1/2	4
30	954	4 1/2	4	48	972	4 1/2	4
30	960	4 1/2	4	48	978	4 1/2	4
30	966	4 1/2	4	48	984	4 1/2	4
30	972	4 1/2	4	48	990	4 1/2	4
30	978	4 1/2	4	48	996	4 1/2	4
30	984	4 1/2	4	48	1002	4 1/2	4
30	990	4 1/2	4	48	1008	4 1/2	4
30	996	4 1/2	4	48	1014	4 1/2	4
30	1002	4 1/2	4	48	1020	4 1/2	4
30	1008	4 1/2	4	48	1026	4 1/2	4
30	1014	4 1/2	4	48	1032	4 1/2	4
30	1020	4 1/2	4	48	1038	4 1/2	4
30	1026	4 1/2	4	48	1044	4 1/2	4
30	1032	4 1/2	4	48	1050	4 1/2	4
30	1038	4 1/2	4	48	1056	4 1/2	4
30	1044	4 1/2	4	48	1062	4 1/2	4
30	1050	4 1/2	4	48	1068	4 1/2	4
30	1056	4 1/2	4	48	1074	4 1/2	4
30	1062	4 1/2	4	48	1080	4 1/2	4
30	1068	4 1/2	4	48	1086	4 1/2	4
30	1074	4 1/2	4	48	1092	4 1/2	4
30	1080	4 1/2	4	48	1098	4 1/2	4
30	1086	4 1/2	4	48	1104	4 1/2	4
30	1092	4 1/2	4	48	1110	4 1/2	4
30	1098	4 1/2	4	48	1116	4 1/2	4
30	1104	4 1/2	4	48	1122	4 1/2	4
30	1110	4 1/2	4	48	1128	4 1/2	4
30	1116	4 1/2	4	48	1134	4 1/2	4
30	1122	4 1/2	4	48	1140	4 1/2	4
30	1128	4 1/2	4	48	1146	4 1/2	4
30	1134	4 1/2	4	48	1152	4 1/2	4
30	1140	4 1/2	4	48	1158	4 1/2	4
30	1146	4 1/2	4	48	1164	4 1/2	4
30	1152	4 1/2	4	48			

THE SAMUEL J. CRESWELL IRON WORKS

Twenty-third and Cherry Streets
PHILADELPHIA, PA.

Products

ARCHITECTURAL WROUGHT and CAST IRON WORK, and GENERAL FOUNDRY WORK, including Columns, Stairways (straight and spiral), Wheel Guards, Standards, Manhole Doors and Frames, Fenders, Roadway Drain Grates and Frames, Vault Plates and Frames, Ash Pit Doors and Frames, Cleanout Doors and Frames, Trench Covers and Frames, Cesspools, Drain Gutters, Pavement Doors, Gates and Grilles, Post Caps, Railings, etc.

Facilities

THE SAMUEL J. CRESWELL IRON WORKS is one of the largest and best equipped plants in the vicinity of Philadelphia for the production of the various kinds of architectural wrought and cast iron work mentioned above. Further, this company is prepared to submit estimates, or designs and estimates, for any ornamental work for large or small buildings, etc., on short notice.

General Foundry Work

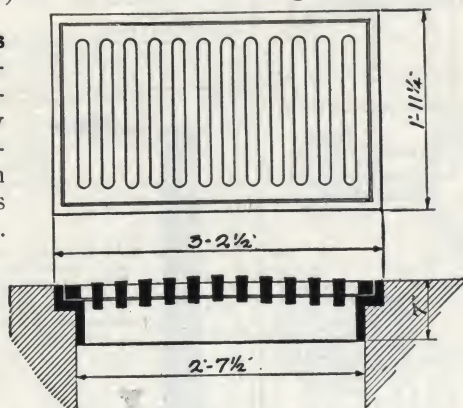
In addition to architectural work, a fully equipped foundry is prepared to produce special castings and do general foundry work, including cast iron ornamental or plain columns from stock designs (sent on request) or to architects' designs.

Stock Specialties

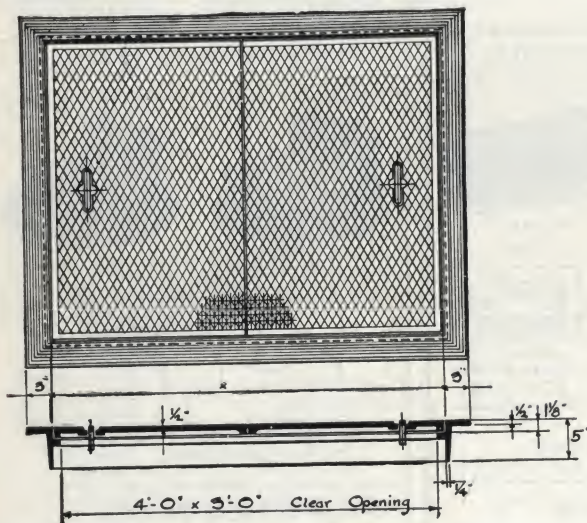
The accompanying illustrations show a few specialties regularly carried in stock. The prices quoted are f. o. b. Philadelphia.

Catalogue

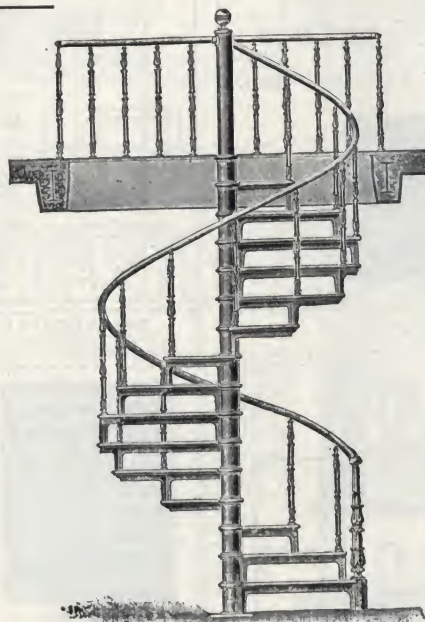
A catalogue illustrating the entire line, and discounts, will be sent on request.



No. 3 Sewer Inlet
Price, \$22.00



No. 34 Manhole Cover
Price, \$38.00. Extra heavy pattern, price, \$45.00



Spiral Stairway

Following sizes stock pattern, 3'6", 4', 4'6", 5', 5'6" and 6' diameters. Any height



No. 15 Fender
9" projection
3' 5" high



**Nos. 16 and 17
Corner Fenders**

Wall	Price
9"	\$25.00
13"	25.50
18"	27.50
22"	30.00
24"	35.00

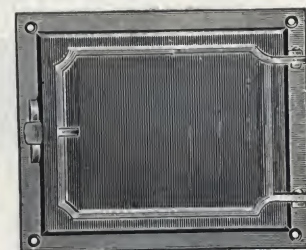
Design No.	Projection	Height	Price
16	9"	3' 5"	\$10.00
17	9"	2' 8"	9.00
17A	14"	3' 0"	25.00
17B	8 3/8"	2' 0"	9.00

Can be made for walls to 36 in. thick.



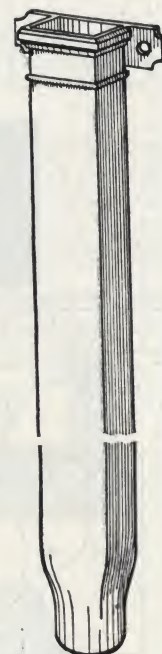
**No. 9 Ash Dump for
Fireplaces**

Opening	Price
6" x 6"	\$1.25
6" x 8"	1.50



**No. 8 Cleanout Doors and
Frames**

Width	Height	Price
20"	16"	\$5.00
16"	24"	7.00
16"	12"	3.50
12"	12"	2.25
12"	10"	2.00
10"	8"	1.75
9"	7"	1.25
8"	6"	1.25
7"	5"	1.25



**No. 4
Rain Conductor Shoes**
3"x4"

Length	Price
5'0"	\$7.25
4'0"	6.50
3'0"	5.00
2'0"	4.00
1'6"	3.00
1'0"	2.00

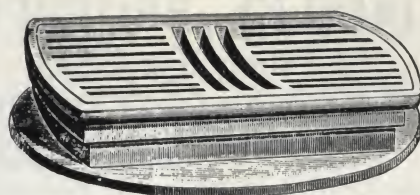
We have patterns for other sizes. Prices on application.



No. 1 Manhole Door and Frame

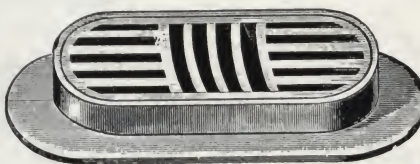
Width	Height	Price	Width	Height	Price
36"	36"	\$30.00	24"	30"	\$11.75
33"	49"	30.00	24"	24"	11.00
24"	48"	20.00	20"	24"	10.00
24"	36"	12.50	18"	24"	8.50

All manhole doors and frames have return flanges 4 in. deep.



No. 10 Roadway Drain Grate and Frame

13 1/4" x 24 1/2" grating.....\$9.00
12" x 18" grating..... 8.00



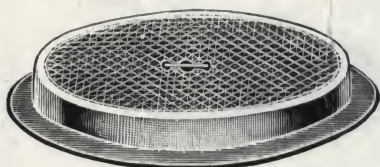
No. 11 Roadway Drain Grate and Frame

11" x 22 1/2" grating.....\$6.00
8 1/4" x 17 1/4" grating..... 4.00



No. 3 Manhole Door and Frame

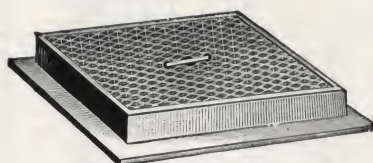
Width	Height	Price	Width	Height	Price
24"	36"	\$12.50	16"	24"	\$7.50
24"	24"	11.00	18"	18"	8.00
18"	24"	8.50			



No. 3 Vault Plate and Frame;
No. 4 Vault Grating and Frame

Size	Price	Size	Price
12"	\$3.00	20"	\$7.00
14"	4.00	24"	9.50
16"	5.00	30"	22.00
18"	6.00	34"	25.00

Depth of frame, 3 in.

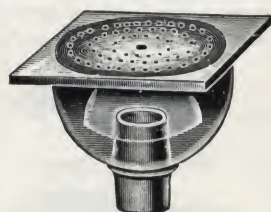


No. 7 Vault Plate and Frame;
No. 8 Vault Grating and Frame

Size	Price	Size	Price
36"x36"	\$32.50	7 1/2" x 7 1/2"	\$2.50
30"x30"	21.50	14"x24"	8.50
24"x24"	12.00	18"x24"	10.00
20"x20"	10.25	18"x30"	12.00
18"x18"	9.00	18"x36"	15.00
16"x16"	7.50	24"x30"	16.00
14"x14"	6.00	24"x36"	21.00
12"x12"	3.75	24"x42"	24.00
		24"x48"	30.00

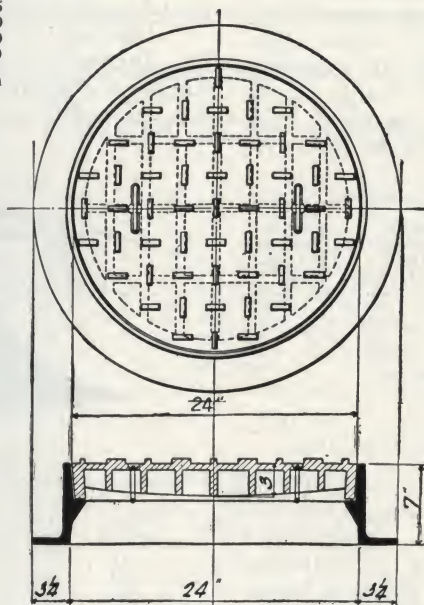
Depth of frame, 3 in.

All sizes can be made extra heavy at additional cost.



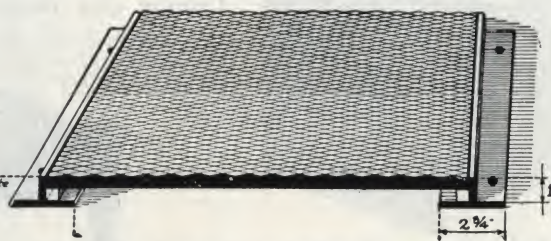
No. 21 Bell Trap

12"x12", 4-in. outlet.
Price, painted.....\$2.50



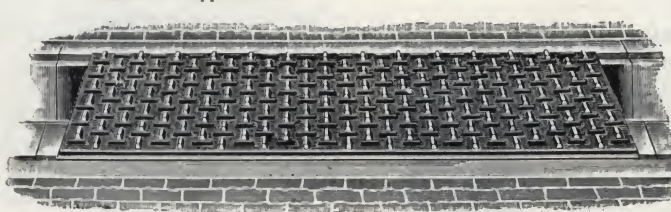
No. 19 Manhole Cover

Extra heavy for city use.....\$17.00
With concrete or asphalt filled cover..... 22.00



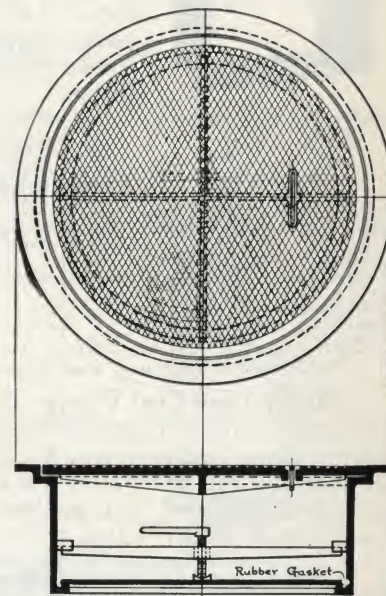
Cover and Curbing for Ducts or Trenches

Plates made to suit conditions. Curbing carried in stock.
Prices on application.



No. 28 Gutter Cover Plate

18" wide, 1" thick, \$3.00 per lineal ft.
24" wide, 1 1/2" thick, \$6.00 per lineal ft.

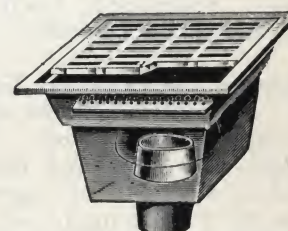


No. 23 Manhole Cover with Inside Lid

Lock bar with brass screw

Size	Price
36"	\$60.00
30"	42.50
24"	29.00
20"	26.50
18"	21.50

Depth of frame, 9 in.



No. 22 Bell Trap Cesspool

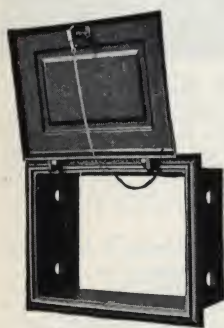
16"x16", 4-in. outlet.
Price\$6.00
12"x12", 4-in. outlet.
Price 4.50

Products

DONLEY PACKAGE RECEIVERS; COAL CHUTES; ASH DUMPS; FIREPLACE DAMPERS; ASH PIT DOORS; FIRE BASKETS; ANDIRONS; METER BOXES; GARBAGE RECEIVERS; MAIL RECEIVERS and other Building Specialties.

Donley Coal Chute

Replaces old-fashioned, battered coal windows. Protects foundation and siding. Locks when closed. Unlocks from within by pulling chain outside of coal bin.



Burglar-proof. Frames of unbreakable, malleable iron. Solid metal doors of copper-bearing steel, close fitting and rust-resisting. Glass doors protected by steel shield when open. Body of heavy weight, rust-resisting copper-bearing steel, reinforced upper edge. Hinges and latch of malleable iron. Latch and chain attachment galvanized against rust. Entire chute has neat, attractive design.

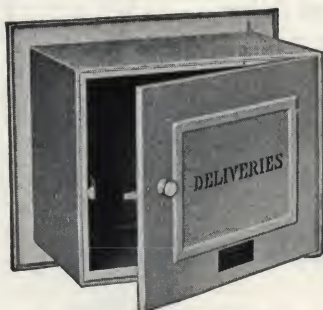
Description	Wall opening, in.	Straight body for 9-in. wall	Slanted bottom body for 13-in. wall	Slanted bottom body for 17-in. wall
Solid door, paneled, copper-steel.....	24x17	No. 29	No. 213*	.....
Glass door, cast iron, wire glass panel.....	24x17	No. 39	No. 313*	.....
Solid door, paneled, cast iron	32x22	.....	Straight body No. 613	No. 617*
Glass door, cast iron, glass panel.....	32x22	.....	No. 713	No. 717*

*Hopper optional. Hopper weights: small, 11 lb.; large, 19 lb.

Grade Line Coal Chute—For low set and terraced residences. Also frequently used for stores. This improved chute has provision for drainage. Drain has a strainer and can be connected with sewer. Constructed with checkered steel door, malleable iron frame and reinforced steel chute. Latch and chain galvanized.

Donley Package Receiver

A steel receptacle built into the outer wall of kitchen, for delivery of groceries, etc. Outer door locks automatically when closed; released automatically when inner door is opened. Installation detail furnished with every receiver. See following page. Approved by Good Housekeeping Institute.



Donley Package Receiver
Size: Outside height, 11 in.; width, 13½ in.; wall depth, 9 in.

Donley Underground Garbage Receiver

Prevents nuisances arising from ordinary garbage can. Consists of outer shell and inner receptacle that can be removed for emptying. Service lid of Parkerized steel operated by foot lever, which fits snugly, excluding flies. Made in 6, 10, 14, and 21-gal. capacities. Approved by Good Housekeeping Institute.



Donley Garbage Receiver

Donley Electric Meter Box

A steel cabinet built into basement wall where service wire enters. Supplied with 60-amp., 250-volt safety switch operated from basement. Meter read through glass pane from outside.

Large inner and outer doors. Height, 13½ in.; width, 16½ in.; wall depth, 10⅝ in.; shipping weight, 45 lbs.

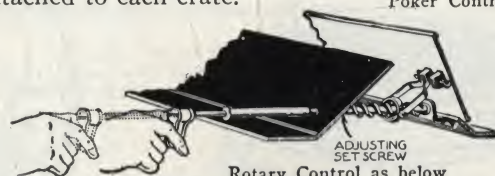
Donley Fireplace Damper

A correctly formed throat and draft regulator combined, the Donley damper simplifies correct fireplace construction and promotes clean, economical fires through proper draft regulation. Two types of control, as shown. See following page for correct damper size. For intermediate size openings use next largest damper.

Dampers crated separately. Instructions for building fireplaces and installing dampers attached to each crate.



Poker Control



Rotary Control as below

**Donley Fireplace Damper**

Damper No.		Size front, in.	Shipping weight, lb.
Rotary control	Poker control		
324	224	24	34
330	230	30	36
336	236	36	40
342	242	42	53
348	248	48	56
354	254	54	98
360	260	60	110
372	272	72	150

Donley Fire Basket

Made in 24, 28, 30, 34 and 40 in. sizes with respective shipping weights of 58, 64, 66, 73 and 86 lb. Depth of each, 15 in.



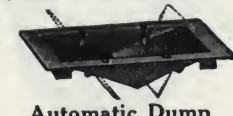
Donley Fire Basket

Meets demand for beautiful, substantial fire basket co-ordinated to wall angle that radiates most heat, as shown in plans on following page. Basket has removable ends.

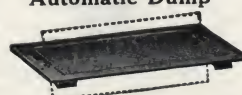
Donley Ash Dumps

Are iron trap doors in the hearth above the ash pit. Automatic, self-closing dumps are 5x7 in. in size. The Common dumps are 5x8 in.

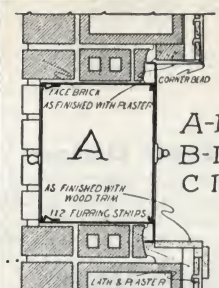
The most convenient method of ash disposal.



Automatic Dump

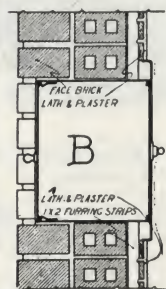


Common Dump

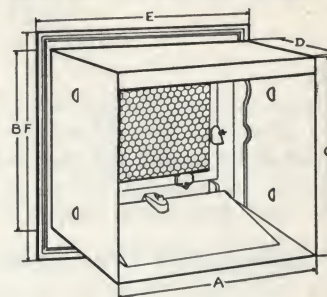
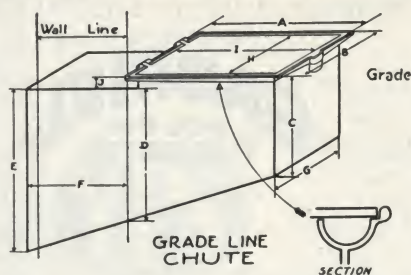


**DONLEY
PACKAGE
RECEIVER
INSTALLED**
A-In 13" Brick Wall
B-In 9" Brick Wall
C In Frame Wall

Height-11"
Width-13 1/2"
Wall Depth-9"
Shpg. Wt. 23 lbs.



THE DONLEY COAL CHUTE



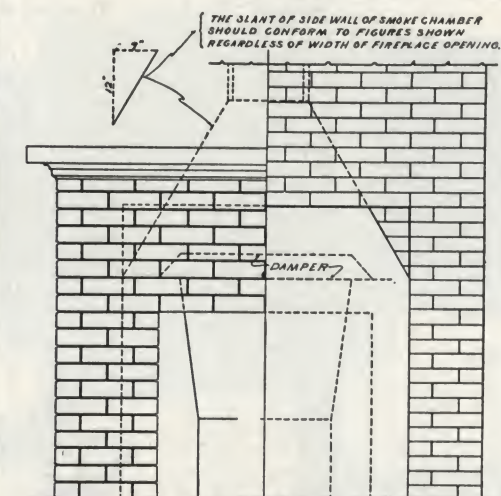
**DIMENSIONS OF DONLEY GRADE
LINE COAL CHUTE IN INCHES**

No.	A	B	C	D	E	F	G	H	I	J
1	21	26 1/4	14 1/2	19 1/2	24 1/2	14 1/2	24 1/2	25 1/2	20	21 1/2
2	27	32 1/4	17 1/2	24 1/2	30 1/2	16 1/2	30 1/2	31 1/2	26	21 1/2

**DIMENSIONS OF DONLEY STANDARD
COAL CHUTE IN INCHES**

Chute No.	A	B	C	D	E	F
29 and 39	22	16	16	9	25	19
213 and 313	22	16	18 1/2	12	25	19
613 and 713	30 1/2	21	21	12	34 1/2	24 1/2
617 and 717	30 1/2	21	24 1/2	17	34 1/2	24 1/2

DONLEY FIREPLACE CONSTRUCTION



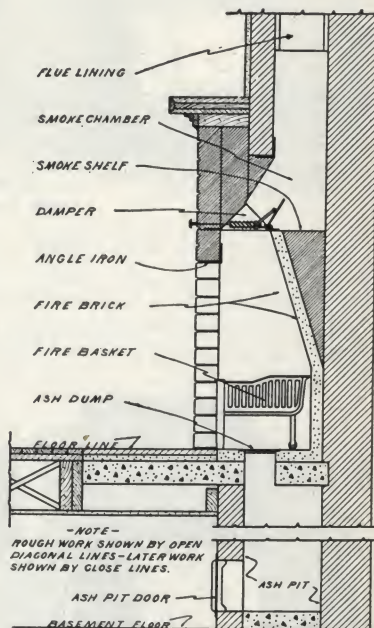
VIEW OF FINISHED FIREPLACE
DOTTED LINES INDICATE ROUGH
WORK

VIEW OF ROUGH BRICKWORK OPENING
DOTTED LINES INDICATE FINISHED
WORK

Wall depth should be of 18 to 20 inches for small fireplace, with little advantage in depth of more than 24 inches for larger fireplace.



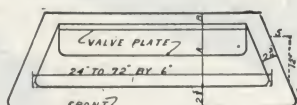
SHOWING RADIATION OF HEAT
FROM PROPERLY SLANTED
SIDE WALL OF FIREPLACE



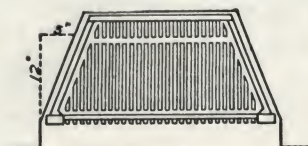
-NOTE-
ROUGH WORK SHOWN BY OPEN
DIAGONAL LINES-LATER WORK
SHOWN BY CLOSE LINES.

Width of opening, in.	Approximate height, in.	Use damper number		*Flue size, in.	
		Rotary control	Poker control	Regular	Round (diameter)
24	28	324	224	8 1/2 x 8 1/2	10
28	28	330	230	8 1/2 x 13	10
30	30	330	230	8 1/2 x 13	12
34	30	336	236	8 1/2 x 13	12
36	30	336	236	8 1/2 x 18	12
40	30	342	242	8 1/2 x 18	15
42	30	342	242	8 1/2 x 18	15
48	33	348	248	13 x 13	15
54	36	354	254	13 x 18	18
60	39	360	260	18 x 18	18
72	42	372	272	18 x 18	18

*Net flue area should be at least one-twelfth that of fireplace opening.



SIZE	A	B
24" TO 48" INC	8"	12"
54" - 72" - "	12"	18"



ILLUSTRATING BASKET SET IN FIREPLACE
AND CORRECT SLANT OF SIDE WALLS.

GABRIEL STEEL COMPANY

Manufacturers of Rolled Steel Products

2441 Bellevue Avenue, DETROIT, MICH.

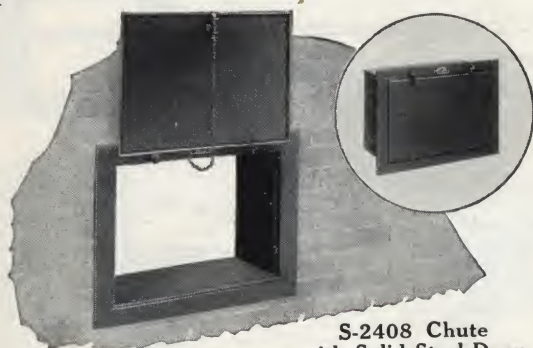
Products

GABRIEL ROLLED STEEL COAL CHUTES; ASH PIT DOORS; DOME DAMPERS; FIRE-PLACE ASH DUMPS; PACKAGE RECEIVERS; INSERTS.

For Steel Joists, see page A573.

Gabriel Rolled Steel Coal Chute

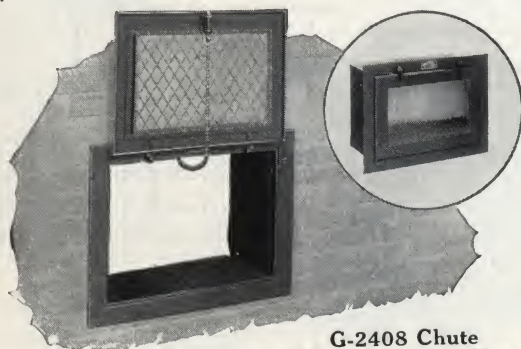
The Gabriel Coal Chute is neat and attractive in appearance. Made of rust resisting rolled steel, which entirely eliminates broken hinges, doors or frames. Joints are electrically welded throughout. Hinges are of very heavy rolled steel and designed to hold the door in a vertical position when open. Automatic spring latch is made of heavy rolled steel. Hopper is easily attached or removed, and is designed to lie perfectly flat on bottom of chute when not in use. Equipped with roller and chain attachment which permits of operation from any point desired.



S-2408 Chute
with Solid Steel Door

Furnished either with rolled steel or glazed door. In the glazed doors, 1/4-in. glass is attached by means of special glazing clips. Glass is bedded and face puttied and protected on the inside by heavy wire guard.

Sizes: 16x24 and 22x32 in. for 8, 12 1/2, and 17-in. walls.



G-2408 Chute
with Wire Reinforced Glass Door

Gabriel Ash Pit Door



Ash Pit Door

Made entirely of rust resisting, rolled steel. Door and frame are true fitting, insuring practically an airtight closure. Frame of door is electrically welded and door is a single piece of heavy rolled steel plate.

A deep lug anchor is turned up at each of the four corners to facilitate installation and insure secure anchorage in chimney.

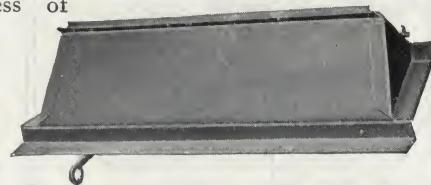
The hinges and keeper are practically unbreakable.

Made in four sizes: 8x8, 8x10, 10x12 and 12x16 in.

GABRIEL
ROLLED STEEL
PRODUCTS

Gabriel Rolled Steel Dome Damper

The Gabriel tank steel dome damper accurately controls the draft, promotes cleanliness, saves fuel and is conveniently operated. Its vertical front flange permits its use regardless of

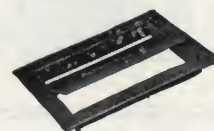


Dome Damper for Fireplaces
Showing Pushrod Operator

the construction of the fireplace and seals the joint between the rough brick and the fireplace facing. It is substantially constructed, operated with ease, stays in position and can be had for handle, poker, chain or pushrod operation. Furnished in five sizes: 24, 30, 36, 42 and 48 in., with or without horizontal front angle.

Gabriel Ash Dump

The Gabriel ash dump is unbreakable, with an unremovable leaf. Frame is electrically welded, and heavy enough to withstand any usage. It is very neat in appearance and will not warp or twist with use. Made in one size only, 5x7 in.



Gabriel Ash Dump

Gabriel Package Receivers

Neat, inconspicuous and weathertight. Design and quality insure satisfactory operation year after year. Made of heavy rolled steel plate, with two latched doors—one outside and one inside. Handles designed to permit installation in an inverted position, if necessary. Made for 12x14-in. wall opening. Width permits installation between studs of standard spacing, 16 in. on centers. Body of receiver is made in three depths: 5, 9 and 13 in.



Package Receiver
Inside Door

Gabriel Inserts

Gabriel inserts are made from structural grade new billet steel. All sections used in the fabrication of insert are rolled sections. Pressed metals, cast and malleable irons, have been entirely eliminated. Structural sections, especially rolled, give the necessary fillets at points of maximum stress. Specially designed anchors assure a maximum holding power.

Average ultimate capacity of several Gabriel plug inserts, by test, 12,000 lb. each. Average ultimate capacity per foot of Gabriel slotted insert, 11,000 lb. Standard lengths of 1, 2, 3, 4, and 5 ft. Furnished with or without end caps. Made in 3/4, 1, and 1 1/2 in. size. Height of plug insert, 3 3/8 in.; weight, 3/4 lb. Height of slotted insert, 1 1/2 in.; weight, 2.1 lb. per ft. Anchors 3 1/4 in. high.



Simple Method
of Attaching
Beam Flange
Insert to
I-beam



Design and
Anchorage of
Adjustable
Inserts



Gabriel Slotted Insert
Where a Range of
Adjustment Is
Desired



Gabriel Plug Insert Where
Exact Location of Fitting
Is Known

THE YOUNGSTOWN PRESSED STEEL COMPANY

Manufacturers of Copper Steel Coal Doors and Basement Windows

GENERAL OFFICES AND FACTORIES

WARREN, OHIO

For District Offices, see page B1309

Products

YPS COPPER STEEL COAL DOORS.

YPS STEEL BASEMENT WINDOWS.

For the complete YPS line including: Metal Lath, Steel Channels, Expanded Metal, Stucco Reinforcement, Corner Beads and Base Beads, see pages B1309-1311.



TRADE-MARK

Value of Copper Steel Coal Doors

Steel coal doors have become standard equipment in modern American dwellings. Home owners are demanding them both for the protection of the foundation walls and as a guard against intruders.

The YPS Copper Steel Coal Door is good looking and sturdy. It will prevent the unsightly marring of the window frame so noticeable in the foundations walls of buildings where coal is chuted through the ordinary cellar window.

Most home owners have been through the annoying and expensive experience of broken windows due to coal being chuted through the ordinary frame window. Broken windows are eliminated by the use of YPS Copper Steel Coal Doors.



YPS Coal Door

Style, in.	Wall thickness, in.	Masonry opening, in. width, height	Weight lb.
18 x 24	8	21 3/4 x 18	46

Details of Construction—All the skill in design which has made an enviable reputation for the YPS designers, is brought out in the YPS Coal Door and the quality of materials is up to the high standard which builders all over the country have come to expect in every product of this great YPS plant.

The frame of the YPS Coal Door is one solid piece of deep drawn, heavy copper steel tank plate 1/8 in. thick. The same material is used throughout the doors construction.

The self-closing lock is exceptionally strong with a heavy spring which insures positive locking when the door is closed. Locks may be equipped with a chain in order to release catch from the floor above.

Unbreakable hinges automatically hold the door, when open, against the foundation to give perfect protection to the wall when the coal is being put in.

Heavily coated with red oxide at the factory, the YPS Coal Door comes ready to go into the foundation with the least effort and the greatest amount of satisfaction possible.

YPS Copper Steel Basement Windows

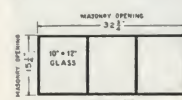
Heavy one-piece frames of YPS basement sash are the stiffest on the market. Hanger hinges, an exclusive feature, permit ready removal or placing of ventilators, though ventilator comes out only when lifted to horizontal. Ventilators and frames are interchangeable; detachable jamb bar strips, new design, can be supplied for brick or stone wall; positive lock is simple, yet unbreakable. YPS sash admits as high as 80% more light than wood sash, and gives greater ventilation when open.

Five standard sizes.

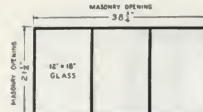


YPS Basement Window

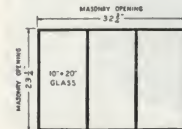
Style No.	Type	Glass size, in.	Masonry opening, in.	Weight, lb.
701	3 light	10 x 12	32 3/4 x 15 1/4	18
702	3 light	12 x 18	38 3/4 x 21 1/4	23
703	3 light	10 x 20	32 3/4 x 23 1/4	22
704	2 light	14 x 20	30 3/4 x 23 1/4	20
705	2 light	10 x 14	32 3/4 x 17 1/4	20



STYLE 701



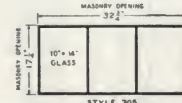
STYLE 702



STYLE 703



STYLE 704



STYLE 705

Note: Window No. 705 is a new YPS sash for use with concrete block construction where no sill is desired. No. 701 and 703 require sills, but can also be used for this type of construction.

Specifications for YPS Coal Doors and Basement Windows

Provide and install where shown on the plans YPS Copper Steel Coal Doors and YPS Solid Steel Basement Windows of sizes to fit masonry openings shown on the plans, and as manufactured by THE YOUNGSTOWN PRESSED STEEL COMPANY, Warren, Ohio.

Deliveries of Coal Doors and Basement Windows

YPS Coal Door and Basement Windows are sold only through dealers.

These dealers located in the principal cities of the United States are in a position to make deliveries of any quantity of the sizes listed in the tables.

**Over-all Dimensions
Standard Sizes of
YPS Basement
Windows**

KEWANEE MANUFACTURING COMPANY

Basement Coal Chutes, Basement Windows and Building Specialties

85 North Tremont Street, KEWANEE, ILL.

Nationally distributed through Dealers in Building Material, Hardware and Structural Steel

Products

KEWANEE COPPER STEEL BASEMENT COAL CHUTES: Window, Store, and Grade Line.

For Kewanee Copper Steel Basement Windows, see page A1041.

General

Kewanee Chutes afford efficient facilities through which to deliver coal to basements of buildings. They withstand hard knocks which shatter ordinary construction, protect the building from damage and defacement, and are simple and convenient to operate. The saving in repair bills alone quickly overcomes the difference in cost between a Kewanee Coal Chute and makeshift arrangements.

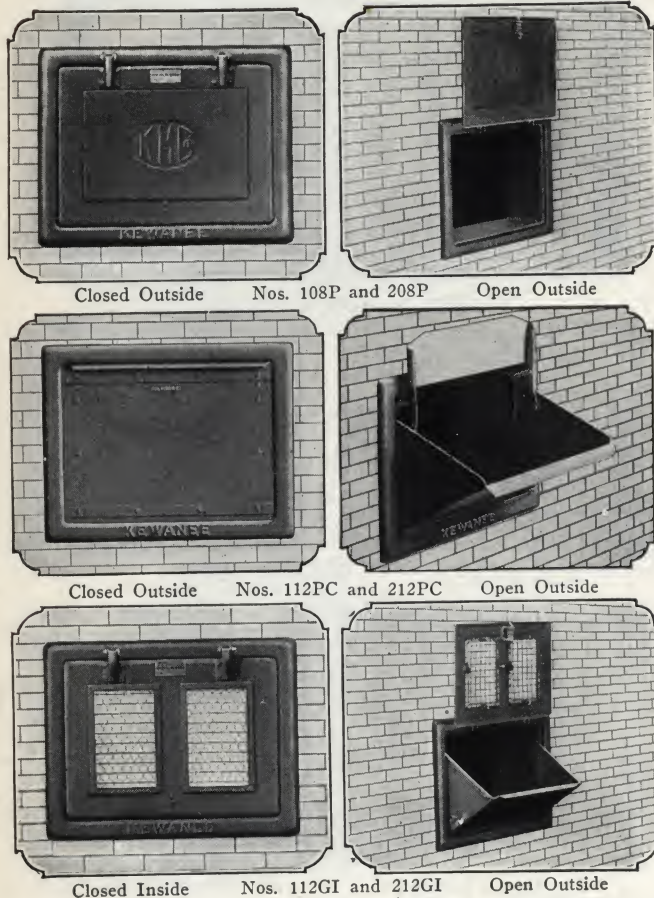
All parts, even the rivets, are of heavy Keystone Copper Steel—a special alloy which is not only rust resistant but tougher than ordinary steel. Kewanee Chutes harmonize perfectly with the foundation wall, whether it be of brick, concrete, stone or other material.

They can be readily installed in old as well as new buildings.

In order to meet various conditions, Kewanee Chutes are manufactured in three distinct types: Window Chutes, Store Chutes and Grade Line Chutes. Each type is furnished in two standard sizes and one or more styles.

Every Kewanee Coal Chute is *guaranteed* against breakage and warranted to give satisfactory service.

Kewanee Window Coal Chutes



Kewanee Window Chutes are the type most commonly used, being designed to take the place of the common basement window in buildings with foundation walls extending sufficiently above the grade line. These chutes are furnished in two sizes—with plain or glass doors, with or without hoppers, and with bodies for 8, 12 and 18-in., or thicker, foundation walls. Three typical styles of Kewanee Window Chutes are illustrated at the left.

Frame—Frame and bottom of all Kewanee Window Chutes are pressed out of one piece of heavy Keystone Copper Steel. Frames of the regular size (the "100" series) chutes have a clear net opening for the delivery of coal 21 in. wide by 15½ in. high, and those of the large size (the "200" series) have a net opening 28 in. wide by 20 in. high.

Body—Kewanee Window Chutes are regularly furnished with flat bottom bodies 8 in. deep or sloping bottom bodies 12 in. deep.

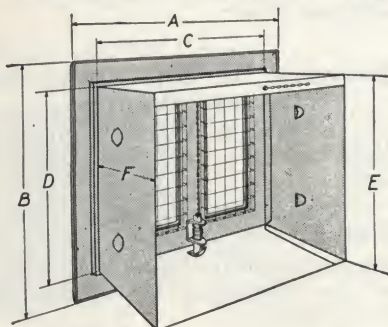
Sloping bottom bodies 18 in. or more deep for extra thick foundation walls will be supplied on special orders.

Door—Two styles of doors are supplied, the style P door ("Plain" door), admitting coal alone and the style G door ("Glass" door), for use where light also is required. All top hung doors have slotted hinges which automatically hold the door upright when open.

Hopper—In style PC Chutes ("Plain" door, "Combination" hopper), the door is hinged at the bottom, and in combination with wings, forms a convenient and substantial hopper for the reception of coal. The shield for protecting the wall above is automatically raised and lowered with the opening and closing of door. In style GI Chutes ("Glass" door, "Independent" hopper), the hopper is independent of the door. A chute with hopper prevents scattering and is desirable where coal will be shoveled in directly, or delivered in bag, basket or wheelbarrow.

Lock—All styles of Kewanee Window Chutes lock automatically and positively.

By attaching a chain or cord the lock can be easily operated from any place in the building.



No.	Size known as	Door	Hopper	Dimensions in inches						Net and ship. wt., lbs.
				A	B	C	D	E	F	
108-P	24x17	Plain	None	26	20½	21½	16	16	8	39
112-P	24x17	Plain	None	26	20½	21½	16	18½	12	48
112-PC	24x17	Plain	Combination	26	20½	21½	16	18½	12	64
208-P	33x22	Plain	None	33	25	28½	20½	20½	8	64
212-P	33x22	Plain	None	33	25	28½	20½	23	12½	75
212-PC	33x22	Plain	Combination	33	25	28½	20½	23	12½	98
108-G	24x17	Glass	None	26	20½	21½	16	16	8	42-47
112-G	24x17	Glass	None	26	20½	21½	16	18½	12	51-56
112-GI	24x17	Glass	Independent	26	20½	21½	16	18½	12	65-70
208-G	33x22	Glass	None	33	25	28½	20½	20½	8	65-72
212-G	33x22	Glass	None	33	25	28½	20½	23	12½	76-83
212-GI	33x22	Glass	Independent	33	25	28½	20½	23	12½	102-109

*Also furnished with body 18 in. deep (19½ in. high at back).
†Also furnished with body 18 in. deep (24 in. high at back).

Advantages of Kewanee Window Chute Construction

(The glass door chute is chosen for reference as the style best illustrating the various features of Kewanee construction.)

(1) Stronger glass door construction—two smaller glass panels instead of a single large one. Panels simply and efficiently protected during coal delivery by heavy wire guards, readily removed for cleaning glass.

(2) Pressure on glass is evenly distributed—retaining clips bear on a steel binding angle and not directly on the panels, which are cushioned in putty.

(3) Lock is actuated positively by a strong spring, not by gravity.

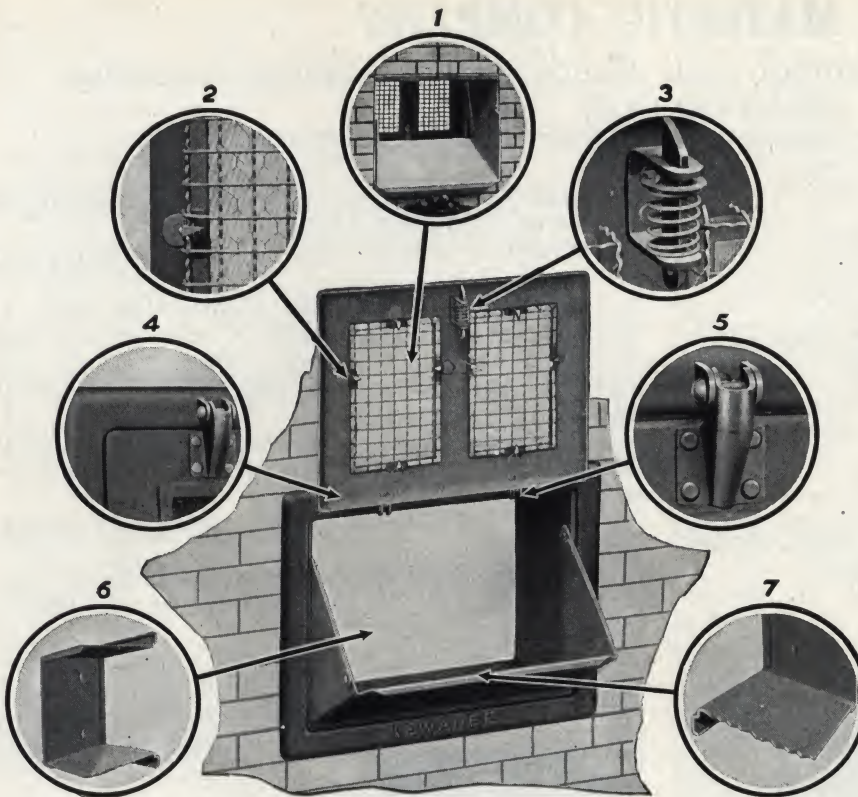
(4) Appearance is clean-cut and attractive—the smooth lines of Kewanee Chutes are due to pressed steel construction.

(5) The rugged, pressed steel hinges are slotted so as to automatically hold the door up when in the open position.

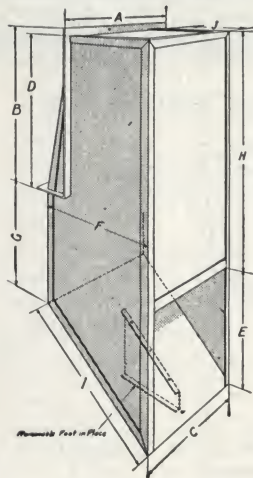
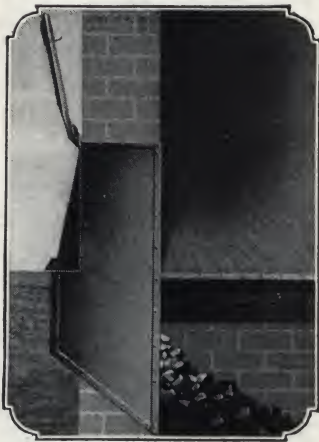
(6) Greater throw-in space for coal—the pressed steel frame is less bulky than brittle cast iron. The maximum throw-in space is particularly important in the regular size chute.

(7) Bottom of body, where wear is greatest, formed out of same piece of heavy Keystone Copper Steel as the frame. All parts, even the rivets, are made out of this rust-resistant alloy.

The Kewanee line also includes plain door chutes of exceptionally strong and simple hopper construction, opened and closed by a simple pull or push.



Kewanee Store Coal Chutes

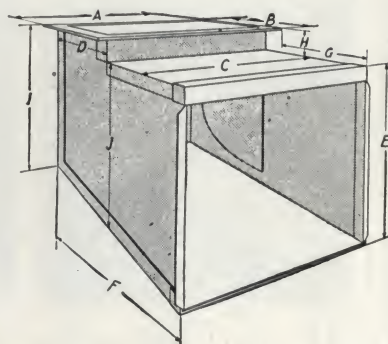
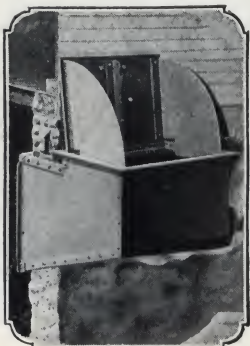


Kewanee Store Chutes are adapted for use in buildings where the first floor is too near the ground level to permit the installation of the regular window type of chute.

These chutes are provided with convenient and automatic locking arrangements same as Kewanee Window Chutes. Slotted hinges hold the door open. A foot attached to the sloping bottom supports the chute in upright position while the foundation wall is being built around it.

No.	Hopper	Dimensions in inches										Net and ship. wt., lbs.
		A	B	C	D	E	F	G	H	I	J	
31-P	None.....	26	22	24	21	17	16½	18	29	18	12	130
31-PI	Independent..	26	22	24	21	17	16½	18	29	18	12	145
32-P	None.....	34½	26	31½	24	17	16½	18	34	18	12	170
32-PI	Independent..	34½	26	31½	24	17	16½	18	34	18	12	190

Kewanee Grade Line Coal Chutes



Kewanee Grade Line Chutes are also used in buildings with low first-floor levels. Kewanee heavy, Copper Steel construction is particularly essential in chutes of this type, because the door and frame are liable to be driven over with heavy loads and otherwise subjected to great stress and strain.

No.	Hopper	Dimensions in inches										Net and ship. wt., lbs.
		A	B	C	D	E	F	G	H	I	J	
21	28½	22	25½	19	25	37½	18	3	16	18½	150
22	34½	28	31½	25	31	43½	18	3	19	24	225

THE MAJESTIC COMPANY

Manufacturers of Breakproof Coal Windows and Building Specialties
HUNTINGTON, IND.

*DISTRIBUTED THROUGH 5000 HARDWARE, BUILDING SUPPLY AND LUMBER DEALERS

Products

COAL WINDOWS.
GRADE LINE COAL CHUTES.
STORE COAL CHUTES.
MILK and PACKAGE RECEIVERS.
BUILT-IN and APARTMENT GARBAGE RECEIVERS.
UNDERGROUND GARBAGE RECEIVERS.
FIREPLACE DAMPERS.
FIREPLACE ASH DUMPS.
ASH PIT DOORS.
FLUE CLEAN-OUT DOORS.
FLUE THIMBLES.

Also Manhole Doors, Cellar Wall Grates, Cistern Rings and Covers, Rubbish Burners, All-metal Flower Boxes and Cast Iron Porch Column Bases.

Majestic Coal Window

This popular, sturdy window has won universal preference because of the protection it gives to the entire opening and sidewall when coal is being deposited in the bin. It gives the greatest protection to the building above the window where it is most needed—thus it saves its initial cost many times over and enhances property value by its permanence, sightliness and convenience.

Built for permanent service—will withstand the most severe conditions of usage.

Backed by 20 years' experience in building quality coal chutes.

Guaranteed Breakproof Doors—The doors of Majestic coal windows are made of heavy pressed steel, electro-galvanized to resist rust. When raised, the door holds itself open automatically, thus protecting the building above the opening.

Breakproof Frames—Frames are made of certified malleable iron. They set true in the masonry—no installation difficulties.

Frame and door fit snugly, making the window weathertight.

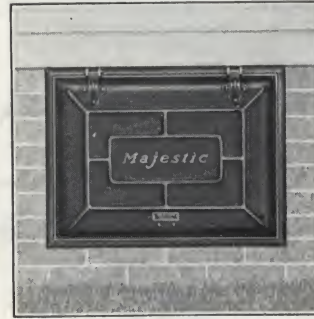
Breakproof Hinges—Hinges are made of certified malleable iron, making breakage at this point a practical impossibility.

Hinges are flat with support on each side of the hinge pin. Neat and inconspicuous, eliminating the necessity of cutting the water table to provide hinge clearance.

Reinforced Bodies—Bodies and hoppers are made of Keystone copper steel and heavily reinforced at points of strain. Angle iron reinforcement allows masonry to be laid directly on the body without the use of a lintel.

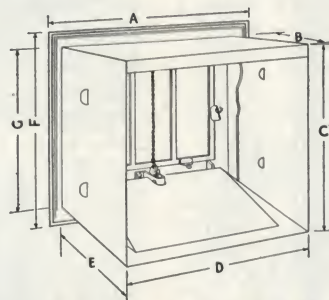


Open



Closed

Majestic Coal Windows Nos. M101 and M203



Dimension Diagram of All Styles of Majestic Coal Windows

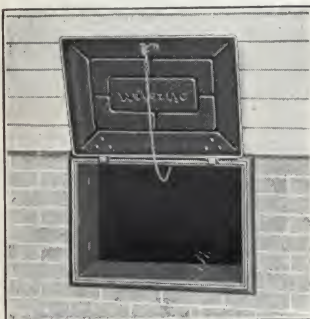
STYLES AND SIZES OF MAJESTIC COAL WINDOWS

Steel door styles		Glass panel styles		Rough wall opening, in.		
No.	Style	No.	Style	Wide	High	Deep
M101	*B	M10	*A	23	17	12
	§D		§C			
M203	*B	M20	*A	32	22	17
	§D		§C			
M500	§*	M600	§C	23	17	9
M520	**	M620	**	32	22	12

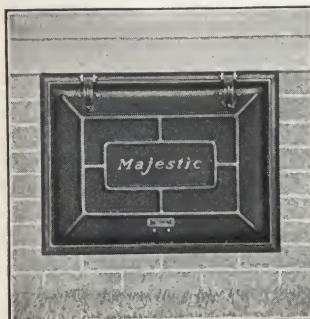
*Furnished with hopper. §Furnished without hopper.
**Has 9-in. straight bottom body—no hopper furnished.

Dimensions in inches

No.	A	B	C	D	E	F	G
M101	24 1/8	12	18 1/4	21 3/4	12 1/2	18 1/8	15 1/2
M203	33	17	24 3/4	29 1/2	17 1/2	23 3/8	20 3/8
M500	24 1/8	9	15 1/2	21 3/4	9	18 1/8	15 1/2
M520	33	12	20 3/4	29 1/2	12	23 3/8	20 3/8
M 10	24 1/8	12	18 1/4	21 3/4	12 1/2	18 1/8	15 1/2
M 20	33	17	24 3/4	29 1/2	17 1/2	23 3/8	20 3/8
M600	24 1/8	9	15 1/2	21 3/4	9	18 1/8	15 1/2
M620	33	12	20 3/4	29 1/2	12	23 3/8	20 3/8

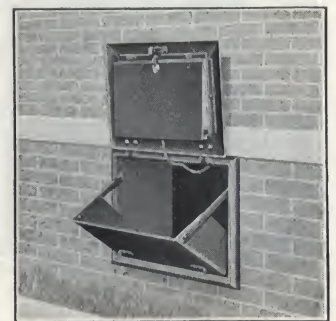


Open

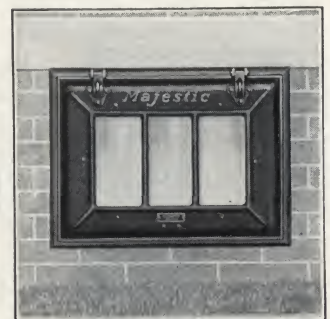


Closed

Majestic Coal Windows
Nos. M500 and M520



Open



Closed

Majestic Coal Windows
Nos. M10 and M20

Burglarproof Automatic Locks—Unfailing burglarproof and troubleproof. Doors are unlatched (from inside only) by a chain which may be extended to any part of the house. Lock drops shut automatically when door is closed.

Styles—Majestic coal windows are made in solid steel and in glass panel styles as follows:

No. M101 (Steel Door Style)—Equipped with sloping bottom body and chain to gravity catch.

Style B has a copper steel hopper for coal delivery with bags or wheelbarrow.

Style D is without hopper.

No. M203 is the same as No. M101 but larger in size.

No. M500 (Steel Door Style)—Differs only from No. M101 in that it has a 9-in. straight bottom body, without hopper.

No. M520 is the same as No. M500 but larger in size.

No. M10 (Glass Panel Style)—Used when daylight is desired in the coal bin or basement. Has three lights of 1/4-in. plate glass set in a 1/2-in. angle iron frame with two pressed steel dividing strips to give still more strength. Rubber packing is used instead of putty. The door is heavy, electro-galvanized steel, the glass being protected by a steel shield when open. Otherwise the No. M10 is the same as No. M101.

Style A has a hopper.

Style B is without hopper.

No. M20 is the same as No. M10 but is larger in size.

No. M600 (Glass Panel Style)—Differs only from No. M10 in that it has a 9-in. straight bottom body, without hopper.

No. M620 is the same as No. M600 but larger in size.

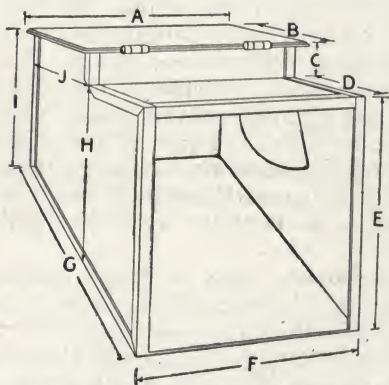
Majestic Grade Line Coal Chute

The Majestic grade line coal chute is designed for buildings having little or no foundation above ground, as in low set or terraced homes, apartments, stores and office buildings.

Door swings upward and, when raised, forms part of the hopper and becomes a shield which protects the building when coal is delivered. When closed, the door locks automatically and is burglarproof.

Breakproof construction throughout. Frame, door and hinges are of certified malleable iron, with solid brass pins; body of Keystone copper steel, reinforced with angle iron. The door fits snugly over the top of the frame when closed. This feature, with the waterproofing ridge around the inside edge of the frame, gives an absolutely watertight job.

Strong and durable — will outlast any building in which it is installed.



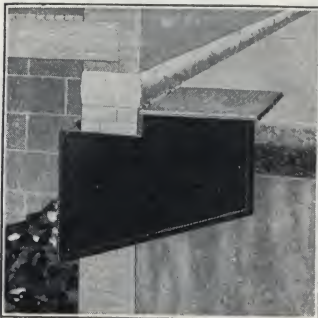
Dimension Diagram of Majestic Grade Line Coal Chutes

Dimensions in inches

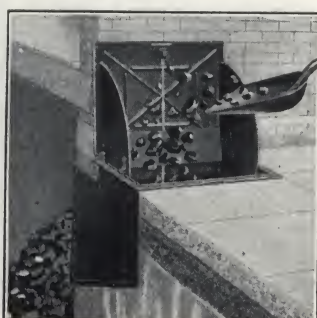
No.	A	B	C	D	E	F	G	H	I	J
M16	26	21	4	15 1/2	24 1/2	24 1/2	36 1/2	19	16 3/4	19 1/4
M18	31 3/4	27	4	17	31	31	45	24	19 1/2	25 1/4

SIZES OF MAJESTIC GRADE LINE CHUTES

No.	Door opening, in.	Rough wall opening (inches)		
M16	23 1/4 x 18 1/4	25	x	25
M18	29 x 24	31	x	31



Closed



Open

Majestic Grade Line Coal Chute

Majestic Store Coal Chute

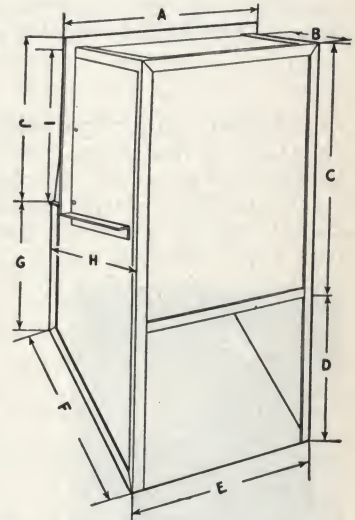
The Majestic store coal chute is designed particularly for store and office buildings, where the first floor is on a line with the sidewalk or alley.

It does away with the dangerous sidewalk coalhole and the necessity of putting up a bond for the protection of pedestrians.

Frame and hinges are certified malleable iron; doors of heavy gauge pressed steel, electro-galvanized to resist rust.

Two sizes, with or without hoppers.

On special order, the Majestic store chute can be supplied with a duplex body so that coal can be deposited either under the sidewalk or in the basement as desired.



Dimension Diagram of Majestic Store Coal Chutes

Dimensions in inches

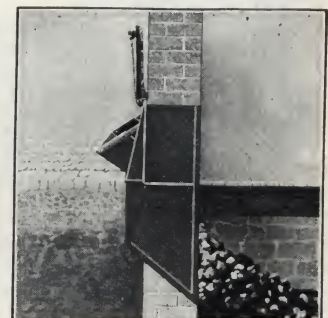
No.	A	B	C	D	E	F	G	H	I	J
M12	25	11 1/2	26 3/8	15 1/4	23	19 1/2	13	15 1/2	17	18
M15	33 1/2	11 1/2	30	16	30 3/4	19 1/2	13	15 1/2	21 1/4	22 1/2

SIZES OF MAJESTIC STORE CHUTES

No.	Door opening, in.	Rough wall opening (inches)	
		Above grade	Below grade
M12	21x15	23x16 3/4	23x25
M15	29x19 1/4	31x21 1/2	31x24 1/2



Closed



Open

Majestic Store Coal Chute

Majestic Milk and Package Receiver

Designed to hold 6 or more quart bottles of milk, depending on the thickness of the building wall in which it is installed. It consists of two cast iron frames and doors, connected by a steel body, adjustable to the thickness of the wall in which it is placed. Castings and steel body are coated with *bitumastic solution*, the enduring protection against rust.

The burglarproof gravity latch on the outside door can be unlocked only from inside. The kitchen side door is provided with a refrigerator type latch and handle and can not be opened from outside. Doors can be reversed at time of installation—either door can be installed inside or outside to open either to right or left by simply changing the gravity latch from one door to the other.

How Operated—A chain attached to the gravity latch runs through two cast iron eyes to the inside frame, where a cast iron ball is suspended. When empty bottles are placed in the receiver, the ball is pulled down. Its weight, and the friction of the chain holds the latch on outside door unlocked. The inside door is then closed and locked by the refrigerator latch.

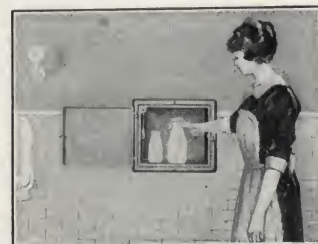
When the outside door is opened, the chain is drawn outward and held by friction. This leaves the gravity

latch in locking position, and when the door is closed, it locks automatically.

Sizes—Made in two depths of adjustable bodies, adapting them to walls of any thickness.

No. 1 body adjustable to walls from 5 to 8 in. thick; No. 2, from 8 to 14 in. Bodies of special depths furnished at additional cost.

Outside dimensions of package receiver frames, 16 $\frac{1}{4}$ in. wide by 14 in. high; wall opening required, 14 in. wide by 12 in. high.

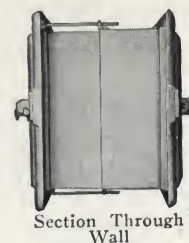


Inside View



Outside View

Majestic Milk and Package Receiver



Section Through Wall

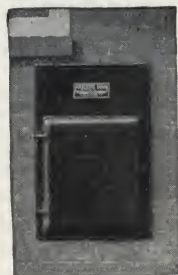
Majestic Garbage Receivers

Built-in and Apartment Garbage Receivers—

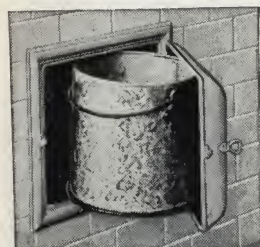
5K Built-in Receiver—Front opens into kitchen where garbage is deposited, and back casting opens to some accessible place outside building where garbage is removed. Doors fit closely and lock with a refrigerator type latch. Body is made of heavy gauge steel in two



Inside View of No. 5K Built-in Garbage Receiver



Outside View of No. 5K Built-in Garbage Receiver



Nos. 3A and 5A Apartment Garbage Receivers



No. 9A Apartment Garbage Receiver

telescoping sections, one fastened to the front casting and the other to the back or outside casting, therefore the body is adjustable for 8 and 12-in. walls. For narrow walls, casings may be used inside and outside.

3A and 5A Apartment Receiver—Consists of a heavy cast iron frame and door, a galvanized iron body which recesses in wall, and a galvanized iron garbage pail which sets on a cast iron shelf fastened to the door. When door is opened, can is ready to receive garbage, as shown. The receiver is vented through the wall by two 4x2 $\frac{1}{4}$ -in. heavy cast iron ventilators furnished with each receiver.

9A Apartment Receiver—Has a front casting only, with a steel body that is recessed in the wall to receive the garbage can. Front is provided with a hopper garbage door and two doors below for removal of can. Doors fit closely and lock with a refrigerator type latch.

Underground Garbage Receiver—Offers an out-of-sight, odorless, flyproof, waterproof, sanitary and convenient method of garbage disposal. Consists of a receiver shell made of Keystone copper steel, and ring, lid and foot lever of cast iron. Entire receiver is treated to prevent deterioration, and formation of rust.

Comes complete with either a heavy plain can or an extra heavy Witt corrugated can.

The receiver shell is buried in the ground (in any convenient location) to the upper band. Lid is opened by a slight pressure of the foot on the trip. When foot pressure on trip is released, lid snaps tightly shut and no odors can escape. When can is full, it is easily lifted out.

Supplied in 5, 8, 12, 15 and 20-gal. capacities.



Majestic Underground Garbage Receiver

MAJESTIC BUILT-IN AND APARTMENT GARBAGE RECEIVERS

No.	*Can capacity, gal.	Wall openings, in.			Size over all, in.	
		Wide	High	Deep	Wide	High
3A (Apartment)	3	14 $\frac{1}{2}$	12	10	16 $\frac{1}{2}$	14
5A (Apartment)	5	14 $\frac{1}{2}$	16 $\frac{1}{2}$	10	16 $\frac{3}{8}$	19 $\frac{1}{4}$
9A (Apartment)	9	18	29	10	20 $\frac{1}{2}$	30 $\frac{1}{2}$
5K (Built-in)	12	18	29	.....	20 $\frac{1}{2}$	30 $\frac{1}{2}$

*One galvanized iron garbage can furnished with each receiver.

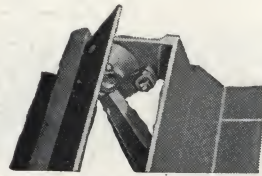
Majestic Fireplace Dampers

The Majestic damper is scientifically designed, simple in construction, easy to operate and gives perfect draft control. The Majestic throat is theoretically and

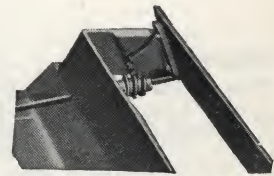
any reasonably well built fireplace, it insures absolute satisfaction. Smoking in the room is eliminated by the Majestic damper.



Majestic Fireplace Damper as Installed in Fireplace

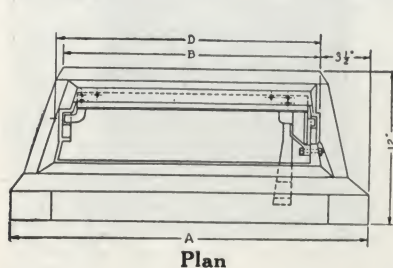


End View Showing Friction Type of Control

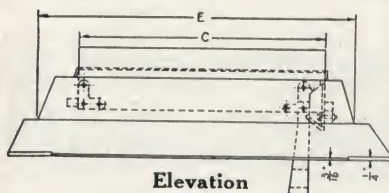


End View Showing Ratchet Type of Control

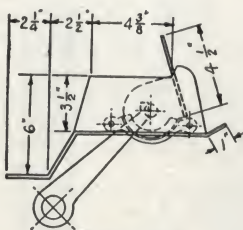
practically correct, due to the built-in lintel, which assures the correct height of damper throat above finished opening—also correct position of damper. Installed in



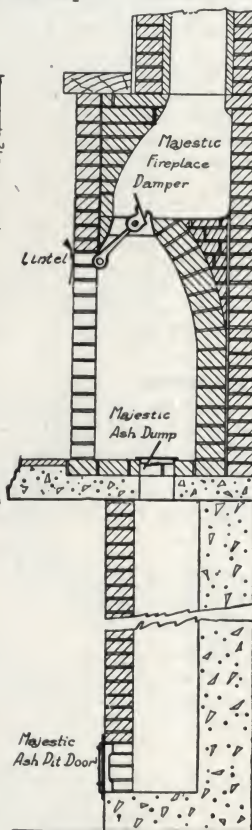
Plan



Elevation



Detail of Damper Operation



Fireplace Section Showing Application of Damper

The making of the lintel integral with the frame of the damper makes it certain that the distance from the top of the opening of the fireplace to the top of the throat is correct—and this is the most important dimension of the whole fireplace. It also makes it necessary to place the damper forward in the fireplace, thus leaving room for a smoke shelf behind.

Ease of operation is accomplished by the *trouble-proof friction principle for opening and closing the door or valve*. The operating lever is out of sight and easily moved forward or backward with a poker, and it stays in position until again adjusted. The throat opening is subject to the best minute adjustment, and there are no knobs or handles to protrude through the front of the fireplace.

The Majestic Type X, however, is supplied for those who prefer the handle or knob control.

The valve or door is hinged at the back, which permits heat to be thrown out into the room, draws the smoke off from the nearest possible distance from the face of the fireplace, and aids the smoke shelf in turning the down-draft back up the chimney.

With the Majestic throat and damper any mason can build a perfect fireplace by following the drawings and instructions furnished with each damper.

SIZES AND DIMENSIONS OF MAJESTIC FIREPLACE DAMPERS

Damper No.....	26	30	34	38	42	46	50	54	60
A.....in.	30½	34½	38½	42½	46½	50½	54½	58½	64½
B.....in.	23¾	27¾	31¾	35¾	39¾	43¾	47¾	51¾	60½
C.....in.	21½	25½	29½	33½	37½	41½	45½	49½	55½
D.....in.	24	28	32	36	40	44	48	52	58
E.....in.	26	30	34	38	42	46	50	54	60
Finished opening:									
Width, in.....	26	28	30	32	34	36	38	40	42
Height, in.....	28	29	30	30	30	31	31	31	32
Firebox depth, in...	16	16	17	17	18	18	19	19	20
Flue size, in.....	8x8	8x8	8x12	12x12	12x12	12x12	12x16	12x18	12x18
Shipping weight, lb.	45	52	59	66	70	75	81	89	90



Majestic Fireplace Ash Dump

A single lid permanently hinged to the frame, as shown. Lid can not fall out—essential in any fireplace. Keeps dust and odors from room and permits ashes from fire to drop to base of chimney.

No.	6	8	9	10
Outside, in.	8x8	10x10	6x9	7x10
Inside, in.	6x6	8x8	4x7	5x8



Majestic Cast Iron Ash Pit Door

Fits closely and securely. Simple and effective latch. Sturdy, smooth working hinges. Sizes: 12x15 and 15x15 in.



Majestic Cast Iron Flue Clean-out

Hand fitted. Malleable iron turn key and latch locks door tightly and securely. Anchor irons fold flat. Sizes: No. 88, 8x8 in.; No. 810, 10x8 in.; No. 812, 12x8 in.; No. 1012, 12x10 in.; Nos. 812 and 1012 are ample in size for ash pit doors.



Majestic Cast Iron Flue Thimble

Made for 5, 6, 7, 8, 9 and 10-in. smoke pipe. Over-all size of thimble is ½ in. greater than smokepipe size.

BENNETT HEATER COMPANY, INC.

The Bennett Heater and Ventilator for Open Fireplaces
NORWICH, N. Y.

The Bennett Heater

The *Bennett Heater* can be had for almost any fireplace, old or new, and saves two-thirds of the heat usually lost up the flue.

It consists of an air duct through the back of the chimney from which heating tubes lead over and through the fire to a register at the top of the fireplace opening.

Pure fresh air entering from the outside is heated as it passes through the tubes, then discharged into the room at a high temperature, with the result that the room is uniformly heated, unhealthy drafts are eliminated and the fuel expense cut to a minimum.

The heater delivers a constant flow of pure warm air into the room and takes the place of the main heating plant for many weeks in the spring and fall.

For New Fireplaces—We furnish stock sizes with which are included plans and specifications covering the fireplace opening, throat, smoke chamber and flue. Also, a 3x3-in. angle bar cut to proper length for the fireplace opening and with brackets attached to receive the heater front. Also, a wood form for the air duct, around which the mason work is built up. Data for the plans and specifications are from United States Government recommendations on fireplace design.

For Old Fireplaces—The *Bennett Heater* is assembled to meet the size requirements of each fireplace and installation is primarily a matter of cutting the air duct through the chimney.

Throat Dampers—A throat damper should always be used. We can supply one at extra charge which will give economy and general satisfaction.

Basket Grates—These are very desirable for both wood and coal. We can furnish special grates in which the heater itself forms the grate back and with a special lug which keeps the grate in proper relation to the heater.

Advantages of the Bennett Heater

Can be constructed to fit almost any fireplace, old or new.

Does not require the fireplace to be built around the heater.

Can be removed in ten minutes when it is desired to clean the chimney flue.

Utilizes the heat, which generally goes up the chimney, to heat fresh cold air from outside.

These Advantages Secure—(1) Increased heat value from the fuel burned. (2) Added circulation of heated fresh air in the room.

Other Advantages—The high efficiency of the *Bennett*

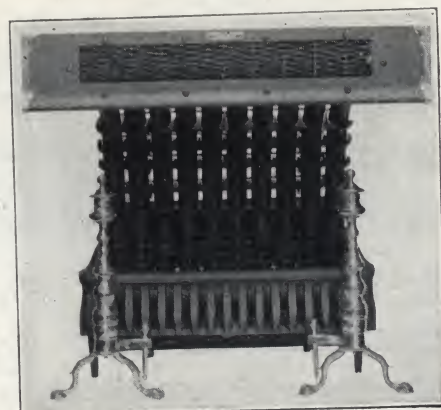
BENNETT
FIREPLACE HEATERS
TRADE-MARK

Heater is secured through the concentration of its heating surfaces at the hottest part of the fireplace. These heating surfaces have a larger area than the total area of bottom, back and sides of the fireplace.

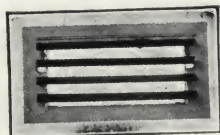
The greatest advantage of the *Bennett Heater* is due to the large quantity of fresh air heated and discharged into the room, thus counteracting

the leakage of cold air into the room around windows and doors. The *Bennett Heater* heats the whole room, not just around the fireplace.

Its economic advantages and mechanical construction are the results of years of study, experiment and development, based on the scientific principles of heating and ventilating, skillfully worked out and practically applied.



Special Basket Grate and Heater



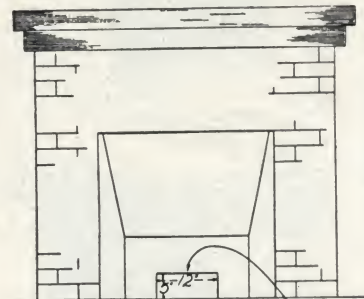
Air Intake Fitting for Back of Chimney

Guarantee

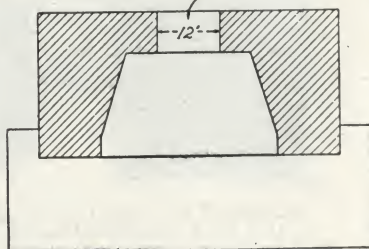
The *Bennett Heater* is guaranteed to give satisfaction when installed in any usable fireplace which already burns satisfactorily without smoking.

The *Bennett Heater* will not warp or crack from heat. There are no flat heating surfaces to warp or buckle, the flexible heating tubes provide for all expansion and contraction.

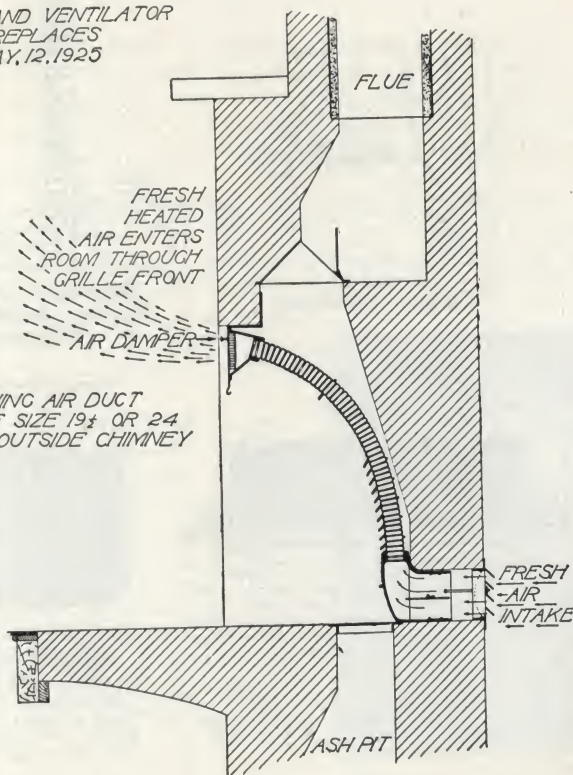
BENNETT HEATER AND VENTILATOR
FOR OPEN FIREPLACES
PATENTED MAY, 12, 1925



ELEVATION



FLOOR PLAN



CROSS SECTION

HEATILATOR COMPANY

Manufacturers of the Heatilator, a Practical Heating and Ventilating Unit

MAIN OFFICE AND PLANT

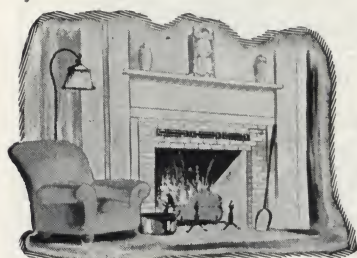
Glen and East Brighton Avenues
SYRACUSE, N. Y.

Distributed Through Leading Mason Supply Dealers

The Heatilator

The Heatilator modernizes fireplaces. It has double walls on both sides, top and back with an air space between and an opening through the back wall to the outside. It is especially valuable in building new fireplaces and is equally desirable for remodeling.

Principles of Operation—Fresh air enters the double wall from the rear, passes through and around the three sides and top of the fireplace where it is heated and emerges into the room through the grille opening above the open fire. This heated fresh air circulates to the top of the room, cools, descends where it feeds the fire and passes up the flue.



A Modern Heatilator Fireplace

The principle is similar to a hot air furnace with fresh air intake, heating chamber and warm air register or grille. Instead of being entirely enclosed like a furnace, it becomes an open hearth or fireplace adding charm and attractiveness to the home and insuring an efficient and satisfactory fireplace. Adapted to use with brick, stone, tile or stucco.

Advantages—The Heatilator fireplace corrects common faults of fireplace design and construction—such as smoking, cold air drafts, insufficient heat and waste of fuel.

Saves one-half its cost in material and labor.

Saves much heat formerly wasted.

Makes fireplaces an economy.

Furnishes perfect fresh air ventilation at all times.

Insures scientifically correct construction.

Prevents drafts by furnishing plenty of fresh, pre-heated air to warm the room and feed the open fire.

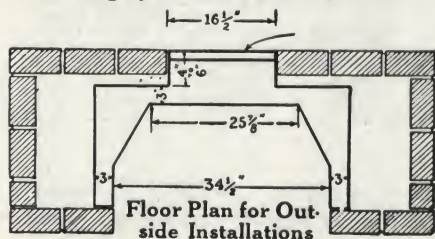
Popularizes the use of fireplaces.

Adds greatly to value of home for owner's use or resale.

Construction—The inner shell or part exposed to the fire is of $\frac{1}{8}$ -in. copperoid, non-rusting, boiler plate iron. The outside or back wall of the heating chamber is of 14 gauge, copperoid iron. All seams are electric-welded.

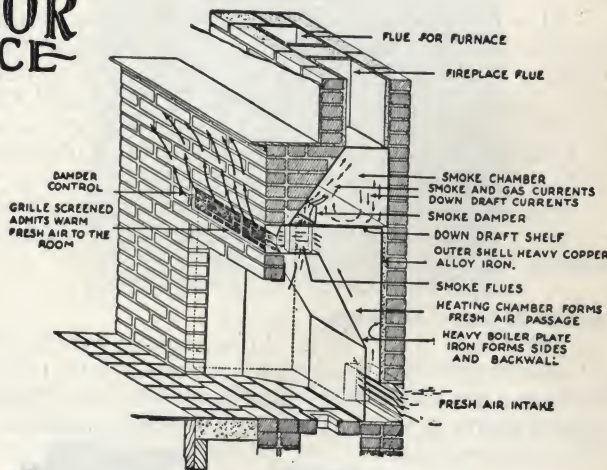
Front grille outlet for warm air is of bronze, size $5 \times 33\frac{1}{2}$ in. Louver type of grille at back furnishes the intake for fresh air. If located in the center of the building a fresh air box is used to carry the air to the bottom of the heating chamber.

The smoke damper and control are part of the Heatilator. The same attachment controls the intake of fresh air, making a perfect ventilating system at all times.



Floor Plan for Outside Installations

HEATILATOR FIREPLACE



Dimensions

Size of Fireplace Opening— $34\frac{1}{2}$ in. wide by about 28 in. high; depth 21 in. from face of brick to inner wall.

Area of Smoke Flues—96 sq. in.

Area of Air Intake— $7\frac{1}{4} \times 16\frac{1}{2}$ in., 70% unobstructed or 90 sq. in. net.

Area of Grille Warm Air Outlet— $5\frac{1}{2} \times 34\frac{1}{2}$ in., 60% unobstructed or 114 sq. in. net.

Chimney Flue Recommended—About $8\frac{1}{2} \times 13$ in.

Installation Directions

Simple installation directions and a plan drawing are included with each unit.

Shipped for Free Inspection

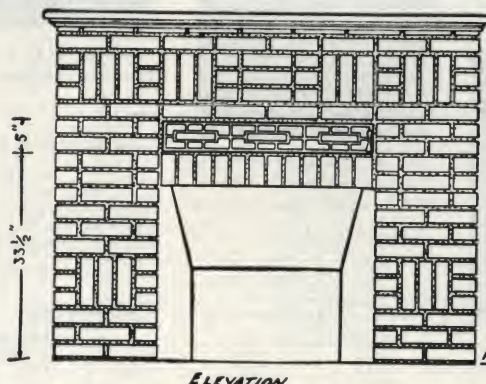
Shipment will be made to any reliable dealer for inspection. If not satisfactory in every way shipping instructions will be given and freight refunded.

Price and Shipping Weight

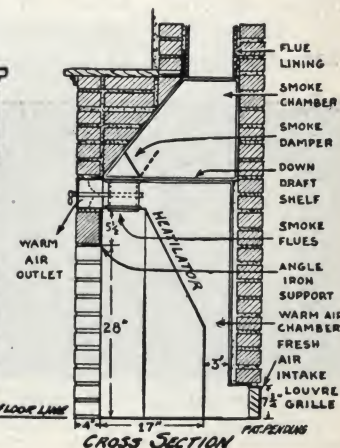
The price of the No. 34A Heatilator, complete, ready to install, carefully crated, is \$78.00. The shipping weight is 340 lb.



Heatilator with Brick Work Begun at End and Back Wall
Shows fresh air grille of louver design



ELEVATION



CROSS SECTION

THE ADAMS COMPANY

Manufacturers of Building Specialties and Fireplace Furniture

109 West 6th Street, DUBUQUE, IOWA

Products

ADAMS FIREPLACE DOME DAMPERS, ASH PIT DOORS, ASH DUMPS, COAL CHUTES.

Also manufacturers of Adams Fireplace Screens, Fireplace Grates, Andirons, Fire Sets, Metal Fireside Baskets, and complete line of Fireplace Furniture; Floor Drains, Bell Trap Cesspools, Underground Garbage Receivers, Wheel Guards, Chimney Caps, Revolving Chimney Tops, Cistern Covers, Cast Flue Thimbles, Coalhole Covers, and Ventilation Grates.

For Adams Steel Windows and Steel Garage Doors, see page A943; for Adams Metal Frame Window Screens, see page B1195.

Adams Dome Dampers

With high dome, large throat, simple construction and ease of operation insure perfect draft control to your fireplace under all weather conditions. The large damper blade is center-pivoted. Nothing can lodge behind it to hinder its operation.



No. 10 Adams Dome Damper

Operated by worm and gear mechanism. Damper operated from front, side or middle of fireplace. Damper easily adjusted, opened and locked at any desired point. Has unobtrusive solid brass handle.



No. 3 Adams Dome Damper

Damper operated from either front center or right front. Operated by ratchet lever placed underneath, readily reached with poker. Working parts are easily adjusted, opened and locked at any desired point.

Adams Coal Chutes

THE ADAMS COMPANY manufactures a complete line of coal chutes; grade line coal chutes and store coal chutes. Hopper optional. Doors on all the chutes lock automatically when closed.



No. 150 Adams Coal Chute

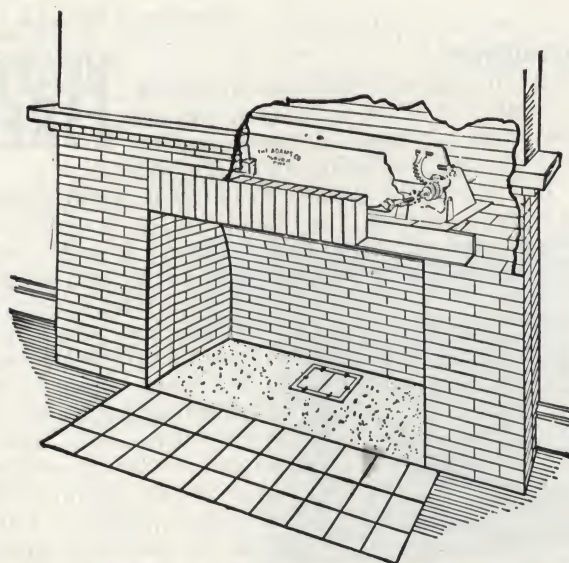
24 in. wide, 17 in. high, 9 in. deep. Two 8x12-in. wire glass panels. Weight 55 lb.



No. 2 Adams Ash Pit Door

Black Baked Japan Finish

Size, in.	Ship. wt. per doz., lb.
8x8	75
8x10	95
8x12	110
10x12	130



Installation Adams No. 10 Dome Damper

SIZES ADAMS DOME DAMPERS NO. 10 AND NO. 3

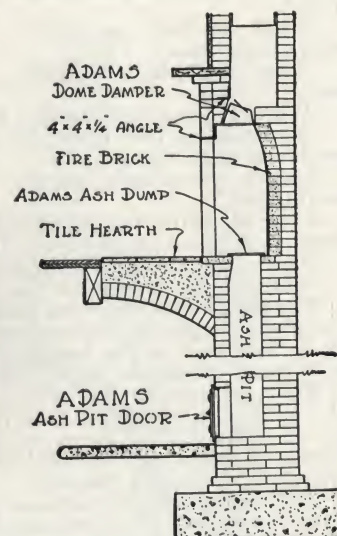
Front, in.	Back, in.	Depth, in.	Throat opening, in.	Wt. crated, lb.	Flue size in.
24	17	13 1/4	18x10	35	8x12
30	23	13 1/4	24x10	40	8x12
34	27	13 1/4	28x10	42	8x12
36	29	13 1/4	30x10	45	8x12
38	31	13 1/4	32x10	48	8x16
42	35	13 1/4	36x10	60	8x16
48	41	13 1/4	42x10	65	12x12
54	47	13 1/4	48x10	77	12x16
60	53	13 1/4	54x10	100	16x16
66	59	13 1/4	60x10	116	16x16
72	65	13 1/4	66x10	142	16x20

Damper Easily Installed

The Adams Dome Dampers are easily set in all types of fireplaces whether brick, tile, stone, marble or wood mantel.



Adams No. 1 Ash Dump Double Acting, Automatic



SIZES ADAMS ASH DUMPS

Number	Outside, in.	Inside, in.	Wt. per doz., crated, lb.
Double Acting Automatic No. 1	7 1/2 x 8 3/4	5 1/2 x 7 1/2	40
Single Acting No. 2	10x10	7 3/4 x 7 3/4	50
Single Acting No. 3	8x8	5 3/4 x 5 3/4	33
Single Acting No. 4	10x7	7 3/4 x 4 3/4	33

Catalogues

Catalogues giving illustrations and full information of our products will be gladly furnished upon request.

ESTABLISHED 1856

J. H. BAWDEN & CO.

Manufacturers of Bawden Fireplace Specialties

FREEHOLD, N. J.

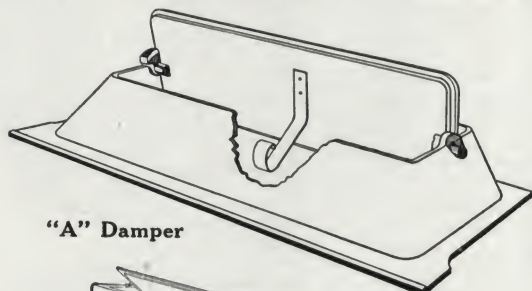
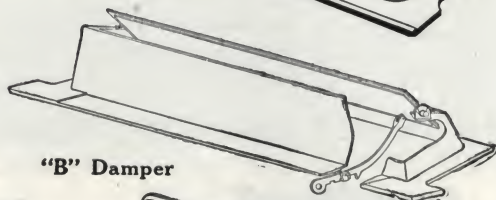
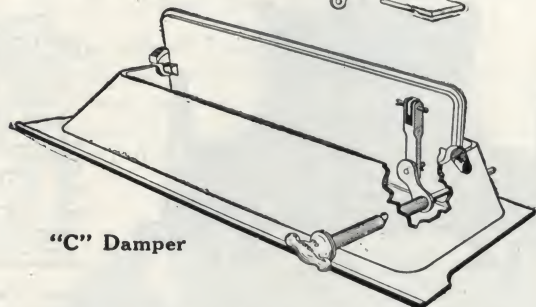
Products

DOME DAMPERS, ASH PIT DOORS and ASH TRAPS.

Dome Dampers

Design and Construction—The three types of dome dampers shown are designed with the single idea of efficiency. This has been attained to an unusual degree by so constructing the dampers as to eliminate all pockets or cut-ins, which tend to impede the free passage of the smoke, thus overcoming the principal weakness of the ordinary dome damper. The flange of the damper forms an arch bar of ample strength to support the weight of the masonry above the fireplace.

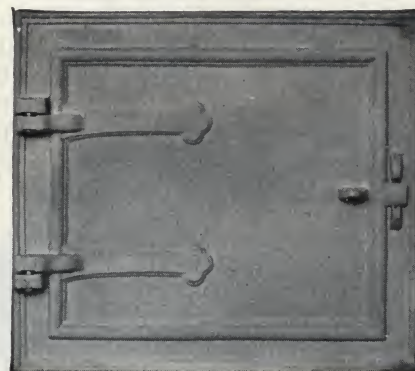
Operation—Extreme simplicity is the cardinal point in the operation of these dampers. All that is required to operate Styles "A" and "B" is a common poker. Style "C" operates with a straight thrust, by means of a rod through breast or side of fireplace. It contains no cogs, gears, worms or springs in the throat to rust fast or give out. *One damper that never fails to operate.*

**"A" Damper****"B" Damper****"C" Damper****DIMENSIONS OF BAWDEN DAMPERS**

*Damper No.	Extreme of flange, in.			Base of dome, in.			Height of dome, in.	Width of fireplace, opening, in.
	Front	Back	Depth	Front	Back	Depth		
24N	24	17	12½	20	15½	9½	3½	20
28N	28	21	12½	24	19	9½	3½	24
32N	32	24	12½	27	22	9½	3½	27
34N	34	27	12½	30	25	10	4½	30
38N	38	30	12½	33	28	10	4½	33
40N	40	33	12½	36	31	10	4½	36
44N	44	36	12½	39	34	10	4½	39
46N	46	39	12½	42	37	10	4½	42
34S	34	25	15	30	24	12	6	30
38S	38	28	15	33	27	12	6	33
40S	40	31	15	36	30	12	6	36
44S	44	34	15	39	33	12	6	39
46S	46	37	15	42	36	12	6	42
52S	52	43	15	48	42	12	6	48
58S	58	49	15	54	48	12	6	54
64S	64	56	17	60	54	12	7	60
76S	76	68	17	72	66	12	7	72

*“N” after number indicates the narrow depth.

“S” after number indicates wide or standard depth.

**Ash Pit Doors****SIZE OF ASH PIT DOORS**

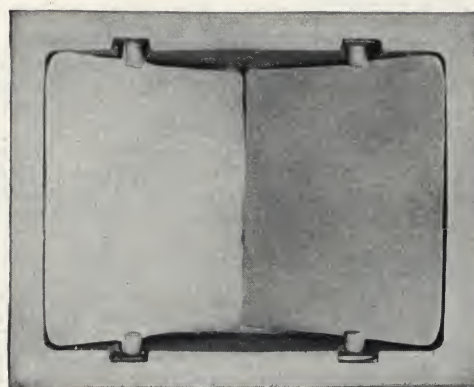
No.	Opening, in.	No.	Opening, in.
3	16x20	4½	10x12
3½	12x16	5	8x12
4	12x12	6	8x8

**No. 1 Ash Trap**

Outside, 7½x9½ in. Opening, 6½x8½ in.

**No. 2 Ash Trap**

Outside, 6x9 in. Opening, 4½x7¼ in.

**Automatic Trap**

Outside, 7x9 in. Opening, 5½x7½ in.

COLONIAL FIREPLACE COMPANY

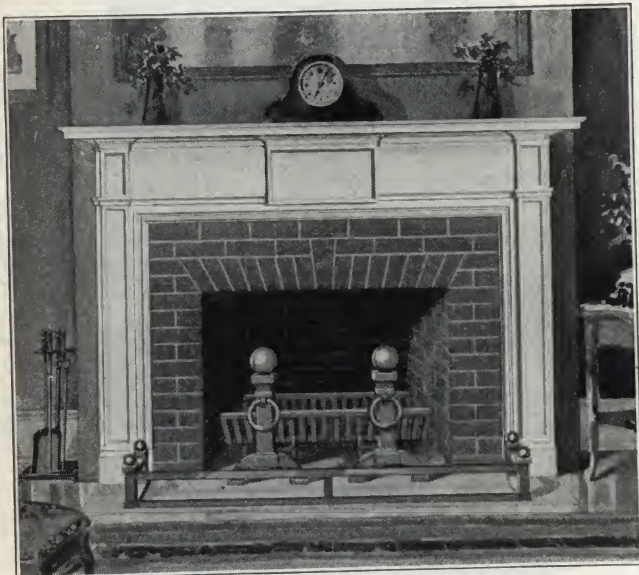
TELEPHONE
LAWDALE 0140

4644 West Roosevelt Road
CHICAGO, ILL.

Products and Service

THE IMPROVED COLONIAL HEAD THROAT and DAMPER for Fireplaces; GLO-HOT ELECTRIC GRATE.

Also complete Fireplaces in brick, stone, marble, tile, and wood mantel bases; complete Fireplace Furnishings: Fenders, Grates, Andirons, Fire Sets, Trimmings; Special Brass and Wrought Iron Work for fireplaces.



Special Service to Architects and Builders

Through the experience of a quarter of a century we have successfully encountered the difficulties of all types of fireplace construction as well as many unusual conditions, and we will gladly put this knowledge and experience at your command. For many years a growing number of leading architects have written us freely regarding their fireplace problems. We will gladly serve you also.

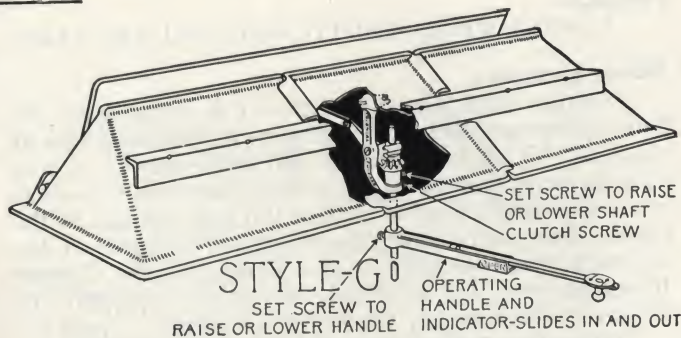
Colonial Damper Works Right in Any Fireplace

With the new "Style G" lever arm operating device (patent applied for) the Colonial Damper may be set one, two or three courses above the opening or even higher with a long shaft. Operating handle is out of sight yet easily accessible.

Colonial Damper Takes Up Heat Expansion

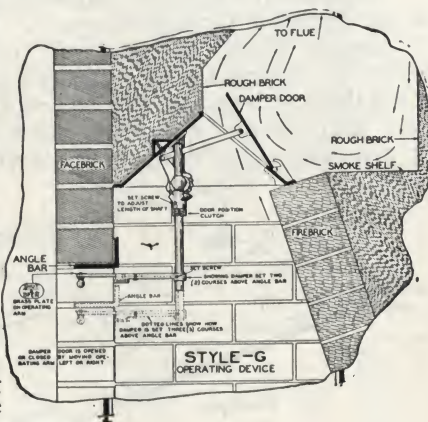
Built in sections of best iron castings reinforced with steel angle bar so as to sustain great weight and intense heat. The overlapping joints between sections take up heat expansion and prevent cracking the face of the fireplace.

Colonial Dampers are available in Styles A, E and G as illustrated in circulars which will be mailed upon request. The Colonial Head compels correct formation of the fireplace throat—the vital part—and saves its entire cost in labor. May be



used with any type of fireplace, arched or square opening.

For genuine fireplaces the Colonial Damper is without a peer. The Style-G operating device perfectly regulates the opening of the throat. The operating handle slides forward and moves right or left to open or close and when the draft is adjusted, slides back again under the opening out of sight. The Colonial Damper backs up beauty of your design with the assurance of successful operation.



Sectional View, Style-G

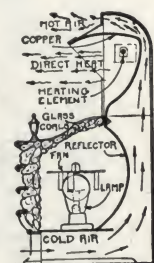
Showing method of operation and adjustments. With this device the Colonial head may be set anywhere in throat as high up as desired

"Glo-Hot" Electric Fireplace Grate (Patented)

Approved by the Underwriters' Laboratories, Inc.



No. 2710



Cross Section

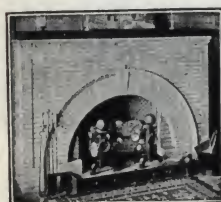
Details of construction and air space between copper reflector and back. Steady circulation drives hot air into the room

Enables the architect to produce real fire effect *with heat* where no flues are provided in the plan. The heat flows out from the "Glo-Hot" heating element under the hood. The scientifically designed copper reflector throws all the heat rays straight into the room. Gives the fascinating flicker as of real fire in glowing coals, and heats as well, without requiring any flue.

Standard size: 1000 watts, 110 volts. Installation requires No. 12 wire on separate circuit. Also in 500-watt and 2000-watt capacities. The 500-watt size may be connected with ordinary house lighting circuit.

Fireplace Blue Print Details Free on Request

A very informative blue print, "How to Avoid Common Mistakes in Fireplace Construction," showing the best and latest practices of correct design sent free on request. Special details if required. Complete catalogue free when requested on business stationery.



No.	Width of opening, in.	Flue areas, in.	No.	Width of opening, in.	Flue areas, in.
00	20 to 23	8 x 8	3	42 to 44	8 x 16
0	24 to 28	8 x 8	3-A	45 to 47	8 x 16
1	29 to 32	8 x 12	4	48 to 51	12 x 12
1-A	33 to 35	8 x 12	5	52 to 57	12 x 12
2	36 to 38	8 x 12	6	58 to 64	12 x 16
2-A	39 to 41	8 x 16	7	66 to 72	16 x 16

THE H. W. COVERT COMPANY

Manufacturers of Fireplace Specialties

243 East 44th Street, NEW YORK, N. Y.

Products

COVERT PATENT FIREPLACE DAMPERS and SMOKE CHAMBERS.

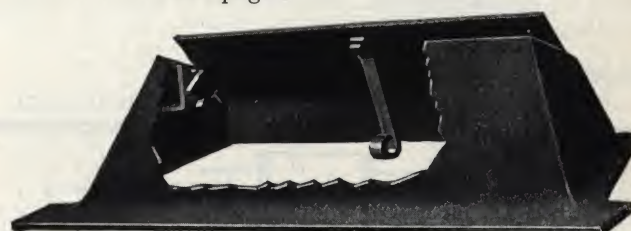
Also Cleanout Doors, Ash Dumps, Franklin Fireplaces, Coalhole Covers, Trap pit Covers, etc.

For Floor Drains, see page C2348.

COVERT
FIREPLACE DAMPERS
TRADE-MARK

for use in large and deep fireplaces.

Made in three series, 10, 12 and 16 ins. deep in the base opening, of extra heavy construction, as shown at the bottom of the next page.



"Old-Style" Damper Series A, B, C and F

Damper plate, operated by a lever reached with a poker, is adjustable to three positions: open, closed and half closed.

Covert Rotary "Face or Side Control" Damper

This type is especially adaptable for use where it is desirable to operate the plate from the face or side of the fireplace by a brass handle.



Covert Rotary "Face or Side Control" Damper

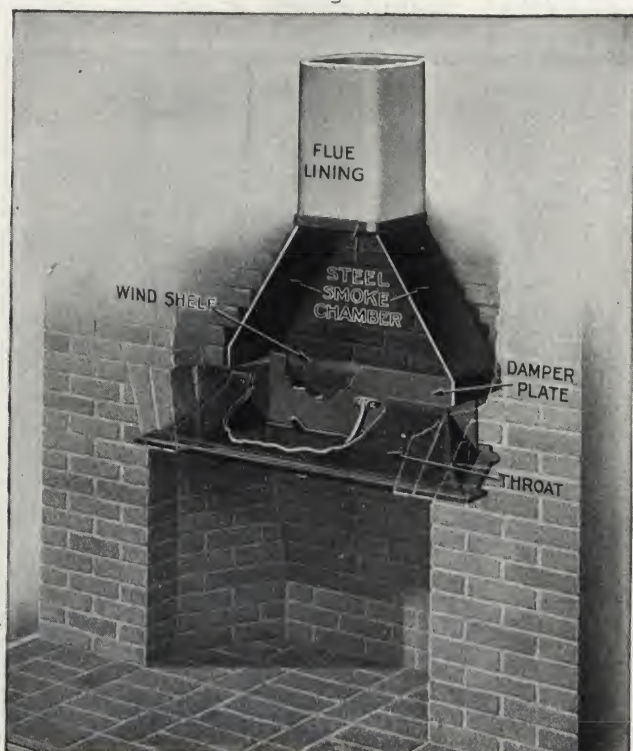
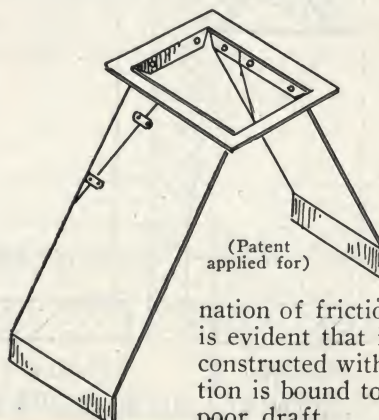
Avoiding the usual worm gear (which is likely to become clogged by accumulations of soot), the Covert damper makes use of a simple crank movement that can be connected up to operate from the face or the side of the fireplace with the mechanism accompanying each damper.

Cross section is approximately the same as Series C "Old-Style" with 9-in. depth and 5-in. height, made for fireplaces up to 48 ins. wide.

Covert Steel Smoke Chamber

To secure the best results a Covert steel smoke chamber should be built above the damper, forming a smooth and properly shaped approach to the flue, thereby reducing friction, increasing the flue power, saving mason's time and insuring proper form of construction.

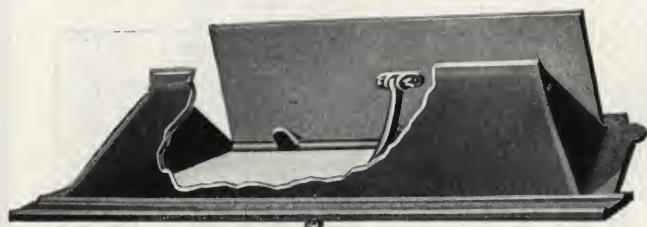
Since a successful fireplace depends largely upon the elimination of friction to the rising smoke, it is evident that if the smoke chamber is constructed with ragged brickwork, friction is bound to occur, thus resulting in poor draft.



Installation Showing "Improved" Damper and Steel Smoke Chamber

Covert "Improved" Fireplace Damper

This type is very efficient in action due to its curved front and wide, unobstructed smoke opening. Inrushing air follows the curved front up into the smoke chamber with a minimum of resistance.



"Improved" Damper Series D and E

The ratchet handle allows the damper plate to be adjusted to any size opening, from the front of the fireplace.

The operating mechanism is very simple and the valve plate is easily removed during construction or for removing accumulations of soot.

Used in fireplaces 20 ins., or less in depth at the hearth.

Covert "Old-Style" Damper

This type is preferred by some architects, especially

The Covert steel smoke chamber eliminates this difficulty in fireplace construction.

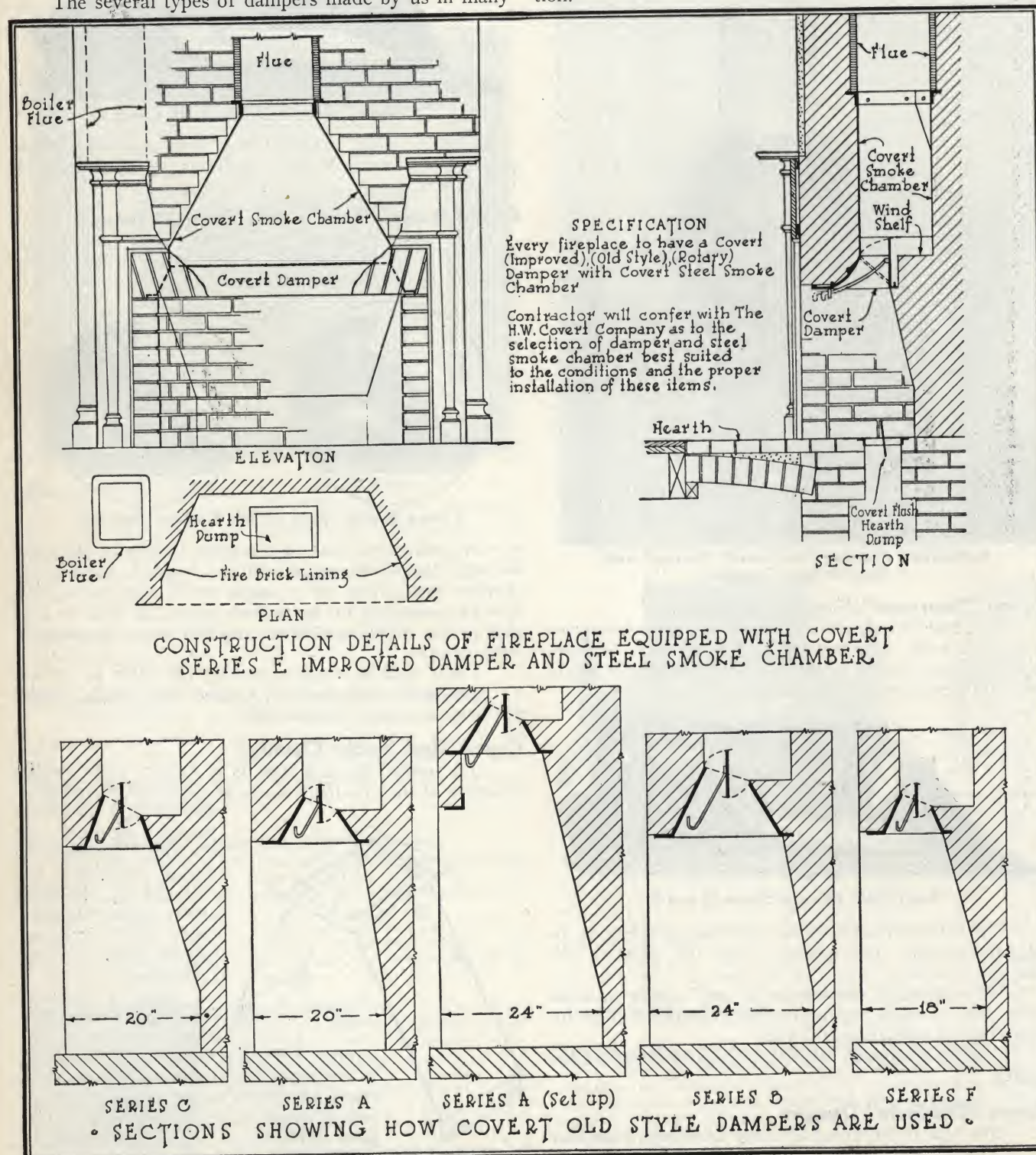
This smoke chamber consists of two steel plates, a collar the same size as the flue lining, and four bolts for fastening. The mason bolts the two plates to the collar, places this frame over the damper, and builds his brickwork around it. Thus we have a smoke chamber with smooth steel sides which practically eliminates friction. This is impossible in brick facing. Moreover we have a chamber of correct form scientifically designed for ample capacity, and installed in much shorter time than under the old method.

Service

The several types of dampers made by us in many

different sizes, covering fireplaces up to seven feet wide, provide the architect, when detailing his fireplaces, with a large choice to meet the many varying conditions encountered in fireplace construction. The following page shows sectional views of each separate type of damper, with their exact dimensions; and the accompanying table gives all further necessary information together with the size of flues recommended in both rectangular and round shape.

We are always pleased to have architects, owners or builders consult with us regarding details of construction of fireplaces and are glad to give them without charge, the benefit of our long experience. Our booklet of fireplace construction will be sent on application.



EDWIN A. JACKSON & BRO., INC.

Manufacturers of Jaxon Fireplaces and Building Specialties

50 Beekman Street; also Lexington Avenue and 65th Street

NEW YORK, N. Y.

Products

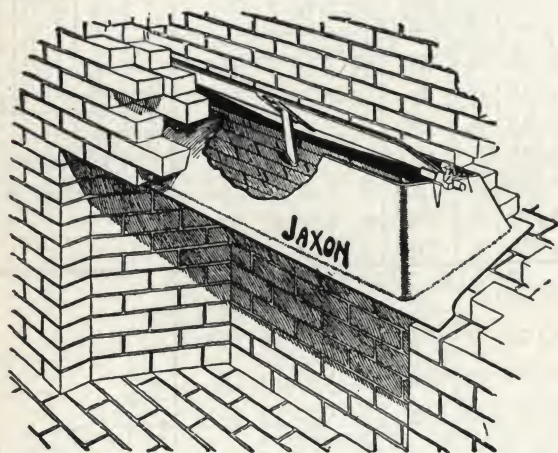
JAXON DAMPERS, SMOKE CHAMBERS, DUSTLESS ASH TRAPS, BUILT-IN and UNDERGROUND GARBAGE RECEIVERS, WOOD MANTELS, ANDIRONS and FIREPLACE FIXTURES.

Also manufacturers of Jaxon Sidewalk Chutes, Windo-Shutes, Package Receivers. For Wood Mantels, Franklin Stoves and Ventilating Grates, see page B1237.

Jaxon Dampers

These dampers are made in three styles, namely, throat, rotary and push. They are designed to insure best possible draft under all conditions.

Our throat type is the latest and best style of fireplace damper. The patent arm holds the door in any desired position. Operation is by poker; no handle shows on the face. Also made in extra width for very deep fireplaces.



Jaxon Throat Damper

No.	Dimensions, in.				Flue size
	Width fireplace opening	Extreme of flange			
		Front	Back	*Depth	
24-28	24	28	20	12	8x 8
30-34	30	34	25	12	8x12
32-36	32	36	27	12	8x12
36-40	36	40	31	12	8x12
42-46	42	46	37	15	12x12
48-52	48	52	43	15	12x12
54-58	54	58	50	15	12x16
60-64	60	64	58	19	16x16
72-76	72	76	70	19	16x16
84-88	84	88	82	19	16x20

*Also made in extra width for very deep fireplaces.

Jaxon rotary dampers and Jaxon push dampers operate from the front of the fireplace by a rotary rod or push handle. Rotary style can also be had to operate from end of breast.

Jaxon Smoke Chambers

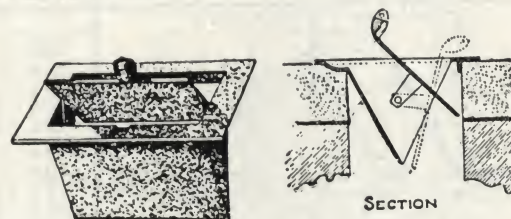
These are designed to prevent the irregular brickwork often carelessly laid in the throat running from the damper to the flue. Each chamber includes two metal sides, fitting damper below and attaching to a metal collar which fits flue above. When specifying, state whether greatest dimension of flue is parallel with face of breast. Also made to fit round flues.

Jaxon Dustless Ash Traps

For dropping ashes without dust from open fireplaces, kitchen ranges and coal grates to ash pits. The ash trap is set with the top flush with the hearth.

The trap is operated by a rod passing through the lower part of the range or grate, permitting the ashes to be passed from the fire to the ash pit without dust entering the room.

The door is easily operated and there are no springs to get out of order.



Jaxon Dustless Ash Trap

No.	Dimensions, in.		
	Outside flange	Brick opening	Trap opening
9	15 x 9	11 1/2 x 6 1/2	10 7/8 x 5 1/2
6	9 x 7	7 1/2 x 5 1/2	6 3/8 x 5

Jaxon Built-in Garbage Receivers

The Jaxon receiver is made of heavy cast iron, including the door and frame. The front of the receiver opens into the kitchen and is so arranged that, when the door is opened, the can is brought forward convenient for use. The door shuts tight and locks securely.

No. 3—Wall opening is 14 1/2 in. wide, 12 in. high and 10 in. deep.

No. 3K, same size and construction, also has an outside door for suburban use.

No. 4—Is similar, and fits a wall opening 19 in. wide, 19 in. high and 10 in. deep.

No. 4K, same size and construction, also has door at back for removal of can through the yard.



No. 3. Garbage Receiver

Wood Mantels

We manufacture wood mantels, copies of good Colonial designs, in stock for prompt shipment. We also make accurately from architect's designs.

For description see page B1237.

Andirons

We import Italian and English andirons, and also make reproductions. We also manufacture other fixtures that will be needed in fireplaces, including grates, fenders, spark screens, etc.

Catalogues

Our catalogues describing in detail all of our products will be gladly sent on request.

THE SYKES METAL LATH CO.

Manufacturers of Fireplace and Building Specialties
NILES, OHIO
REPRESENTATIVES IN ALL PRINCIPAL CITIES

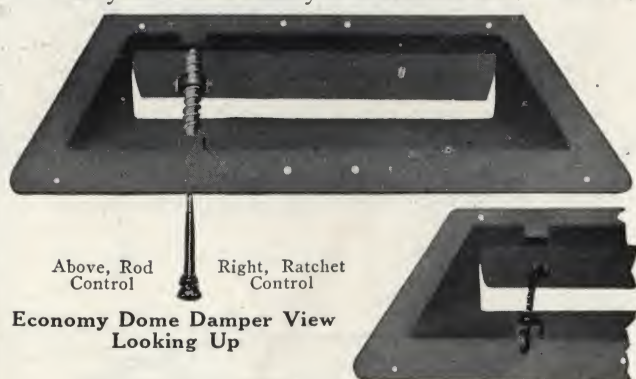
Products

ECONOMY DOME DAMPERS; SYKES ECONOMY ASH DUMPS; ASH PIT and CLEANOUT DOORS; ECONOMY COAL CHUTE DOORS; O. K. ADJUSTABLE THIMBLES; ECONOMY WALL PLUGS; ECONOMY WALL TIES; SYKES COPPER ALLOY STEEL BASEMENT WINDOWS.

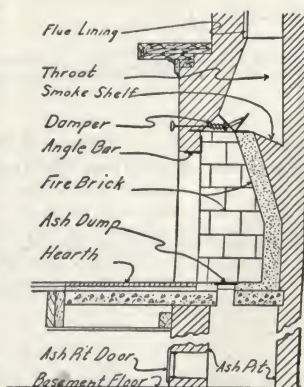
For Metal Lath, Corner Bead, Korerite, Base Bead, Cold Rolled Channel, see pages B1304-1305.

Economy Dome Dampers

Provide, as far as is mechanically possible, a positive means of regulating an open fire. They overcome the annoyance of a smoky or stubborn fire. There are



no working parts to become easily detached or broken. Operated by a ratchet or rod control. Ratchet control dampers are used where it is not desirable to cut through the mantel face. In ratchet control the operating mechanism is underslung and out of sight. By inserting the end of a common poker in the handle of the ratchet the door can be opened or closed to any degree and will stay in that position.



FIREPLACE DIMENSIONS AND DOME DAMPER SIZES

Fireplace			Damper					
Width, in.	Height, in.	Flue outside, in.	Damper area, sq. in.	No.	Dome width, in.		Over-all width, in.	
					Front	Back	Front	Back
24	28	8½ x 8½	52	24	24	18	30	20
28	28	8½ x 13	80	28	28	22	34	24
30	28	8½ x 13	80	30	30	25½	36	26
36	30	8½ x 18	104	36	36	30	42	32
42	30	8½ x 18	104	42	42	36½	48	38
48	33	13 x 13	169	48	48	42	54	44

Depth of dome, all sizes rod control type, 8½ in., poker control type 8 in. Height 4½ in.

Area of fireplace opening should not exceed 12½ times the net flue area.

Sykes Economy Ash Dumps

Provide a quick and economical means of allowing the ashes to drop. A slight pressure of the poker on the counterbalanced door dumps the ashes, and the door swings back into place shutting off up-drafts or dirt from the basement.

Size 5x7½ in.



"The Pyramids Are Permanent Too"

Ash Pit and Cleanout Doors

Installed in the base of the chimney for removal of the soot and ashes. Made in 4 sizes:

6x8 in. weight, 18 lb.
8x8 in. weight, 23 lb.
8x10 in. weight, 28 lb.
10x10 in. weight, 40 lb.



Ash Pit Door

Economy Coal Chute Doors

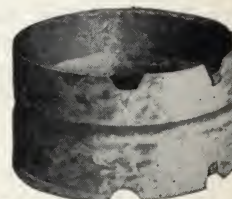
Solve the problem of getting coal into the cellar without disfiguring the outside walls. They cost no more than any ordinary glass window. Made entirely of steel with exposed parts galvanized and then painted to prevent rusting. No cast iron to break and no movable parts to get out of order. A simple automatic burglarproof lock is also a feature.



Coal Chute Door

O. K. Adjustable Thimbles

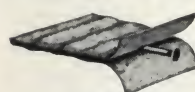
Help the mason in forming the smokepipe hole, hold the pipe snugly in the hole, and prevent sagging or slipping. Made of 26 and 28 gauge galvanized steel.



O. K. Thimble

Economy Wall Plugs

A standard nailing base for interior trim or furring when



Wall Plug

attached to brick, tile or masonry walls. The sides are closed to prevent admission of wet mortar and the deep corrugations grip the nail firmly.

Economy Wall Ties

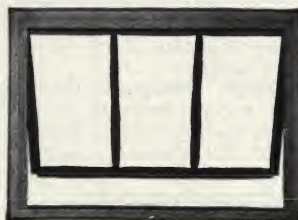
Made from good quality galvanized sheets, of uniform size and gauge. Punched with 2 holes at one end which makes them suitable for use in veneer or solid brick construction. Size 7/8x7 in.



Wall Tie

Sykes Copper Alloy Steel Basement Windows

Extra heavy, easy to install and absolutely water-tight. Have double contact weathering, cam acting lock and two-piece frame. Fit perfectly in concrete, brick or cement block walls. Sash can be removed from the frame by merely lifting from the hooks.



Basement Window

Shipped unglazed.

WINDOW SIZES

Code No.	Light		Width, ft. in.	Height, ft. in.	Weight, lb.
	Number	Size, in.			
21	3	10x12	2 9¼	1 3	29
22	3	10x20	2 9¼	1 11	35
23	2	14x20	2 7¾	1 11	31

PEERLESS MANUFACTURING CO., INC.

Fireplace Dampers and Builders' Specialties

LOUISVILLE, KY.

Products

DOME (Fireplace) DAMPERS; COAL WINDOWS; ASH PIT DOORS; ASH TRAPS; IN-THE-GROUND GARBAGE RECEIVERS.

Also manufacturers of Fireplace Furniture (Andirons, Baskets, Screens, Fire Sets, etc.), Gas Ranges, Combination Coal and Gas Ranges, Coal Ranges, Gas Heaters, and other Builders' Specialties.

Peerless Dome (Fireplace) Damper

This damper is designed to insure a good draft under all atmospheric conditions. It consists of a flanged dome with a door at the top and is manufactured from select gray iron. The front flange is sufficiently strong to support the fireplace arch without the use of angle iron or bar lintel; when a segmental brick arch is used this flange may be cut off as shown on Drawing No. 1. The door is so constructed that it can be readily removed (without the use of tools) giving access to the flue at all times.

Types—There are three types, A, B and C. The dimensions of each of these types are given in the table on drawing No. 1 on the following page. Dampers A, B and C are illustrated to the right. These letters do not indicate in any way the method of operation. There are three styles of control:

Face Control—Operated by means of a brass handle attached to a shaft extending through the face of the mantel. By means of a worm gear and cam arrangement, a three-quarter turn of the handle completely opens or closes the door. The mechanism is exposed inside the dome so that it can be adjusted after the fireplace is built.

Underslung Ratchet Control—Door is operated by means of an underslung forged steel notched lever with brass handle which operates in a cast iron loop fastened underneath the right front flange.

Chain Control—Operated by two pull chains, marked S (shut), O (open). This control is necessary when damper is placed high in the flue.

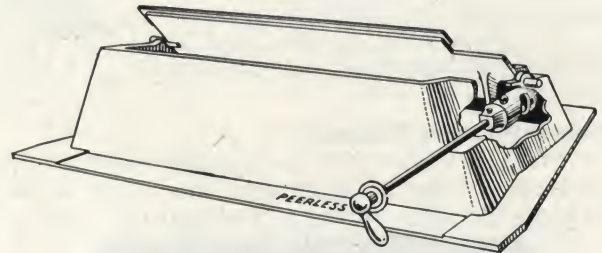
Note Carefully: Styles A and B dampers can be furnished with face, underslung ratchet or chain control. Style C furnished with chain control only. These different styles of controls are interchangeable on the same damper.

Specification for Peerless Dome Dampers—Peerless Dome Dampers are to be installed in accordance with detailed drawings and instructions issued by the manufacturers. Damper is to be placed immediately above the fire chamber, covering its full length, back of damper to rest on top of smoke shelf, the flange at the front of damper to act as an arch bar.

Furnish and set Peerless Dome Dampers as manufactured by THE PEERLESS MANUFACTURING CO., INC., Louisville, Ky., for all fireplaces throughout. To be (mention here the style and size and the particular type of operation desired as described above).

Blue Prints

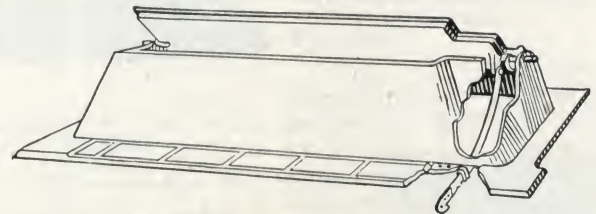
Blue prints and booklet showing complete line sent free on request.



Style A Dome Damper
(Sectional End View Illustrates Face Control)

Face, underslung ratchet or chain control

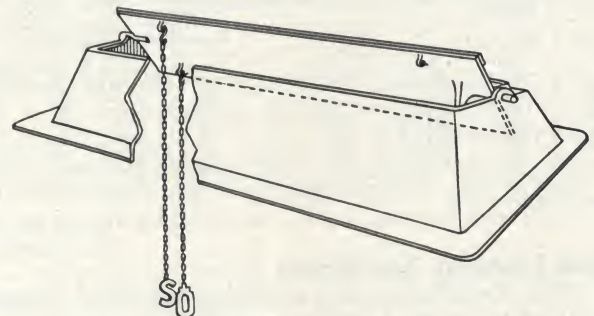
This damper is slightly deeper (front to back) than Style B or C. The principal differences between the three styles is in the measurements which can readily be seen by referring to the table on the following page



Style B Dome Damper
(Sectional End View Illustrates Underslung Ratchet Control)

Face, underslung ratchet or chain control

A really improved damper. The front flange is extra wide, about 2½ in., and is paneled, thus giving a better seating for mortar and added strength when flange is used as arch bar. This damper has about 2 in. less depth (front to back) than Style A



Style C Dome Damper
(Sectional End View Illustrates Chain Control)

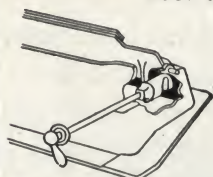
Chain control only

Operates by chains attached to door. Pulling down on chain "O." opens door. Pulling down on chain "S." closes door. A very simple arrangement for operating door when damper is placed far up the flue. Chains may be lengthened to suit the requirement of any fireplace

The differences in Dome Dampers A, B and C can be noted by referring to the table of dimensions below.

STYLE	METHOD OF CONTROL
A	Face, Underslung Ratchet or Chain.
B	Face, Underslung Ratchet or Chain.
C	Chain Control Only.

IMPORTANT: Be careful to specify control desired.



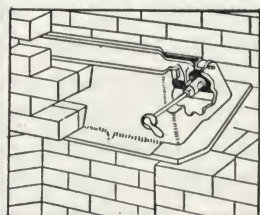
FACE CONTROL: Operated by means of a brass handle attached to a shaft extending through the face of the damper. By means of a worm gear and cam arrangement, a three-quarter turn of the handle completely opens or closes the door.



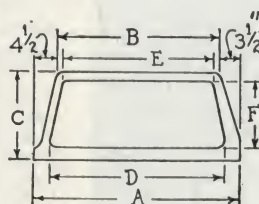
UNDERSLUNG RATCHET CONTROL: Door is operated by means of an underslung forged steel notched lever with brass handle which operates in a cast iron loop fastened underneath the right front flange.



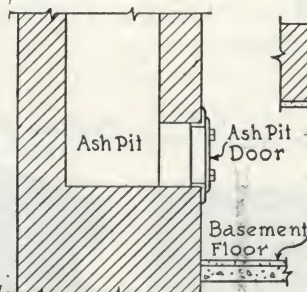
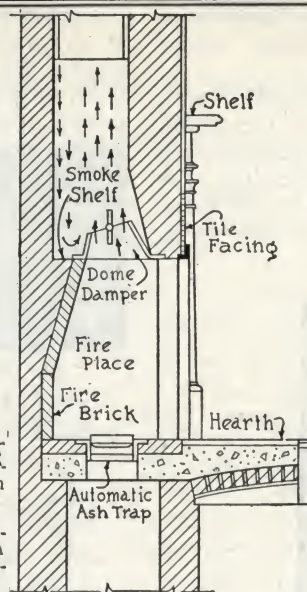
CHAIN CONTROL: Operated by two pull chains, marked S (shut) O (open). This control is necessary when damper is placed high in the flue.



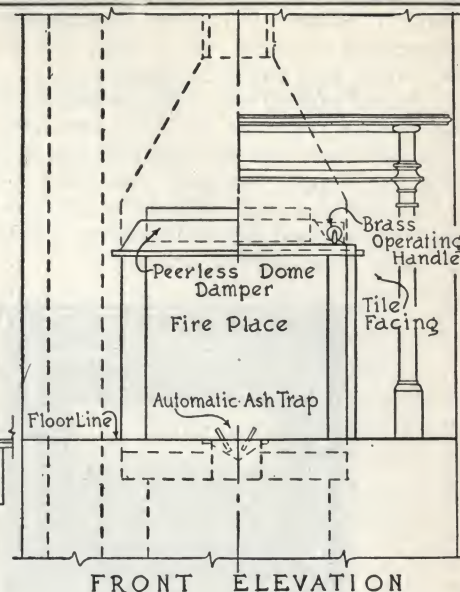
PERSPECTIVE SHOWING METHOD OF SETTING DAMPER



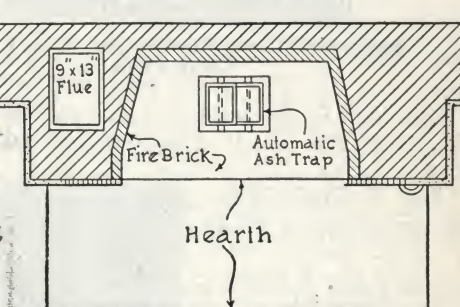
KEY PLAN
(See Table Below for Dimensions)



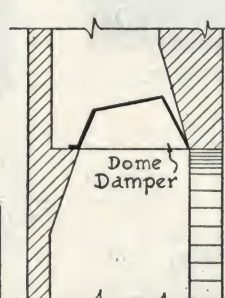
VERTICAL SECTION
DETAILS OF FLAT ARCH FIREPLACE



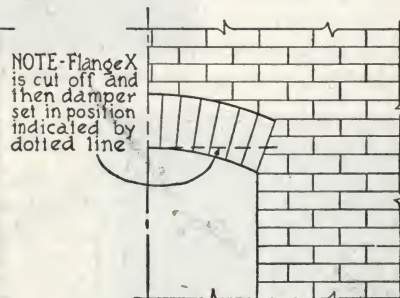
FRONT ELEVATION



PLAN
DETAILS OF FLAT ARCH FIREPLACE

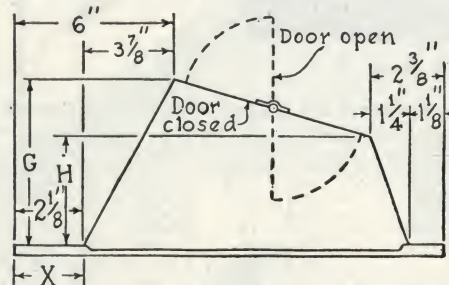


CROSS SECTION



ELEVATION

DETAILS OF SEGMENTAL ARCH FIREPLACE



DETAIL OF PEERLESS DOME DAMPER

Damper Number	Front Width of Fire place Opening	Overall Base Dimensions of Dampers			Dimensions of Dome Opening at Base of Damper and Rear			Height of Dome Front	Proper Size Flue Dims	Round Flue Inside Dims	Shipping Weight Crated Pounds	
		A	B	C	D	E	F					G	H
A-24	24	28	20	15½	24	18½	12½	5	3½	9x13	9	38
A-28	28	32	24½	15½	28	22	12½	5	3½	9x13	10	40
A-30	30	34	26½	15½	30	24	12½	6	4¼	9x13	10	45
A-33	33	37	29½	15½	33	27	12½	6	4¼	9x13	10	50
A-36	36	40	32	15½	36	30	12½	6	4¼	9x13	10	55
A-39	39	43	35½	15½	38	33	12½	6	4¼	13x13	12	61
A-42	42	46	38	15½	42	36	12½	6	4¼	13x13	12	65
A-48	48	52	44½	15½	48	42	12½	6	4¼	13x13	12	68
A-54	54	58	50½	15½	54	48	12½	6	4¼	13x18	15	85
A-60	60	64	55½	15½	59½	53½	12½	6	4¼	18x18	18	100
A-68	68	72	70	19	68	67	14½	7¾	5½	18x18	18	189
B-24	24	28	23½	13¾	24	19	9¾	4¾	3½	9x13	9	37
B-28	28	32	27¾	13¾	28	24	9¾	4¾	3½	9x13	10	39
B-30	30	34	29½	13¾	30	26	9¾	5¼	3¾	9x13	10	43
B-36	36	40	35½	13¾	36	31	9¾	5¼	3¾	9x13	10	48
B-42	42	46	41½	13¾	42	38½	9¾	5¼	3¾	13x13	12	54
B-48	48	52	47½	13¾	48	44	9¾	5¼	3¾	13x13	12	64
C-24	24	28	25½	11¼	24	19½	8¾	4½	3¼	9x13	9	26
C-30	30	33½	31¼	11¼	30	25½	8¾	4½	3¼	9x13	10	30
C-36	36	39½	37¼	11¼	36	31½	8¾	4½	3¼	9x13	10	32

*Chain control only

DRAWN BY
SWEETS CATALOGUE
SERVICE, INC.

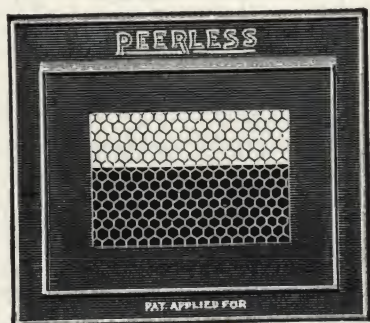
DETAILS OF PEERLESS DOME DAMPER

NOT DRAWN
TO SCALE
DATE-JULY '27
DRWG
1

Peerless Coal Windows

No. 1 Coal Window—Completely automatic. Recommended for the better type of houses, apartments, stores and public buildings.

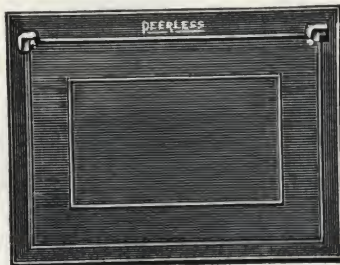
A gentle pull of the chain, which is usually placed in the kitchen, releases the lock and opens the chute, bringing the door back into the wall and at the same time pushing the hopper forward into place. The chain is then fastened to a peg. When the chain is released, the hopper recedes and the door swings gently into place, at the same time locking securely.



Automatic Coal Window No. 1 with Wire Glass Panel

Cast iron frame and heavy cast iron door fitted with 1/4-in. wire glass panel. Heavy gauge boiler plate hopper.

No. 2 Coal Window—Equipped with pull chain control like No. 1 and has a gravity catch. Malleable iron frame and extra heavy boiler plate door. Furnished with or without hopper. Can also be equipped with 1/4-in. wire glass door panel.



No. 2 Coal Window



No. 3 Coal Window

No. 3 Coal Window—Malleable iron frame and hinges, heavy boiler plate door. When door is closed it locks automatically. No hopper or chains.

DIMENSIONS AND WEIGHTS OF PEERLESS COAL WINDOWS

	No. 1	No. 2*	No. 3
Extreme width.....in.	25 1/4	25 1/4	26 3/4
Extreme height.....in.	22 3/4	19 1/2	21
Width of wall opening.....in.	23	24	23
Depth of wall opening.....in.	12	12	9
Height of wall opening, front.....in.	19	17	17
Height of wall opening, rear.....in.	21	19	18 1/4
Door opening.....in.	20x11 1/2	20 1/4x11 3/8	22 1/4x16 3/8
Shipping weight.....lb.	94	62	45

*With wire glass or steel door. Hopper extra.
10 ft. of brass plated steel chain furnished with Nos. 1 and 2.

Specifications for Peerless Coal Windows—Furnish and set where shown on drawings (or herein specified; mention location) Peerless No. 1 (or Peerless No. 2 or 3 coal windows as manufactured by the PEERLESS MANUFACTURING Co., INC., Louisville, Ky. Windows to be securely built into the masonry.

Peerless Ash Pit Doors

Peerless ash pit doors are made of heavy cast iron in all standard sizes. Black japan finish. Doors and frames are carefully ground to make them dust tight. Used at bottom of ash pits through which ashes are removed or at bottom of flues to clean out soot.



Ash Pit Door No. 3

NO. 3 DIMENSIONS AND WEIGHTS

Door opening, in.	Shipping weight, lb.
5 x 7	5
8 x 8	6
8 x 10	7
10 x 12	10
12 x 16	16
14 x 20	22
16 x 24	33

No. 2—This door is made reversible and can be set so the door may be swung to the right or left.

DIMENSIONS AND WEIGHTS

No.	Outside dimensions, in.	Shipping weight, lb.
8	7 x 10	3
8	9 x 11	4
9	7 x 10	3 1/2
9	9 x 11	5



No. 9 Automatic Ash Trap

Peerless In-the-ground Garbage Receiver

Buried under ground with only the top exposed. Garbage deposited by simply stepping upon lever arrangement which raises the lid. To empty the contents the garbage man has only to lift top and remove can. Top hinged to shell to prevent being carried away.



Comes in three sections, a copper-steel rust resisting outer casing, with its attached cast iron lid and a galvanized iron pail. Easy to install. Simply dig a hole wherever you wish the receiver placed—near kitchen door, sidewalk or street curb—and insert outer casing.

DIMENSIONS, CAPACITIES AND WEIGHTS OF GARBAGE RECEIVERS

Can capacity, gal.	Shell diameter, in.	Shell depth, in.	Top diameter, in.	Shipping weight, lbs.
8	16	14	16 3/4	34
12	16	20 1/2	16 3/4	39
15	16	25	16 3/4	42
20	19 1/4	25	20 1/2	56

Peerless Fire-place Lining Set No. 42

Each set consists of a back and two sides or wings. Made of high grade cast grey iron. Design of sides matches back.

Back: 20, 24, 27, 30 or 36 in. wide by 30 in. high. Sides: 12, 15, or 18 in. wide by 30 in. high. Also made in special sizes.

Folder illustrating complete line of Lining Sets sent on request.



BABCOCK-DAVIS CORPORATION

Manufacturers of Pre-cast Concrete Stairs with Steel Stringers

474 Dorchester Avenue

BOSTON, MASS.

Products and Services

BABCOCK-DAVIS PRE-CAST CONCRETE STAIRS WITH STEEL STRINGERS. (Patented.)

Also manufacturers of Ornamental Iron Work: including Cast and Wrought Iron Stairs; Railings, Marquises; Wire Grilles; Elevator Fronts, Frames and Thresholds.

Our engineers invite consultation during preparation of plans and will gladly co-operate in making working drawings and computing proper sizes required. Estimates submitted on request.

For Steel Flagpoles, see page A588.

Pre-cast Concrete Tread and Riser

Strength (Factor of Safety, 10)—At the Massachusetts Institute of Technology tests were made by Professor Irving H. Cowdrey on 4 units. Each unit consisted of a pre-cast concrete tread, 4 ft. long by 11¼ in. wide, and 8-in. riser mounted on steel channel iron stringers. The average of these tests shows:

First hair crack in riser at 2300 lb. total load. Maximum load 3575 lb.

Construction—"Pre-cast concrete tread and riser" construction is economical to install and maintain, and is made from a scientifically prepared formula which makes the stair as hard as stone and practically indestructible. The Babcock-Davis "Pre-cast Tread and Riser" stair marks a decided advancement in stair construction for either inside or outside installation. As the name suggests, it is a combined reinforced concrete tread with steel nosing and riser cast in one interlocking unit. This work is done in our own shop and the units are shipped to the building under construction, where they are applied to the steel stringers furnished by us.

Advantages

Its very practical principle of interlocking, replaceable units has many advantages:

It is of lighter construction, is installed more quickly, at a smaller cost than stairs made entirely of concrete, has a steel nosing and *stringer buttress* as required by insurance engineers.

Wood forms, and such obstructions which delay building operations while the cement is hardening in all-concrete stair construction, are done away with.

There is no ringing sound or vibration to Babcock-Davis "Pre-cast Concrete Stairs" when in use, for they are practically noiseless. They are attractive in appearance. All joints are tight. Their upkeep is reduced to a minimum, as steps need not be painted, and, being dustless, they are easily kept clean.

Babcock-Davis "Pre-cast Concrete Treads and Risers" treated with our Non-slipping Formula and with our steel nosing cast into the tread is a fine safety tread, with no opportunity to chip the nosing.

Specifications

In writing specification, state: "BABCOCK-DAVIS CORPORATION, 474 Dorchester Avenue, Boston, Mass., Patentee, will furnish steel stringers, railing and 'Pre-Cast Concrete Treads and Risers' with steel nosing complete."

For schools, hospitals and public buildings, where non-slipping qualities are desired, specify "To be treaded with BABCOCK-DAVIS CORPORATION Non-slipping Formula."

Installations

We have installed our pre-cast concrete stairs in a great many buildings in the United States and in every case they have received the highest praise and approval of every engineer and architect who has investigated them including the Building Department of the City of Boston.



Pre-Cast Concrete Stair
with Steel Nosing

BOIS PATENTED INTERLOCKING SHEET STEEL STAIRS

(N. BOIS, PATENTEE, 2846 CALIFORNIA STREET, SAN FRANCISCO, CAL.)

MANUFACTURED IN THE UNITED STATES, CANADA AND EUROPE BY THE FOLLOWING COMPANIES

New England States

E. VAN NOORDEN & CO.,
100 Magazine Street, Boston, Mass.

Georgia, Tennessee, Florida, North and South Carolina

DOWMAN-DOZIER MFG. CO.,
Campton Road, Atlanta, Ga.

Ohio, Michigan and Indiana

THE RIESTER & THESMACHER CO.,
1512 West 25th Street, Cleveland, Ohio

Nebraska, Kansas and Oklahoma

PAXTON & VIERLING IRON WORKS,
South 17th Street and Union Pacific Railway, Omaha, Neb.

Illinois, Wisconsin and Iowa

WETZEL IRON WORKS,
3349 West Grand Avenue, Chicago, Ill.

Texas

SOUTHERN ORNAMENTAL IRON WORKS,
Dallas, Tex.

Southern California, Arizona and Hawaiian Islands

A. J. BAYER CO.,
Slauson and Santa Fe Avenues, Los Angeles, Cal.

Missouri

LASAR MANUFACTURING CO.,
16th and O'Fallon Streets, St. Louis, Mo.

Northern California

PEERLESS ORNAMENTAL IRON CO., INC.,
1528 Folsom Street, San Francisco, Cal.

Alabama, Louisiana, Mississippi and Arkansas

DECATUR CORNICE & ROOFING CO., INC.,
Decatur, Ala.

Kentucky and Virginia

LOGAN CO. (formerly The Dow Co.)
1025 Franklin Street, Louisville, Ky.

Maryland, Delaware, District of Columbia, Colorado, Wyoming and Utah

THE HUGHES-KEENAN CO.,
Mansfield, Ohio

New York and New Jersey

PAN-AMERICAN IRON WORKS, INC.,
447-453 East 120th Street, New York, N. Y.

Quebec, New Brunswick, Nova Scotia and Prince Edward Islands

GEO. W. REED & CO., Ltd.,
37 Saint Antoine Street, Montreal, Canada

Great Britain, France and Belgium

FREDK. BRABY & CO., Ltd.,
Petershill Road, Glasgow, Scotland

Ontario

THE A. B. ORMSBY CO., Ltd.,
150 Van Horn Street, Toronto, Ontario

Manitoba and Saskatchewan

DOMINION BRONZE & IRON CO., Ltd.,
Pacific Avenue and Yeoman Street, Winnipeg, Canada

British Columbia, Alberta

PACIFIC SHEET METAL WORKS, Ltd.,
Industrial Island, Vancouver, B. C.

Products

BOIS PATENTED INTERLOCKING SHEET STEEL
TREADS and RISERS.

Also manufacturers of Sheet Steel Stairs.

Advantages

Bois interlocking tread and riser offers distinct advantages of economy, rigidity and rapid erection. The *interlocking* feature eliminates the labor of bolting or riveting, and makes rapid installation possible with unskilled labor.

Heretofore the nosing on sheet metal stairs broke away from the composition steps. Bois interlocking tread and riser prevents breaking away the nosing from the composition step under the heaviest traffic. Its superiority and economy in construction can be readily seen.

Interlocking Feature

The interlocking tread and riser combined is formed from a single sheet of steel with flanged member that interlocks at the nosing line. The metal becomes double thick which reinforces the steps.

Labor Saving Installation

A tie rod is inserted under each tread through the stringer. The installation consists only of setting the tread, bolting up the tie rod and inserting two bolts for each tread where the tread meets the flange of stringer, doing away with the bolting or riveting as in ordinary types of stair work, and speeding up the erection.

Varied Standards

The gauge of metal varies with the width of the stairs and weight to be carried. The interlocking treads and risers can be used with any type of stringer such as sheet steel construction or concrete.

The treads are adaptable to any kind of composition fill, slate, marble, asphalt or concrete, also for any desired safety tread.

Deliveries

When sheet steel stringers are used, the stairs can be assembled at the factory and delivered at the building ready for installation. Each section can be installed as the building progresses, eliminating the use of temporary stairs or ladders, doing away with unnecessary expenses.

If concrete stringers are to be used, the treads and risers are interlocked and put in position from floor to floor, after which the stringers are moulded as usual.

Inquiries

Make all inquiries for estimates to the Manufacturer (list in heading) controlling the territory in which the building is to be erected. State number of treads and risers, width of stairs; type of stringers, and nature of tread. Include sketch or drawing on which all dimensions and quantities are indicated.

Specifications

All metal stairs throughout the building shall be of the Bois Interlocking Tread and Riser construction type.

Each tread and riser shall be of one continuous piece of No. 12 or No. 14 gauge sheet steel. The tread metal shall be continued up and bent into an inner nosing, around which the outer (wearing) nosing shall be bent and secured by an interlocking, depending flange, reinforcing the step and preventing the nosing from breaking away from the concrete.

The junction of the treads and risers shall be securely fastened to the lower flange of the stringers with $\frac{1}{8}$ -in. diameter round machine bolts.

The face and wall stringers shall be of No. 10 gauge sheet steel, with outward top flange and inward bottom flange. Stringers shall be securely tied together with $\frac{1}{8}$ -in. diameter tie rods, placed under each tread, near the nosing.

Platforms or landings shall be of No. 14 gauge corrugated steel plates, with interlocking nosing for connection with riser and shall be securely fastened to angle iron supports connected to stringers.

Newels, railings and balustrades to be of design and construction as indicated on plans.

All work to have 1 shop coat of approved paint.

Information and Catalogue

For full information and illustrated catalogues and detail drawings apply to agent or N. Bois, 2846 California Street, San Francisco, Cal.

FEATURE OF THE BOIS PATENT INTERLOCKING TREADS AND RISERS FOR STAIR CONSTRUCTION;

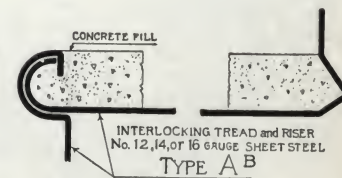
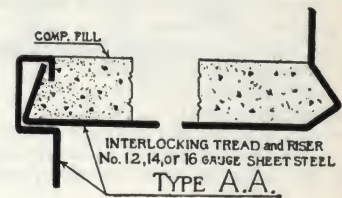
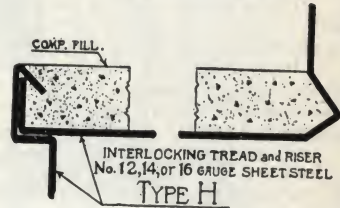
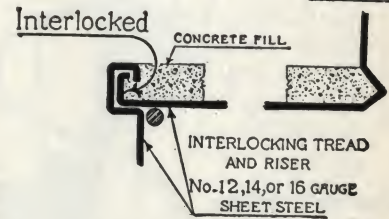
It eliminates all bolting and riveting thus saving considerable labor when assembling the stairs. Where the tread interlocks at the nosing the metal becomes double thick, reinforcing the step and preventing the metal breaking away from the concrete.

It is the most practical, economical, superior stair construction.

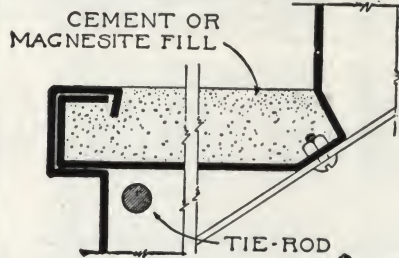
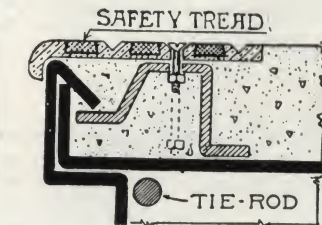


as it Interlocks

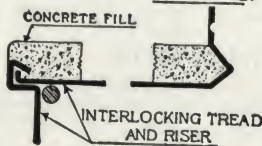
TYPE A



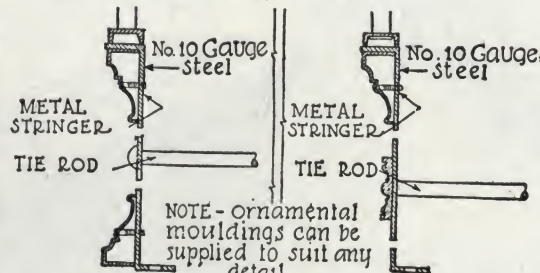
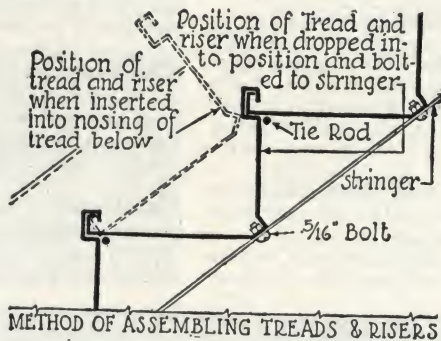
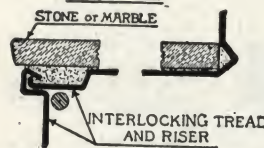
U. S. Patent No. 1,244,021
U. S. Patent No. 1,304,533
U. S. Patent No. 1,353,377
Canadian Patent No. 194,134
Canadian Patent No. 194,135
Canadian Patent No. 213,306
France Patent No. 501,494
Belgian Patent No. 281,657
Great Britain Patent No. 145,251



TYPE C



TYPE E



DETAILS OF METAL STRINGERS

APPROXIMATE WEIGHT OF BOIS INTERLOCKING TREADS AND RISERS

WIDTH OF STAIRS	SQ. FT. OF METAL IN ONE INTERLOCKING TREAD AND RISER	WEIGHT OF ONE INTERLOCKING TREAD AND RISER		
		NO. 12 GA.	NO. 14 GA.	NO. 16 GA.
2'-0"	4 sq. feet	18.0 lbs.	12.8 lbs.	10.4 lbs.
2'-6"	5 " "	22.5 " "	16.0 " "	13.0 " "
3'-0"	6 " "	27.0 " "	19.2 " "	15.6 " "
3'-6"	7 " "	31.5 " "	22.4 " "	
4'-0"	8 " "	36.0 " "	25.6 " "	
4'-6"	9 " "	40.5 " "	28.8 " "	
5'-0"	10 " "	45.0 " "	32.0 " "	
5'-6"	11 " "	49.5 " "		
6'-0"	12 " "	54.0 " "		

TYPICAL SECTIONS SHOWING CONSTRUCTION OF BOIS PATENTED INTERLOCKING TREADS AND RISERS

TEST OF BOIS PATENT INTERLOCKING SHEET STEEL STAIR
MADE BY E. VAN NOORDEN CO., BOSTON, MASS.
December 9, 1924

In order to determine accurately the safe loading for the Bois Interlocking Sheet Steel stair, a test was conducted by Professor H. W. Hayward of the Massachusetts Institute of Technology, Cambridge, Mass. A summary of this test is as follows:

"The full load of 600 pounds per square foot was allowed to remain upon the stairs for two weeks. The load was then removed and after four days the inspection was made.

"The slight distortion in channel header (at top) straightened out when the load was removed. The deflection in the top flange of runner was reduced to a negligible amount upon removal of the load. The general appearance of the stairs was good. No indications of overstrain could be noted either as regards lateral or vertical deflections.

"It should be noted that during the time the load was on the stairs the temperature varied approximately from 0° to 50° F. This variation in temperature would cause additional indeterminate stresses on the stairs."

Full report of test will be sent on request.

GUARSTEEL SAFETY STAIR COMPANY

Manufacturers of Safety Steel Stairs

165 West Wacker Drive

CHICAGO, ILL.

Products

GUARSTEEL STAIRS.
BENT STRINGERS.
TREADS and RISERS.
CIRCULAR STAIRS.
GUARSTEEL THRESHOLDS.
STAIR NOSINGS.

Guarsteel Stairs

The unusual success and wide use of Guarsteel Stairs is largely due to the safety tread feature, the application of which is clearly shown in the illustration below.

In making the treads, small bosses or buttons are first pressed into the plate; a $\frac{1}{8}$ -in. hole is then perforated through the center of each boss. The result is a long lived, non-slipping tread.

Treads and risers can be made in any shape or form as shown on the following pages, and are made of Nos. 12, 14, or 16 gauge blue annealed or copper-bearing rust resisting sheet steel, depending upon conditions. The antislip feature of the Guarsteel Safety Tread is permanent, and while this feature is patented, Guarsteel Stairs can be sold at the price of ordinary steel stairs because of their simplicity of design and correspondingly low shop cost.

Hard usage does not affect the Guarsteel Safety Tread, as the cutting edges of the holes are worn sharper by continued service, and remain effective against slipping.

The installation of Guarsteel Safety Stairs relieves owners of the constant worry of the possibility of accidents in which

people slip and sustain injuries such as broken bones, etc. Guarsteel Safety Stairs constitute one of the best forms of accident insurance that an owner can provide for his own protection.

Engineering Service

We maintain a department of experienced draftsmen and designers, ready to serve architects and builders at all times. We assist in the designing or re-designing of any type of stair that may be desired for any building.

Circular Stairs

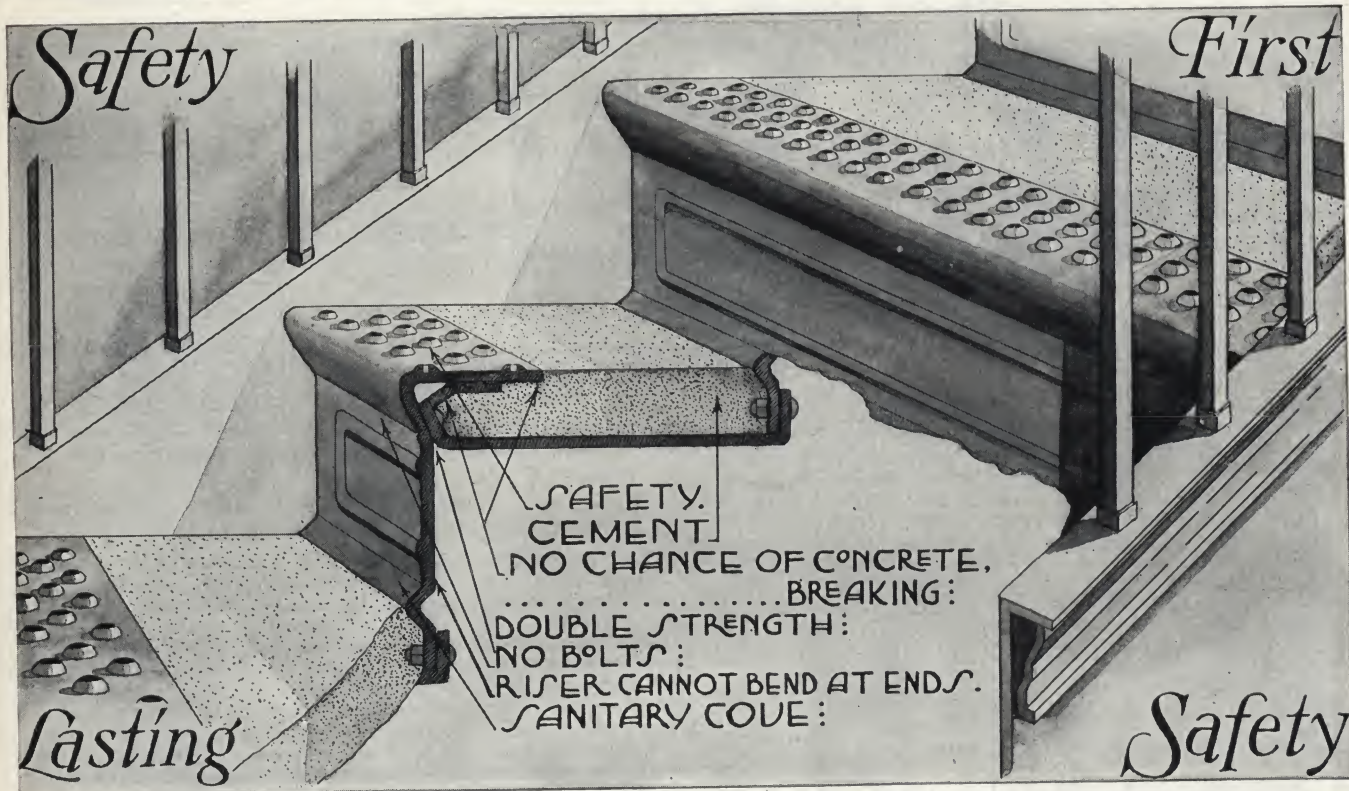
Guarsteel Spiral Stairs are 40% lighter than cast iron stairs; they are slip-proof and are provided with Guarsteel safety features. A big saving in price, less weight to carry on floor or supports, less freight charges. All materials being made of steel, there is no chance of breakage in shipping or installation; no patterns to be made or changed, and no waiting for castings from foundry. The result is a light stair throughout, which is very simple to erect.

Thresholds

Guarsteel Thresholds are less than half the weight of cast iron, and can be made in any required length. The same safety feature is applied to the surface of these thresholds that is used on our stairs.

Catalogue

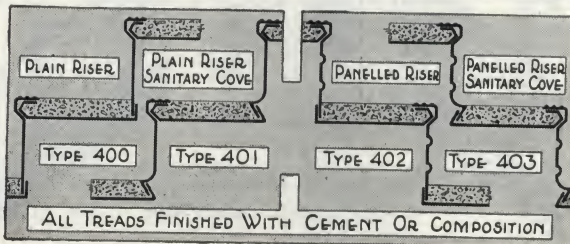
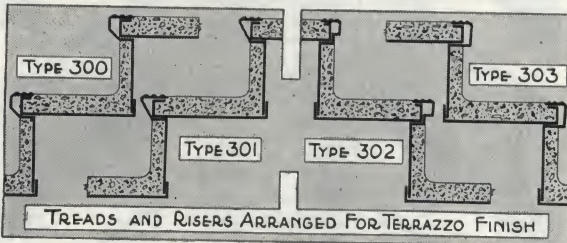
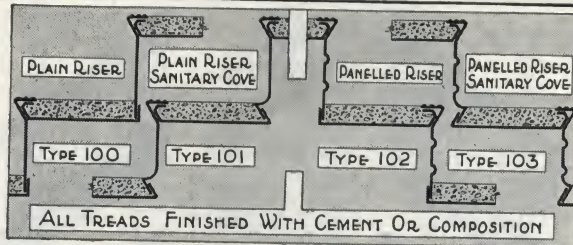
Our complete catalogue is ready for you and contains very useful data and pleasing designs. Co-operation with agents is one of the features of our service.



GUARSTEEL SAFETY STAIRS

Guarsteel Safety Stair Company

165 WEST WACKER DRIVE.
CHICAGO, ILL.



Safety

TYPE G®
STEEL TREADS, WITH ENTIRE UPPER SURFACE PROVIDED WITH *Guarsteel Safety Buttons*. PROVIDED WITH RISERS. TREADS & RISERS ARE ½ WEIGHT OF CAST IRON. IMPOSED LOAD ON THE FLOOR CONSTRUCTION IS AN ITEM TO CONSIDER. ALL MATERIAL CAN BE ERECTED FROM BELOW. NO BULKY CASTINGS TO SLIDE OVER PIPE.

LESS WEIGHT
40% CHEAPER
EASIER TO ERECT
NO BREAKAGE



First

STANDARD SIZES		
DIAM.	CTR. PIPE	TREADS TO CIRCLE
48	3"	12 on 16
54	3½"	12 on 16
60	4"	12 on 16
66	4"	12 on 16
72	4"	12 on 16

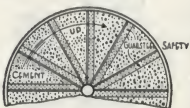
Lasting

Safety

SPIRAL STAIRS OCCUPY ABOUT 30% OF THE SPACE REQUIRED FOR AN ORDINARY STAIRWAY, AND ARE SERVICEABLE FOR STORES, OFFICES, BOILER ROOMS, POWER PLANTS AND THEATRES.

Safety

STANDARD SIZES		
DIAM.	CTR. PIPE	TREADS TO CIRCLE
48	3"	12 on 16
54	3"	12 on 16
60	3½"	12 on 16
66	4"	12 on 16
72	4"	12 on 16



RAILINGS
WE USE 1" GAS PIPE FOR STAIRS, UNLESS OTHERWISE SHOWN OR SPECIFIED. WE CAN FURNISH BRASS, BRONZE, OR SPECIAL ORNAMENTAL RAILINGS IF DESIRED.



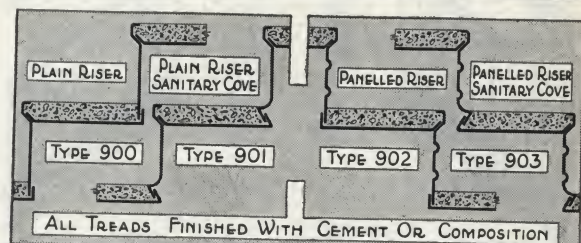
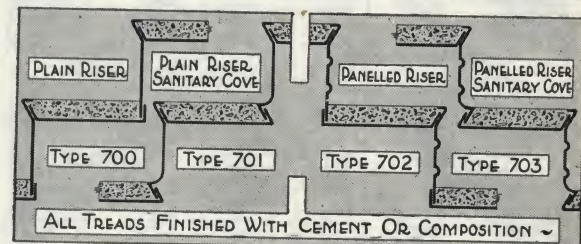
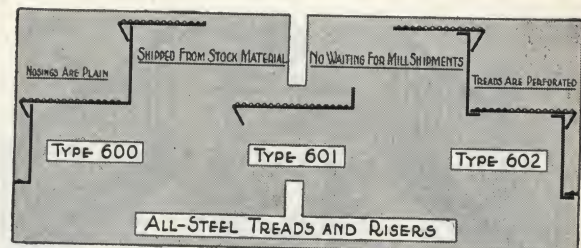
First

TYPE G®
RECESSED 2" FOR CEMENT OR COMPOSITION FILLING WITH SHEET STEEL RISERS. PROVIDED WITH *Guarsteel Safety Buttons* ON THE NOSINGS OF TREADS AND PLATFORMS. NO PATTERNS TO BE CHANGED. NO WAITING FOR CASTINGS FROM THE FOUNDRY. A SAVING IN FREIGHT, CARTAGE & HANDLING CHARGES. MADE EITHER HAND.

SAFETY NOSINGS
EASY TO ERECT
NO BREAKAGE

"Won't Let You Slip"

Safety

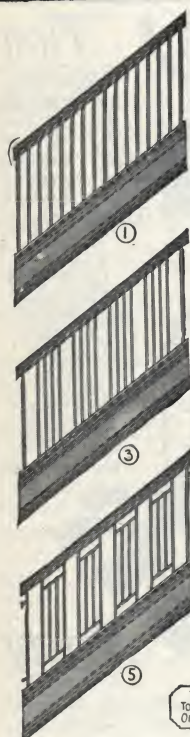


FINISHED SIZE OF OPENINGS MUST BE 2" MORE THAN DIAMETER OF STAIR. RISER HEIGHTS SHOULD BE FROM 8" TO 8½" TO PROVIDE HEAD-ROOM. STAIRS CAN BE MADE 12 OR 16 TREADS TO THE CIRCLE; BUT STAIRS WITH 12 TREADS TO THE CIRCLE ARE EASY WALKING AND ARE PREFERABLE. WE ADVOCATE THE USE OF 60" DIAMETER STAIRS.

GUARSTEEL SAFETY STAIRS

Guarsteel Safety Stair Company

165 WEST WACKER DRIVE. CHICAGO, ILL.



THE SIGN
OF BETTER STAIRS

SPECIFICATIONS

DESIGN No. 1. UPRIGHTS ARE 1\"/>

DESIGN No. 2. UPRIGHTS ARE 1\"/>

DESIGN No. 3. UPRIGHTS ARE 1\"/>

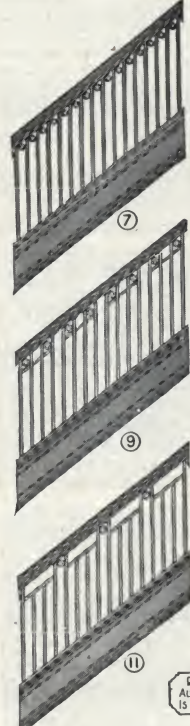
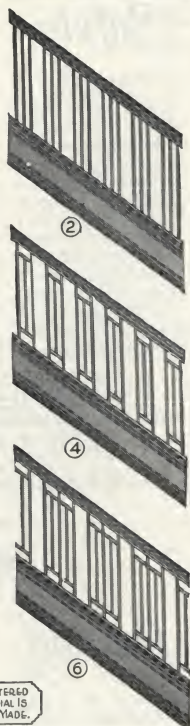
DESIGN No. 4. UPRIGHTS ARE 1\"/>

DESIGN No. 5. UPRIGHTS ARE 1\"/>

DESIGN No. 6. UPRIGHTS ARE 1\"/>

WE ARRANGE HOLES IN TOP CHANNEL FOR FASTENING OF HAND RAIL.

THE DESIGNS SHOWN ABOVE CAN BE ALTERED TO CONFORM TO YOUR DESIGN. ALL MATERIAL IS OF STEEL, AND NO PATTERN CHARGES ARE MADE.



THE SIGN
OF BETTER STAIRS

SPECIFICATIONS

DESIGN No. 7. UPRIGHTS ARE 1\"/>

DESIGN No. 8. UPRIGHTS ARE 1\"/>

DESIGN No. 9. UPRIGHTS ARE 1\"/>

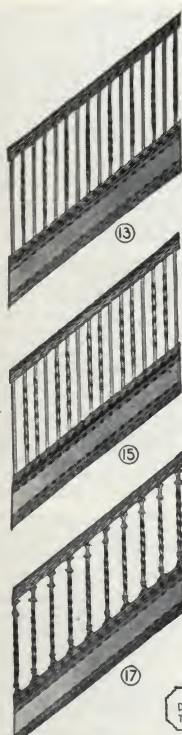
DESIGN No. 10. UPRIGHTS ARE 1\"/>

DESIGN No. 11. UPRIGHTS ARE 1\"/>

DESIGN No. 12. UPRIGHTS ARE 1\"/>

WE ARRANGE HOLES IN TOP CHANNEL FOR FASTENING OF HAND RAIL.

RING DESIGNS ARE ALWAYS PLEASING, AND WILL ALWAYS BE POPULAR. ALL MATERIAL IN THE ABOVE DESIGNS IS STEEL, AND NO PATTERN CHARGES ARE MADE.



THE SIGN
OF BETTER STAIRS

SPECIFICATIONS

DESIGN No. 13. UPRIGHTS ARE 1\"/>

DESIGN No. 14. UPRIGHTS ARE 1\"/>

DESIGN No. 15. UPRIGHTS ARE 1\"/>

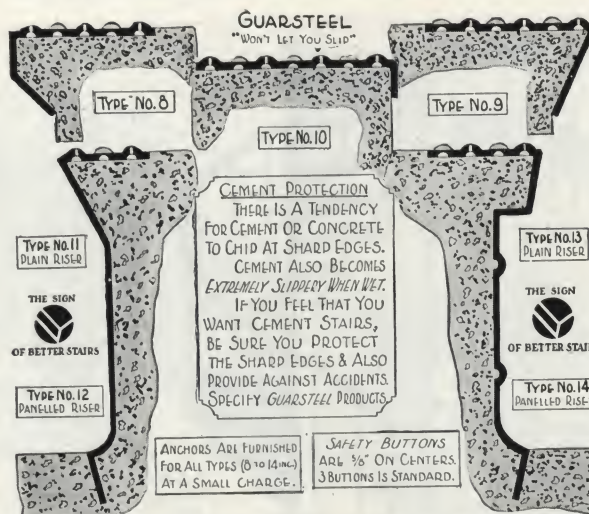
DESIGN No. 16. UPRIGHTS ARE 1\"/>

DESIGN No. 17. UPRIGHTS ARE 1\"/>

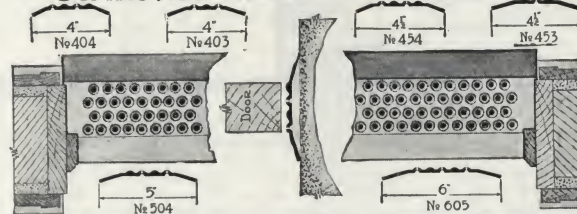
DESIGN No. 18. UPRIGHTS ARE 1\"/>

WE ARRANGE HOLES IN TOP CHANNEL FOR FASTENING OF HAND RAIL.

TWISTED DESIGNS ADD AT THE HEIGHT OF POPULARITY, AND ARE PLEASING TO THE EYE. MAKE THE ORNAMENTAL FEATURES OF YOUR JOB UP TO DATE.



GUARSTEEL SAFETY THRESHOLDS

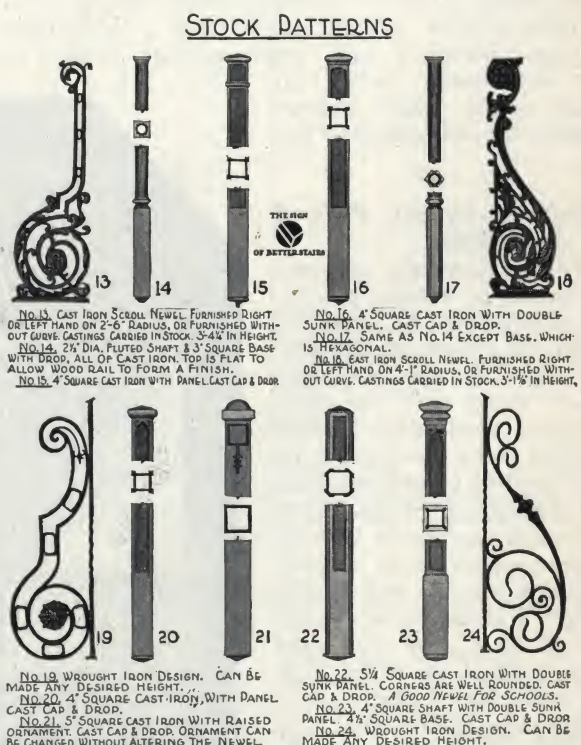
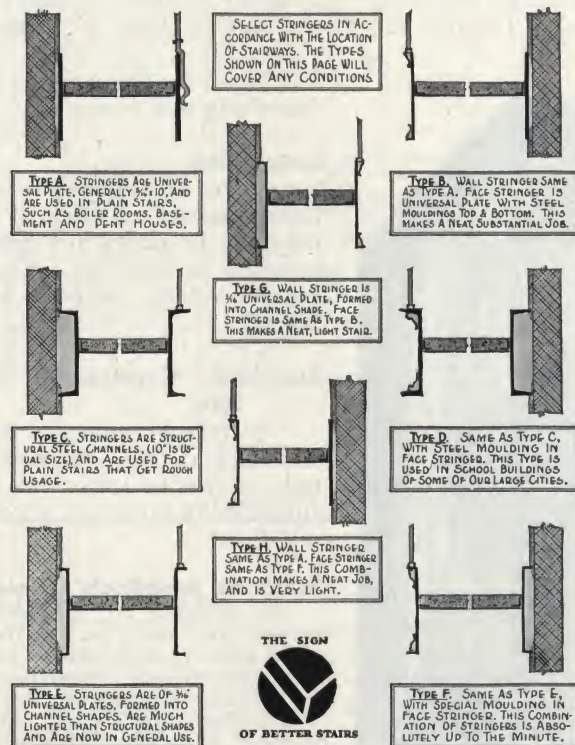
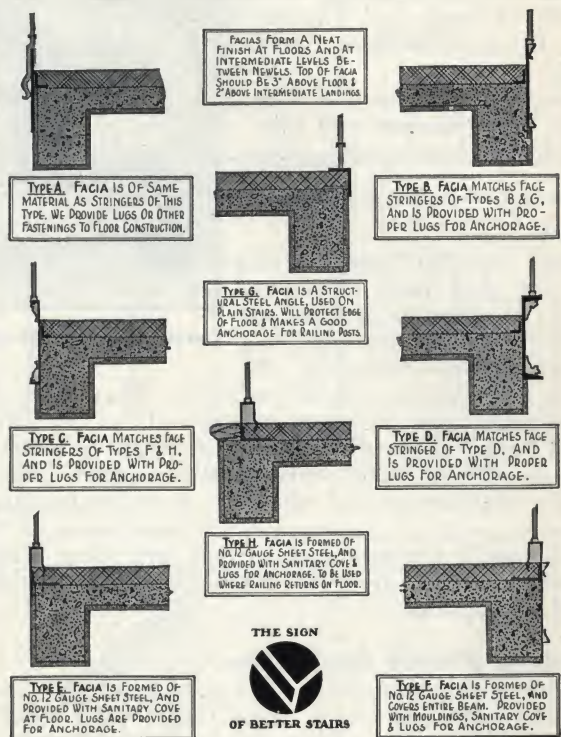
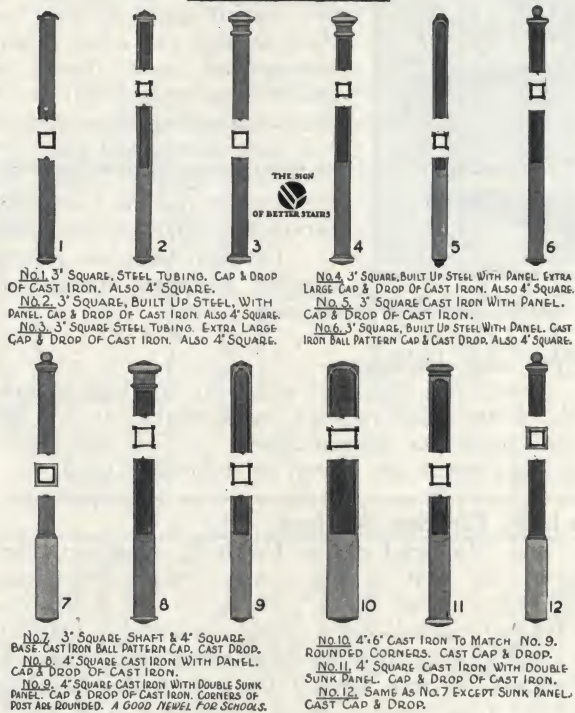


GUARSTEEL SAFETY STAIRS

Guarsteel Safety Stair Company

165 WEST WACKER DRIVE. CHICAGO, ILL.

STOCK PATTERNS



GUARSTEEL SAFETY STAIRS

THE HUGHES-KEENAN CO.

Pressed Steel Stairs and Architectural Iron Work

MANSFIELD, OHIO

Products

SAFETY-LOCK and SAFETY-NOSE INSERT PRESSED STEEL STAIRS.

Also Ornamental and Pipe Railing, Fire Escapes and miscellaneous Ornamental Iron Work.

General

Both types of pressed steel stairs are the result of many years of practical experience in the design, manufacture and installation of steel stairs for all types of buildings and for all purposes. They combine great strength with minimum weight and can be easily adapted to any requirements of the architect or builder and made plain or highly ornamental as desired. They meet the requirements of all State and city building codes.

All special features such as our safety-lock tread and riser and safety-nose insert are covered by patents allowed and applied for.

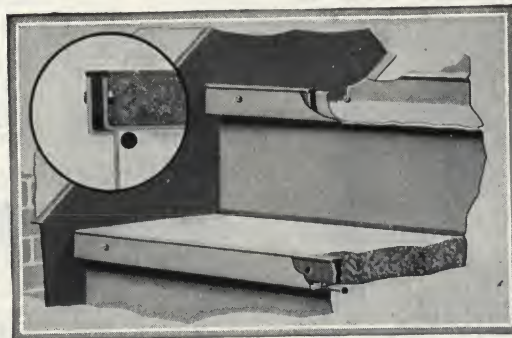
Safety-Lock Pressed Steel Stairs

Made with a continuous steel plate tread and riser firmly interlocked at nosing, each tread bolted rigidly to the lower flange of a Z-shaped stringer and all tied together with a tie rod running under the angle of each nosing from stringer to stringer. With channel shaped stringers light steel carriage angles are used with tread bolted to carriage angle. See following page for construction details.

Safety-Nose Insert Pressed Steel Stairs

These eliminate exposed sheet metal on treads, providing a safety tread as a part of the stair at a cost considerably below that of special safety treads. Tread and riser is a continuous steel plate formed at nosing into a channel or trough section in which a lead insert is firmly bolted, providing a lead safety nosing in edge of the tread where most needed. This insert is easily and quickly installed. Can be renewed when worn at very low cost and does not affect the tread filler when replacing. Cement, composition or asphalt filler can be used. Tie rods with Z-shaped stringers or carriage angles with channel shaped stringers may be used. See following page for construction details.

Write for our special folder describing these stairs.



Detail of Safety-Nose Insert Pressed Steel Stairs

Stringers

Details of various stringers are shown on following page. Face strings are either plain or ornamented with drawn steel moulding at top and bottom. Cast iron rosette is used on end of tie rod with ornamental face stringers. With carriage angles, rivets are countersunk in face stringer except on heavy service stairs.

Pressed steel or structural channel stringers furnished as desired.

Newels and Railings

Newels are furnished either in cast iron or pressed steel. Newels and railings are furnished to any design to suit architects' requirements. A few standard railings and newels are shown on following page.

Pre-built Erection Method

The Hughes-Keenan Pre-built Erection Method reduces the cost of the stairs installed in building 25% below usual cost. There is no reduction in quality of stairs—the saving resulting only from low engineering and erection costs and shop standardization. Stairs are on the job to be installed as building progresses, giving contractor use of them instead of requiring erection of temporary ladders or stairs. Cutting and fitting and patching of plaster is avoided.

Write for our special folder describing this method.

Installation

Stairs are shipped in completely assembled units so that they can be easily and quickly installed at low cost. Experienced erectors furnished when desired.

Standard Construction Details

Standard stringer, tread and riser, railing and newel details, drawn to large scale, are furnished to architects upon application.

Stairs to Architects' Designs

In addition to our patented pressed steel stairs, we can furnish steel stairs of any design and to meet all architects' requirements.

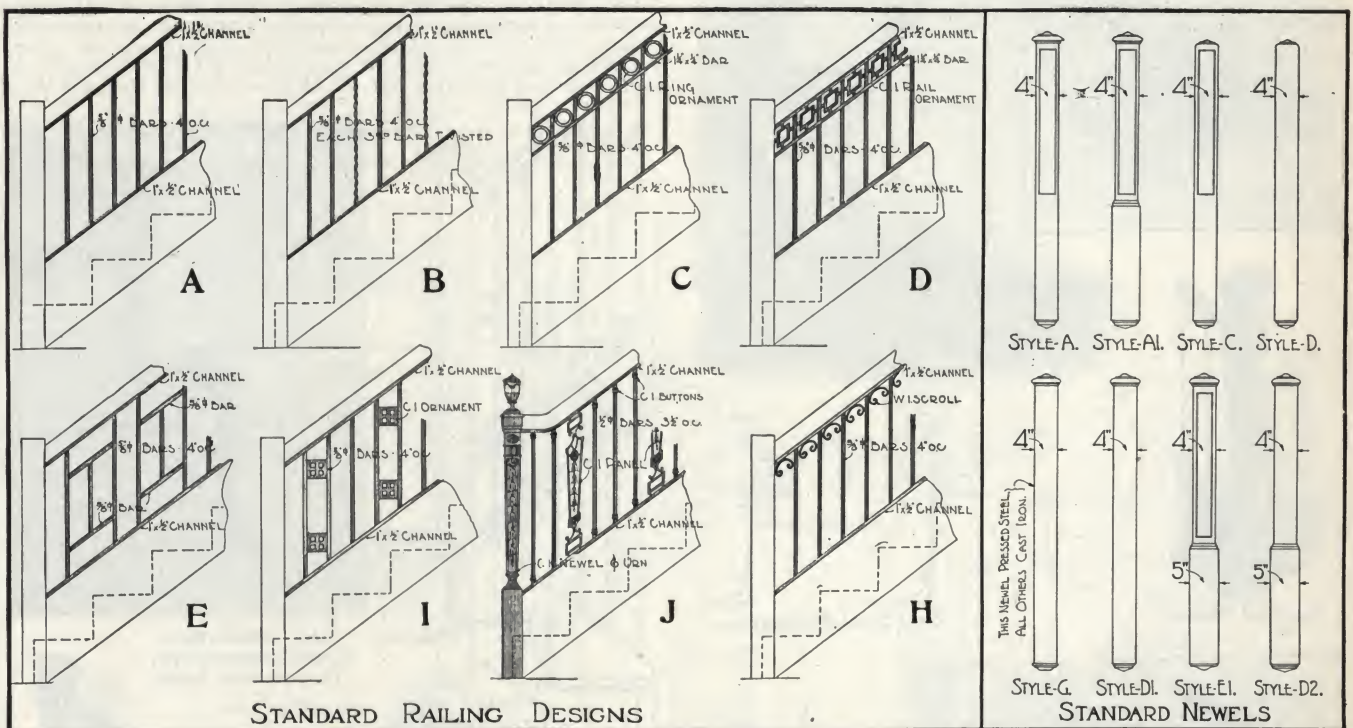
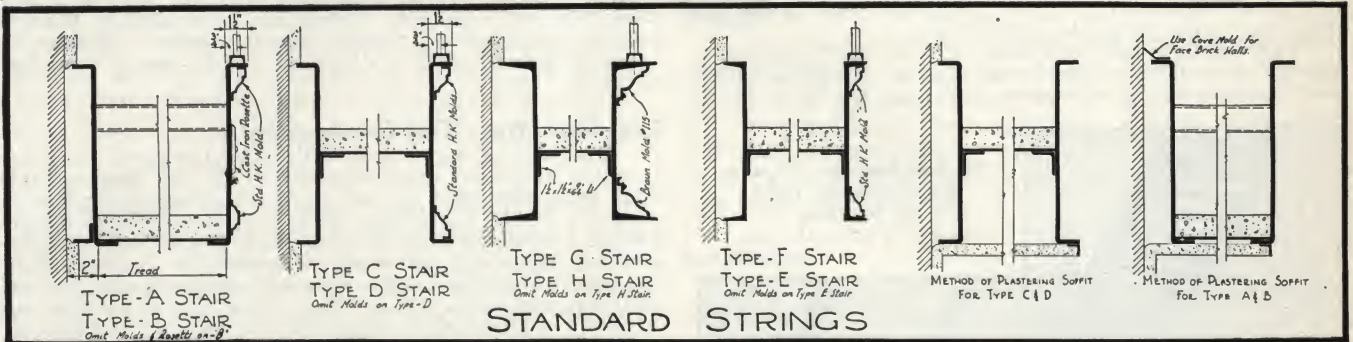
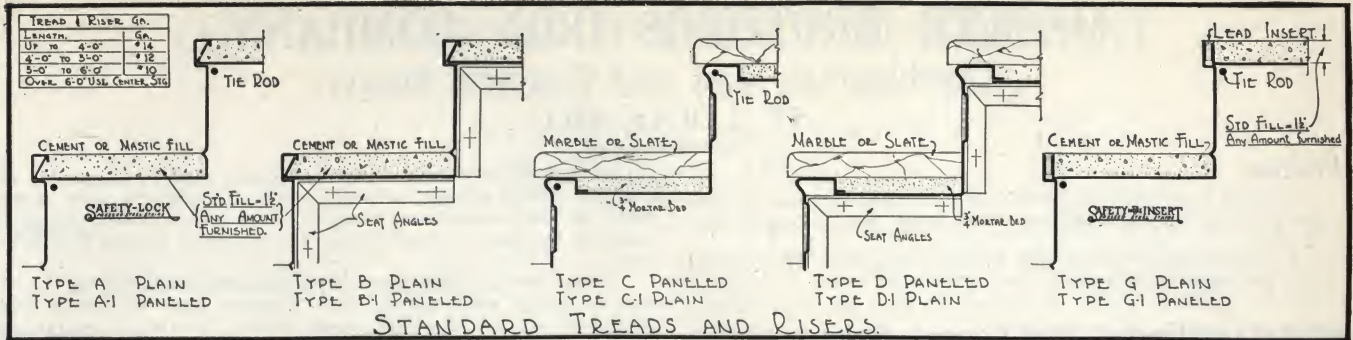
We can also furnish the Bois Interlocking Steel Stairs in the states of Maryland, Delaware, District of Columbia, Colorado, Wyoming, Utah.

Information and Estimates

For catalogue, complete information regarding construction and typical installations and estimates, write THE HUGHES-KEENAN CO., Mansfield, Ohio.



Typical Installation of Hughes-Keenan Safety-Nose Insert Pressed Steel Stairs



Construction Details

Treads and Risers—Illustrated above are standard Safety-Lock and Safety-Nose insert treads and risers. Treads are made to receive cement, composition or asphalt filler. Risers are made either plain or with sunken panel and have sanitary cove.

Standard tread and riser for slate or marble treads are also shown with risers plain or paneled and sanitary cove omitted. The tread and riser is continuous and the gauge of metal used is determined by the width of stair.

Stringers—Sections of various types of standard stringers are illustrated above. Z-shaped, pressed steel stringers are used for both Safety-Lock and Safety-Nose insert stairs when tie rods are used. Pressed steel

or light structural channels are used with carriage angle construction.

The gauge of plate and depth of stringer or size of structural channels is determined by span and width of stair, using a high factor of safety.

Newels and Railings—A few standard railing designs are illustrated above. Pipe railings or railings of any other design can be furnished.

The cast iron and pressed steel newels shown are stock designs with square shaft and base. Newels of any design can be furnished. Pressed steel newels are either 3 or 4 in. square, have perfectly smooth surfaces and are very rigid and strong.

MESKER BROTHERS IRON COMPANY

Combination Steel and Concrete Stairs

ST. LOUIS, MO.

Product

MESKER COMBINATION STEEL AND CONCRETE INTERIOR STAIRS. Also Steel Fire Escapes, Steel Stair and Elevator Enclosure.

For Solid Steel Sash, Solid Metal and Hollow Metal Windows, see pages A1071-1075.

Mesker Combination Steel Concrete Stairs

Mesker stairs are specified as a "Standard" of construction throughout the country and are installed in some of the best buildings erected within the past 25 years.

Specifications—Stringers shall be $\frac{3}{8}$ -in. steel plate, bent in channel form and of width shown on plans. Treads and risers shall be made of one continuous steel plate No. 12 or No. 13

gauge, bent to form as indicated. Treads shall be supported at ends by special clamps, securely bolted to stringers with acorn heads on face stringers and shall be filled with concrete or other material by others (tread filling $1\frac{1}{2}$ in. more or less in thickness).

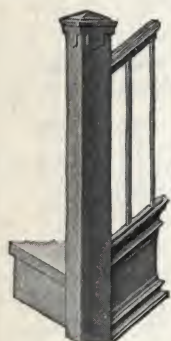
Platforms or landings, where required, shall be No. 12 or No. 13 gauge steel plates, with nosings same as treads and supported on a $2 \times 2 \times \frac{3}{8}$ -in. angle frame, riveted or bolted to stringers, and reinforced with tees not over 2 ft. on centers. Newels shall be No. 12 gauge blue annealed steel with cast iron caps and pendants. Newels to be welded at corners, making a continuous one-piece seamless newel. Railings to be of design indicated on drawings. All to have a shop coat of paint.

Erection—Note This Comparison

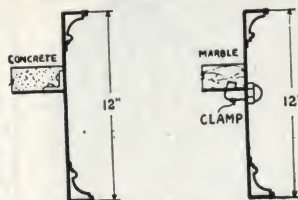
Mesker's Stairway is practically erected, whereas the other is still in its infancy stage, regardless of the fact that a greater number of mechanics are employed. The reason for this is obvious. *Mesker's Stairways come to you completely assembled at factory, carefully painted, checked and inspected prior to being shipped in sections most convenient to handle, and to facilitate installation. No sorting out and assembling various and numerous parts. No refitting, repunching or rebor-ing, all of which not only adds substantially to the cost, but likewise causes serious delay in the erection of same, as well as being a vital factor in marring the appearance thereof. In some instances a seemingly more attractive price may be offered by others, but do not sacrifice absolute satisfaction in every respect, as the effects of poor quality and a higher erection cost will in no way offset the possible difference in the original price.*



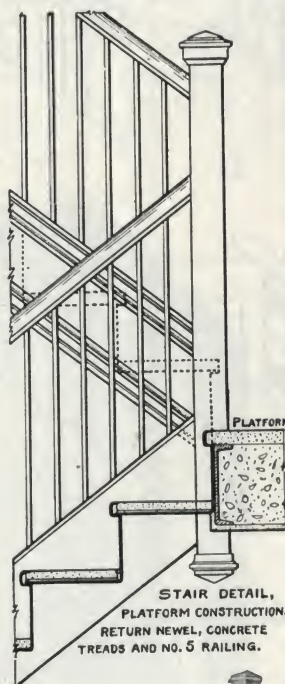
Mesker Stairway Versus the Ordinary Type of Stairway
Erection of vital importance



All-steel Newel



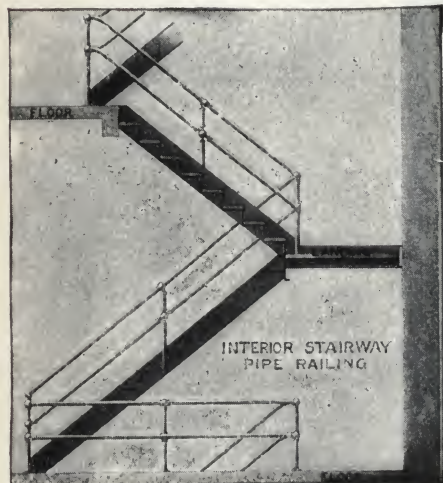
Bent Steel Stringers



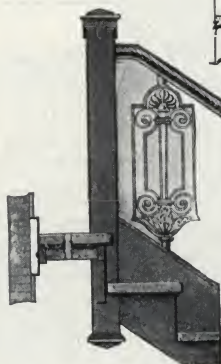
STAIR DETAIL,
PLATFORM CONSTRUCTION,
RETURN NEWEL, CONCRETE
TREADS AND NO. 5 RAILING.



Stair Installation,
Brady Apartments,
Des Moines, Iowa



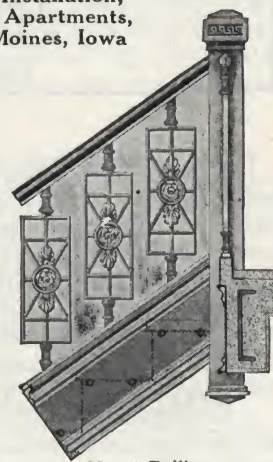
INTERIOR STAIRWAY
PIPE RAILING



No. 4 Railing



No. 5 Railing
Mesker Steel Stair Details



No. 6 Railing

THE RIESTER & THESMACHER COMPANY

Manufacturers of Bois Patented Steel Stairs

1514-1526 West 25th Street
CLEVELAND, OHIO

Products

BOIS INTERLOCKING PRESSED STEEL STAIRS.
For Hollow Metal Doors, see page A837.

Service

A modern plant with complete equipment and an efficient organization qualified to give service. We have a thoroughly efficient estimating and draughting department and are glad to assist in construction details. Typical stair details, estimates and suggestions submitted upon request.

Description

The simple interlocking feature of the tread and riser in this stair, offers distinctive advantages in economy, rigidity, strength and rapid erection. It is also easily adapted to any desired tread material. The treads and risers are formed from one single sheet of steel with flanges that interlock at the nosing line, producing a reinforced edge that is always straight horizontally. This feature of double strength material prevents the nosing breaking away from tread filler. The stringers are tied together with a tie rod running under the angle of each nosing from stringer to stringer. The gauge of metal used is governed by the width of stair and weight to be carried. The entire construction makes for a very

strong and rigid stair and the light gauge steel is not used to reduce cost with a proportionate reduction in strength. Tests of a standard Bois stair have been successfully made carrying a dead weight of 600 lb. per square foot.

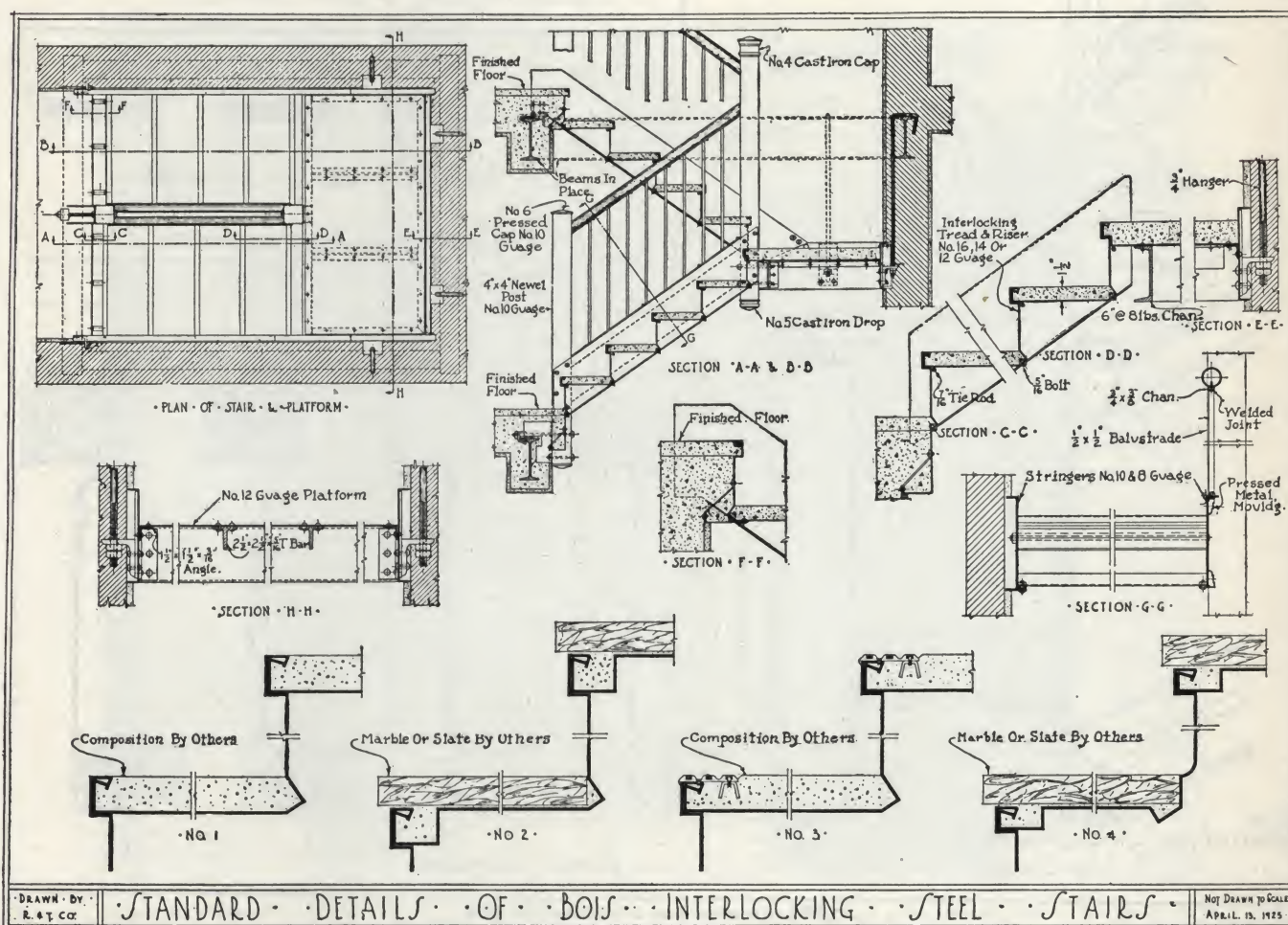
Design

This stair meets the requirements of all state and city building codes and while very simple in design is attractive in appearance and can be readily adapted to the requirements of the architect or builder. Construction may be modified or embellished by ornamenting newel posts, ends of tie rods and stringers, or using cast iron newel posts.

Installation

The interlocking feature dispenses with all riveting and makes for rapid assembling. Each flight of stairs is assembled in a complete unit in the factory and is, therefore, economically erected at the building. This also permits of the stairs being erected with the frame work of the building, giving immediate service before the installation of tread fillers.

For reference we will be glad to furnish names of architects who have specified this product or typical installations which we have made.



SEXAUER & LEMKE, INC.

Ornamental Iron Work, Steel Stairs, and Cast Iron Work
LONG ISLAND CITY, N. Y.

REPRESENTATIVES: SHULTS ENGINEERING Co., Morgan Building, BUFFALO, N. Y.

Products

Manufacturers of ORNAMENTAL IRON WORK, including: "S & L" FIREPROOF STEEL STAIRS, and STEEL FRAMES for Doors and Partitions.

Also General Iron and Steel Staircase Construction; Iron Grilles; Railings; Entrance Doors, Marquises; Elevator Enclosures; Store Fronts; Gratings; Fire Escapes; Fur Racks for cold storage plants, etc.

Service

The thoroughly equipped estimating and draughting departments are at the service of architects. Estimates and suggestive working details will be gladly submitted on request.

Facilities

Our plant is complete in every respect and equipped with the most modern types of machinery and tools, enabling this organization to meet promptly and efficiently all demands for its products.

Our plant is situated at the East River and provided with own docking facilities.

Sexauer & Lemke ("S & L") Steel Stair Construction

Simple, strong, rigid, exceptionally light and easily erected, these steel stairs lend themselves admirably to every type of public office, warehouse, hospital, school and factory building construction.

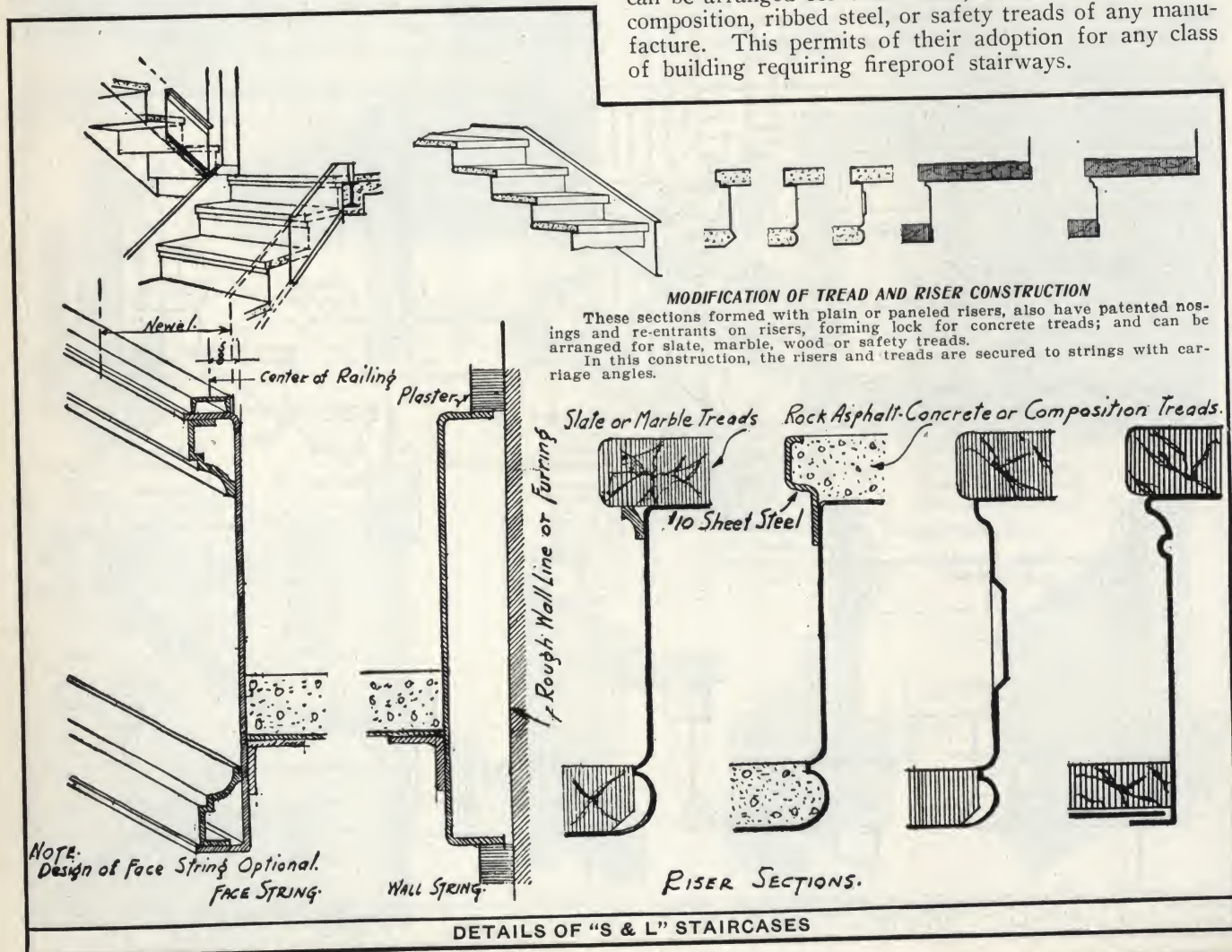
They are formed, primarily, of rolled steel stringers and bent plate steel risers and treads, securely bolted together as shown in line details herewith. The stairs can be furnished to accommodate any condition.

The strings are formed in one piece with flanges, the depth of string, thickness of metal, etc., being governed by the loading, and strings can be made either plain or ornamental with mouldings or otherwise as may be desired.

For stairs for export, the various strings, risers, etc., could be nested to insure compactness and against danger of damage.

All stair structures are figured for a safe live load of 100 lb. per sq. ft. and designed accordingly.

Design—"S & L" stairs can be built plain, or ornamented to any extent to suit architectural requirements and design, with railings and newels to match. Risers may be plain, or paneled and ornamented; treads can be arranged for either slate, marble, wood, cement, composition, ribbed steel, or safety treads of any manufacture. This permits of their adoption for any class of building requiring fireproof stairways.



For cement or composition treads, a patented nosing and re-entrant construction is provided, which forms a pocket or lock for the treads and provides a sanitary cove treatment to the risers.

See detail drawing on preceding page.

The soffits of stairs are left open for painting, and present a neat finished appearance, but can also be arranged for plaster finish, if desired.

Installation—These stairs are particularly easy to erect, as each run is manufactured and fitted in shop before shipment or delivery. This feature insures quick and economical installation; and also permits of the stairs being erected with the framework of the building, thus insuring immediate serviceableness, before the installation of the finish treads.

General Cost and Estimates—These stairways, furnished complete with railing and newels (with concrete treads), are practically as low in cost as stairways of concrete construction with iron railings, and have the advantage of providing a neater and more durable installation. They permit, moreover, a saving in cost of structural supports, on account of special lightness. The thickness of metal employed, depth of strings, and so forth, are governed by the size of stair, loading conditions and so on.

If general layout of stairs together with memoranda of requirements is furnished, the estimating department will be pleased to submit specifications and estimates.

Circular Stairs, Special Stairs, Cast Iron Stairs

Details and information furnished upon request.

Cast Iron and Wrought Iron Front Work

We specialize on all types of this work.

Steel Door Frames

These frames can be formed to meet requirements of all classes of fireproof partition construction. They are formed of No. 14 or No. 12 gauge steel and the miters and connections are all welded, making a one-piece frame.

Reference Installations of Ornamental and Miscellaneous Iron Work

Liggett-Winchester-Ley Building, Madison Avenue, New York, N. Y.

Fisk Rubber Co.'s Building, Broadway, New York, N. Y.

Mt. Sinai Hospital, Fifth Avenue, New York, N. Y.

Office Buildings, 379-385 Madison Avenue, New York, N. Y.

Cunard Building, Broadway, New York, N. Y.

Liberty Title and Trust Building, Broad and Arch Streets, Philadelphia, Pa.

Equitable Building, Broad and Locust Streets, Philadelphia, Pa.

Saks Department Store, Fifth Avenue, New York, N. Y.

Citizens Savings Bank, Bowery and Canal Street, New York, N. Y.

Shelton Club Hotel, Lexington Avenue, New York, N. Y.

Aeolian Building, Fifth Avenue and 54th Street, New York, N. Y.

Ritz Tower, Park Avenue and 57th Street, New York, N. Y.

A. G. Spalding Bros. Building, Nassau and Ann Streets, New York, N. Y.

Postum Building, 250 Park Avenue, New York, N. Y.

Hotel Syracuse, Syracuse, N. Y.

Niagara Hotel, Niagara Falls, N. Y.

Buffalo Consistory, Buffalo, N. Y.

Genesee Building, Buffalo, N. Y.

Arlington Hotel, Binghamton, N. Y.

Corning Free Academy, Corning, N. Y.

U. S. National Bank, Johnstown, Pa.

Citizens National Bank, Waynesburg, Pa.

Erie Trust Building, Erie, Pa.

State Bank Building, Albany, N. Y.

Home Savings Bank, Albany, N. Y.



Cast Iron Front Work, Office Building, Madison Avenue between 46th and 47th Streets, New York, N. Y.

THE A. L. SMITH IRON WORKS

Manufacturers and Erectors of Steel Stairs

CHELSEA, MASS.

Products, Organization and Experience

SMITH STEEL STAIRS.

Also Designers, Fabricators and Erectors of Structural Steel and Ornamental Iron and Bronze Work of every description.

We have been building stairs of all types for nearly 30 years. This broad experience, together with the use of sound engineering



principles, has developed the Smith Steel Stair, the features of which have been fully patented.

Our modern plant, modern production methods, efficient workmen and standardization of parts enables us to produce Smith Steel Stairs economically, but consistent with substantial and permanent construction.

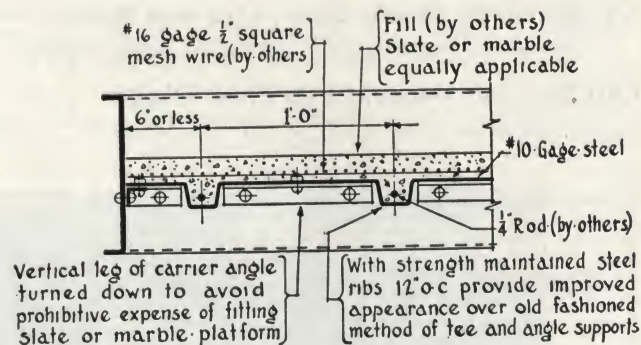
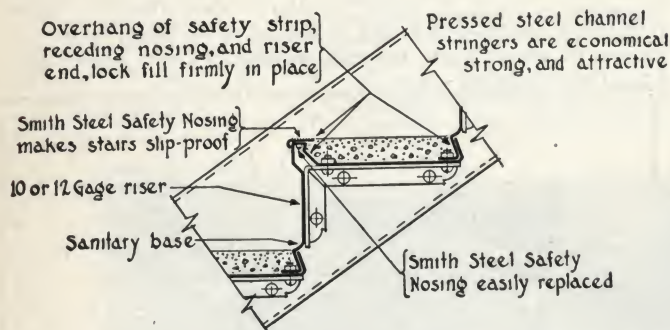
Smith Steel Stairs

The general description and features of construction of Smith steel stairs are completely covered by the standard specifications and illustrations shown on these pages.

Smith steel stairs are suitable for all classes of buildings and are being specified by leading architects and engineers because of their strength, pleasing appearance and low cost. They have been subjected to severe tests, including the following:

A stair loaded with 48 men weighing 7200 lb., on 71 sq. ft. (101 lb. per sq. ft.), showed no evidence of strain. Another stair loaded with 43,000 lb. of steel plates on 71 sq. ft. (equivalent to 600 lb. per sq. ft., which, on the basis of 100 lb. per sq. ft. gives a factor of safety of 6), showed no indication of failure.

These tests clearly show the relation of maximum possible human loading in actual practice against the ultimate carrying capacity of the stairs.



Features of Smith Steel Stairs

Standard Specifications for Smith Steel Stairs

All stairs marked steel on plans shall be Smith Steel Stairs made (and erected) by THE A. L. SMITH IRON WORKS, Chelsea, Mass.

Stringers shall be 10-in. pressed steel channels $\frac{3}{8}$ in. or $\frac{1}{4}$ in. thick as required.

Treads and risers shall be of the Smith one-piece nosing type and shall be No. 10 or No. 12 gauge as required. Treads shall be attached to carrier with two bolts. Fill and reinforcing shall be furnished by others.

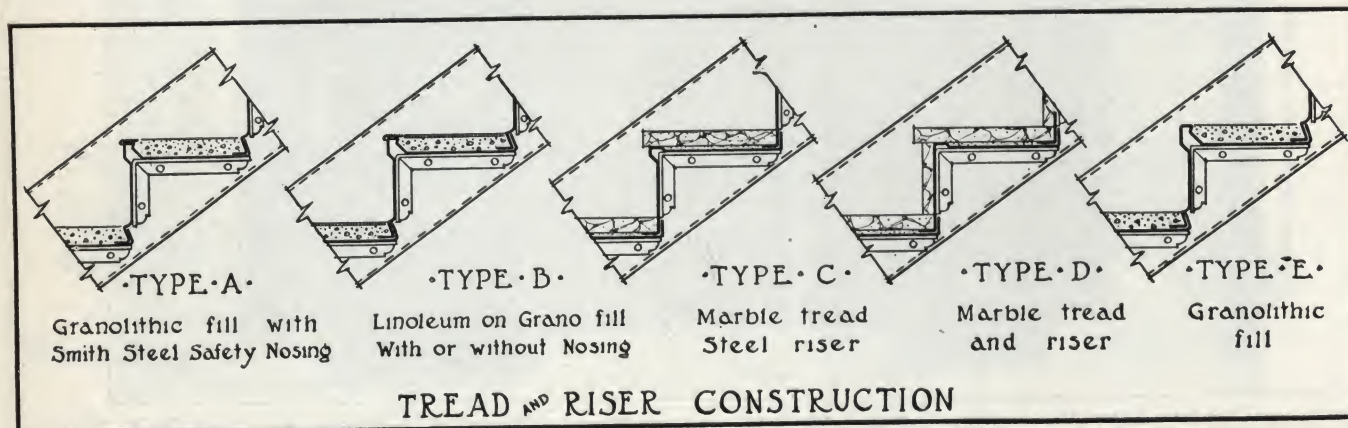
Carriers shall be $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{8}$ in. angles, machine riveted to stringers with three rivets. Rivets shall be countersunk on outside face of face stringer.

Landings shall be of the Smith one-piece pressed-rib type of No. 10 gauge steel. Ribs shall be supported by angle at wall and sides and by steel channel at head of stairs. Fill and reinforcing shall be furnished by others.

Posts shall be Smith Type, made of in. square, with standard cap and drop.

Railing shall be Smith No. attached to channels top and bottom. Wood handrail shall be furnished and attached to top channel by others. (See details of posts and railings for various types and their numbers.)

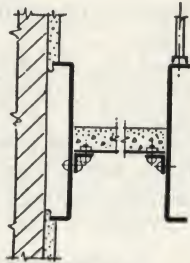
Safety treads, where shown on plans, shall be Smith replaceable steel safety nosing.



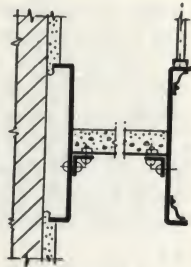
Recent Installations of Smith Steel Stairs

New Parker House, Boston, Mass., Desmond & Lord, Architects, Boston, Mass.
 Medford Junior High School, Medford, Mass., M. A. Dyer Co., Architects, Boston, Mass.
 Co-operative Apartments, 81 Beacon Street, Boston, Mass., J. D. Leland & Co., Architects, Boston, Mass.
 Nurses' Home, Bangor, Me., Coolidge & Carlson, Architects, Boston, Mass.
 Harvard Square Theater, Cambridge, Mass., Mowll & Rand, Architects, Boston, Mass.

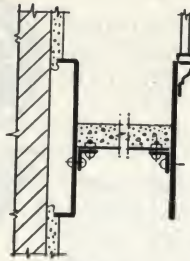
Furlong Building, Boston, Mass., Mowll & Rand, Architects, Boston, Mass.
 Lord Jeffrey Inn., Amherst, Mass., Putnam & Cox, Architects, Boston, Mass.
 Central Police Station, Quincy, Mass., Clark, Batty & Gallagher, Architects, Quincy, Mass.
 Cook Building, Brockton, Mass., W. F. Barlow, Jr., Architect, Brockton, Mass.
 Wesley Methodist Church, Worcester, Mass., Coolidge & Carlson, Architects, Boston, Mass.



TYPE A
Pressed Steel Channel
Face and Wall
Stringers

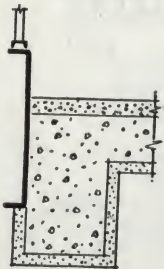


TYPE B
Pressed Steel Channel
Wall Stringer, and
Face Stringer with
Steel Moulding



TYPE C
Pressed Steel Channel
Wall Stringer;
Plate Face Stringer
with Moulding

STRINGER DETAILS



TYPE A
Pressed Steel Channel
Fascia

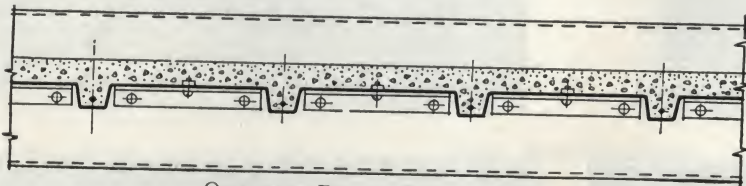


TYPE B
Pressed Steel Channel
Fascia with Moulding



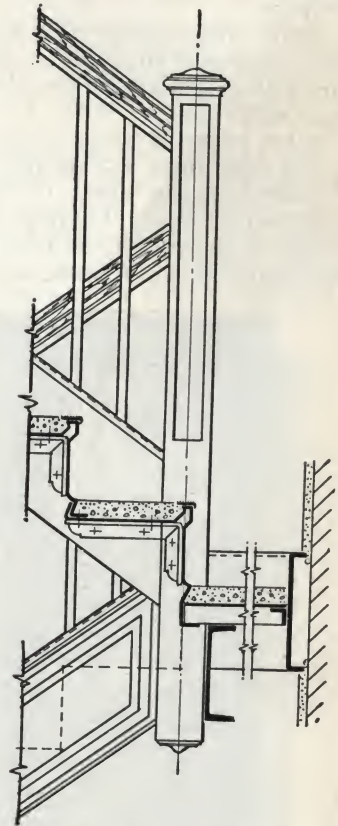
TYPE C
Plate Fascia with
Moulding

PLATFORM FASCIA DETAILS

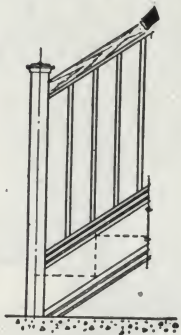


ONE-PIECE PRESSED-RIB PLATFORM

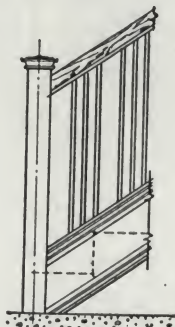
Stringer Fascia and Platform Construction



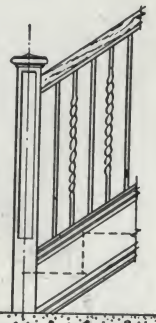
DETAIL AT INTERMEDIATE
PLATFORM



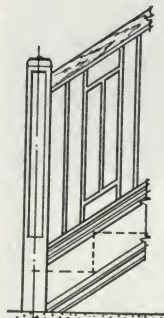
TYPE A POST
Railing No. 1
Post: 3 or 4-in.
steel tube.
Railing: 1/2-in.
square bars, 4 in. on
centers



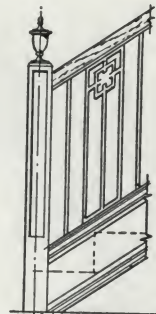
TYPE B POST
Railing No. 2
Post: 4 in. square
cast iron; plain.
Railing: 1/2-in.
square bars set in
groups of three; 4 in.
between groups



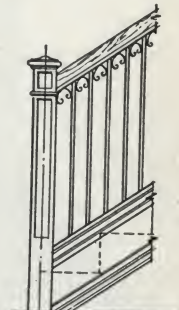
TYPE C POST
Railing No. 3
Post: 3 or 4 in.
square cast iron; paneled.
Railing: 1/2-in.
square bars 3 in. on
centers; alternate
plain and twisted



TYPE D POST
Railing No. 4
Post: 4 in. square
cast iron; paneled,
with rounded corners.
Railing: 1/2-in.
square bars 3 in. on
centers; paneled as
shown



TYPE E POST
Railing No. 5
Post: 4 in. square
cast iron; paneled,
with rounded corners
and bronze or brass
urn cap.
Railing: 1/2-in.
square bars, 3 in. on
centers; paneled as
shown



TYPE F POST
Railing No. 6
Post: 4 in. square
cast iron; double paneled
Railing: 1/2-in.
square bars, 3 in. on
centers, with wrought
iron scrolls

Post and Railing Construction

ESTABLISHED 1890

SMITH & CAFFREY CO.

Structural Steel, Grey Iron Castings and Ornamental Iron
2611 Lodi Street
SYRACUSE, N. Y.

Products

IRON STAIRS of every description, constructed either of pressed stringers or standard rolled sections with cast iron or pressed steel combination treads and risers.

CAST IRON and STEEL POSTS to meet all architects' specifications and details.

FIRE ESCAPES, SPIRAL STAIRS, GATES, AREA DOORS and GRATINGS, LADDERS, PLAIN and ORNAMENTAL RAILINGS, PIPE RAILS, GRILLES, WINDOW GUARDS, DOOR FRAMES and SADDLES and all



other Miscellaneous and Mason Iron required in the construction of a building.

Engineers and Contractors of Structural Steel Work for bridges, buildings, craneways, etc. Designs furnished when required.

Also Grey Iron Castings for special machinery, Wheel Guards, Manholes and Covers, Coal-hole Frames and Covers, Sewer Castings, Clean-out Doors and Frames, Trench Plate Covers, etc.

Wood and Metal Patterns a specialty.



Cast Iron Front and Wrought Iron Window Guard,
Third National Bank, Syracuse, N. Y.
A. L. BROCKWAY, Architect



Check Desk, Third National Bank, Syracuse, N. Y.
A. L. BROCKWAY, Architect



Typical School Stairway, Nottingham School,
Syracuse, N. Y.
A. L. BROCKWAY, Architect



Ornamental Stairway, Keith's Theater,
Syracuse, N. Y.
THOS. LAMB, New York, N. Y., Architect

TITCHENER IRON WORKS, INC.

Structural, Architectural and Ornamental Iron Work

25 Griswold Street
BINGHAMTON, N. Y.

Products

ORNAMENTAL IRON WORK:

Iron Stairs, Fire Escapes, Spiral Stairs, Steel Ladders, Iron and Bronze Railings, Pipe Railings, Folding Gates, Area Gratings, Window Guards, Grilles, Side-walk Doors, Coal Chutes, Coalhole Covers, Marquises, Trusses, Beams, Columns, Metal Lumber, Balconies, Flagpoles, Steel Sash, Store Fronts, Iron Fences, Entrance Gates, Wire Fences, Wire Partitions.

Stair Specifications

All iron stairs shall be pressed steel as made by TITCHENER IRON WORKS, INC., Binghamton, N. Y.

Stringers—Shall be of 10-inch channels formed from 13x $\frac{3}{16}$ -inch steel plates with moulding on top and bottom flanges as detailed.



Tread and Riser—Shall be one unit formed from No. 12 gauge steel sheets with nosing and shall be recessed to receive 2 inches of composition or concrete filling. All treads and risers shall be supported by and bolted to angle iron hips which are riveted to the stringers.

Platforms and Landings—Shall be of No. 12 gauge steel sheets supported and reinforced by structural tees and angles riveted to stringers and platform channels.

Newel Posts and Railings—Shall be as per details.

All iron work to have one shop coat of approved paint.

Note: The above specification may be changed to meet all architects' requirements.



Gate Specifications

Horizontal rails shall be of 2-inch channels. Hinge bars shall be $\frac{3}{4}$ -inch by 2 $\frac{1}{2}$ -inch flat iron, hung on hand wrought hinges to be laid into masonry. Latch bars shall be the same size as hinge bars. Pickets shall be

$\frac{3}{4}$ -inch square bars spaced 5 inches on centers with hand forged top either pointed or upset. Pickets shall extend through horizontal rails and be securely hand calked into place. All to receive one shop coat of approved paint.



WATT MANUFACTURING CO., INC.

Manufacturers and Erectors of Steel Stairs, Plain and Ornamental
217 Martin Building, PITTSBURGH, PA.

Product

STEEL and CAST IRON STAIRS: Ornamental, Plain and Commercial.

Service

We maintain a modern plant fully equipped to execute any size order, and an efficient organization qualified to give complete service. We have an estimating and draughting department and are glad to assist the architect or engineer in the construction and designing of stairs. Typical stair details, estimates and suggestions submitted on request. Send for our new catalogue.

Erection

We are equipped to erect our products anywhere in the United States. We especially plan to erect all stairs in tall buildings along with the structural steel in proper sequence, resulting in considerable saving in erection cost, also making them available for the use of all building trades.

General Construction

We manufacture stairs of every type and construction, employing only skilled mechanics in all departments. We aim to maintain the highest standard and quality of workmanship at a reasonable cost. Our stairs meet the requirements of all state and city building codes.

Our standard stairs are attractive in appearance and can be readily modified to meet the requirements of the architect. They can be ornamented by applying plain or ornamental mouldings on strings and facias, cast iron caps and drops on newel posts, scrolls and leaf motifs on railings, etc.

Welding and Riveting—We employ both welding and riveting as required and according to best shop practice.

Stringers—Made in four types:

- A—Plate and angle
- B—J. & L. stair channel
- C—Pressed steel channel
- D—Structural channel

Types A and C are made of Universal Mill steel plate, especially rolled for stair work.

Type B is a channel section especially rolled for stair work.

Type D is a standard structural steel channel.

Treads and Risers—Treads and risers are made of a continuous piece of blue annealed pressed steel plate with provision for marble, slate, cement, composition, or any standard safety tread. Risers are also made of pressed steel, cast iron, or plate and angle. Also made with or without panels, sanitary coves, and nosings.

Safety Nosing Strip—Where non-slip safety nosing strips are used—our construction allows for replacement by the removal of several brass screws, without damaging treads.

Newels—Made of cast iron or steel. May be plain or ornamental.

Facias—Made of plate and angle, or channel, as required to correspond with strings.

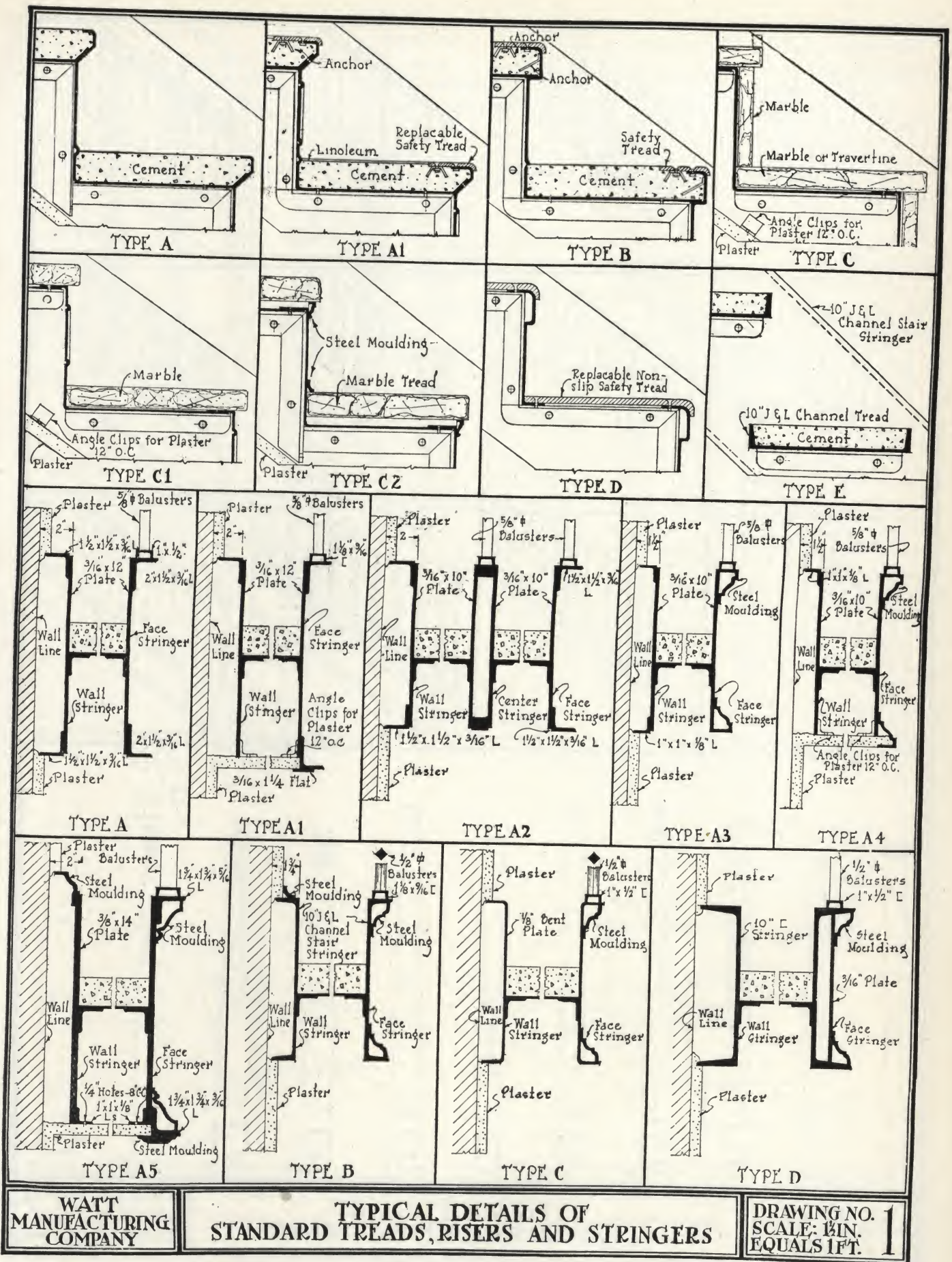
Railings—Made of wrought or cast iron, plain or ornamental, according to architect's details.

Platforms—Made of 1/8-in. blue annealed steel plate supported by angles, tees and channels where required.

Painting—All material receives one good coat of protective paint in shop. We do no field painting.



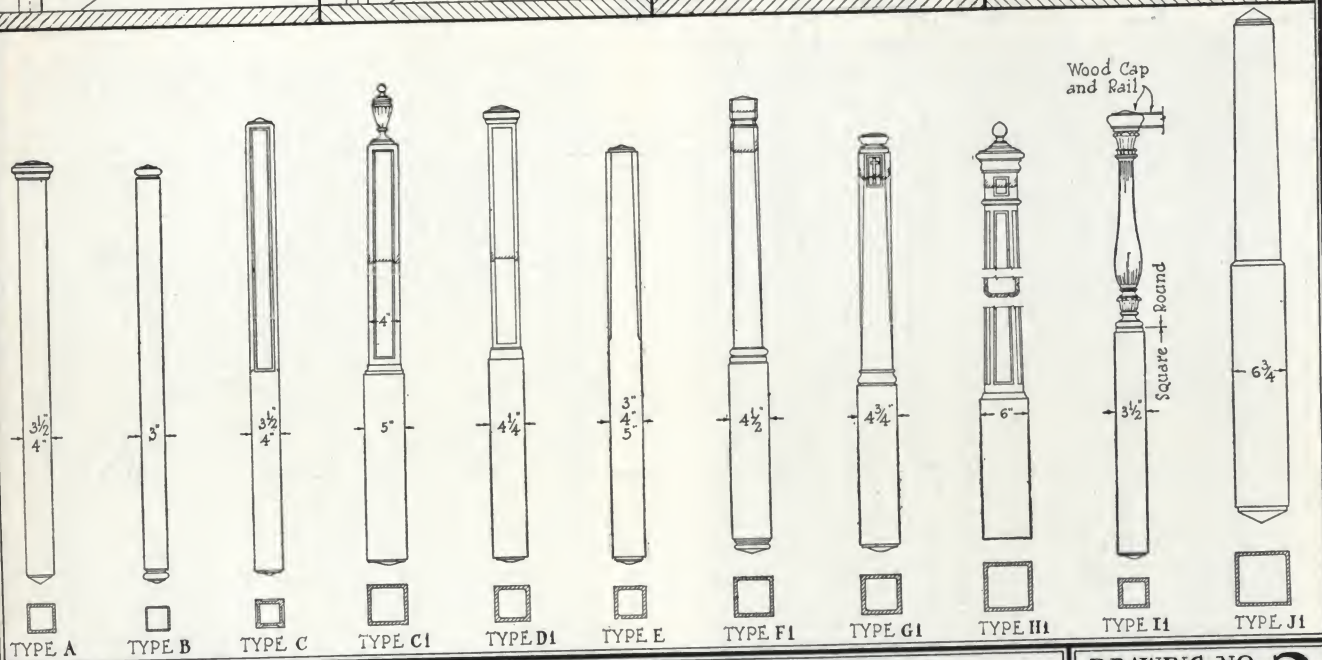
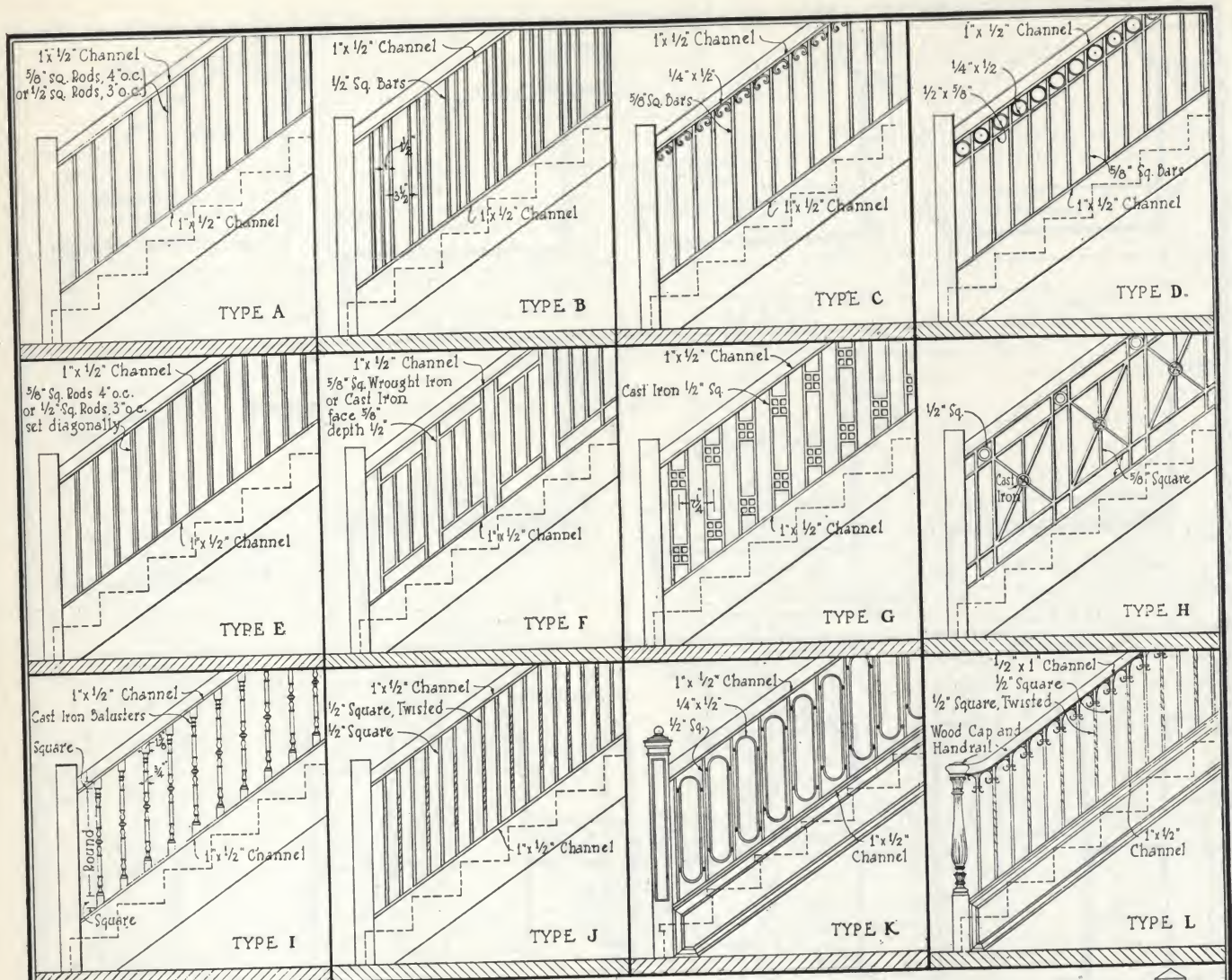
Typical Installations of Watt Steel Stairs and Ornamental Railings



WATT
MANUFACTURING
COMPANY

TYPICAL DETAILS OF
STANDARD TREADS, RISERS AND STRINGERS

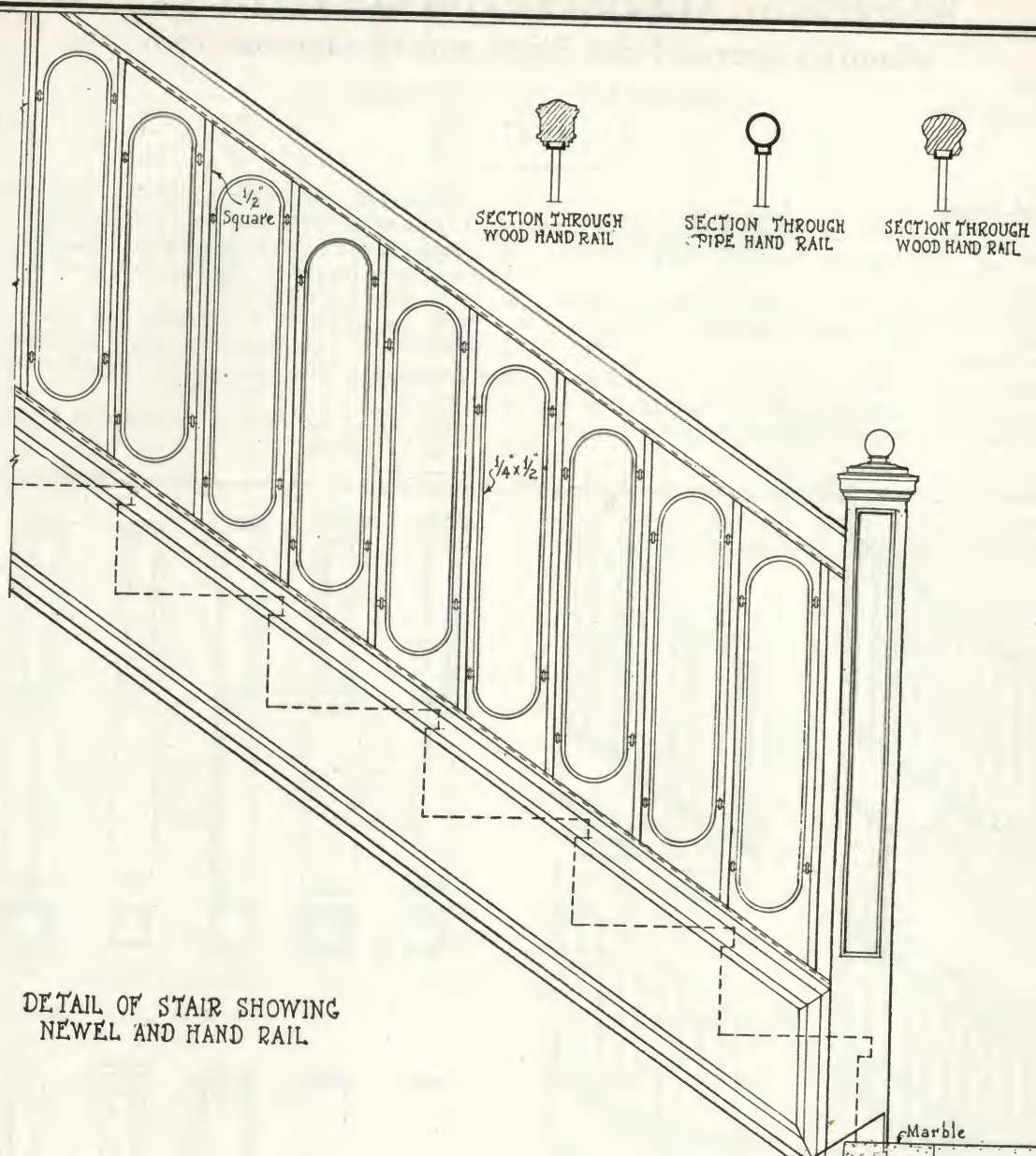
DRAWING NO. 1
SCALE: 1/4" = 1'-0"
EQUALS 1



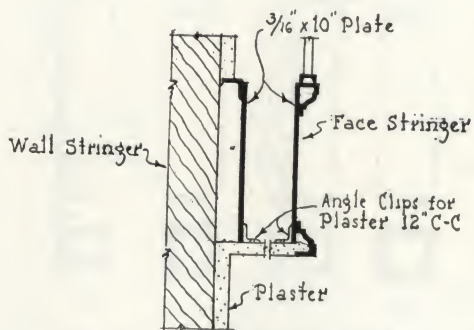
WATT
MANUFACTURING
COMPANY

TYPICAL DETAILS OF STANDARD RAILINGS AND NEWELS

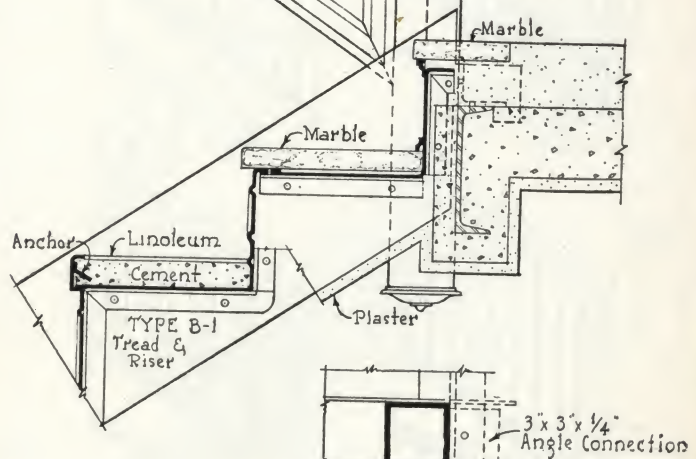
DRAWING NO. 2
SCALE: 1/3" = 1 FT.
EQUALS 1 FT.



DETAIL OF STAIR SHOWING
NEWEL AND HAND RAIL



DETAIL OF FACE & WALL STRINGER
Type A4



PLAN AT NEWEL SHOWING STRINGER CONNECTION

WATT
MANUFACTURING
COMPANY

TYPICAL DETAIL OF STANDARD STAIRS

DRAWING NO. 3
SCALE: 1 IN.
EQUALS 1 FT.

WESTERN ARCHITECTURAL IRON CO.

Manufacturers of Steel Stairs and Ornamental Iron

TELEPHONE

DIVERSEY 7034, 7035

211-233 West Schiller Street
CHICAGO, ILL.

"Ideal" Steel Stairs

"Ideal" steel stairs are the result of fifteen years of experience in stair building and are built and designed by experts.

Their construction permits utmost strength without sacrificing in any way the neat appearance that makes a building attractive.

Architects specify "Ideal" steel stairs because they can secure fireproof construction in any combination of designs necessary to properly harmonize with the surroundings.

Contractors and builders endorse them because they know from experience that their installation is very simple, therefore we suggest the use of local labor for erection, wherever possible. We can, however, send erectors to any part of the country.

Our organization is complete in every detail to insure quality, workmanship and excellent service. Our designers are thoroughly experienced in this field.

Write to us for further information regarding estimates and agencies.



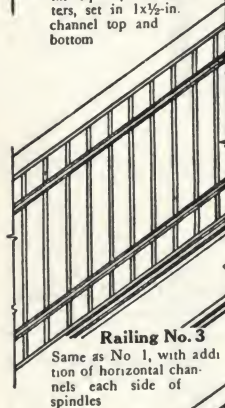
Railing No. 1

Wrought iron spindles, 1/2 in. square, 3-in. centers, set in 1x1/2-in. channel top and bottom



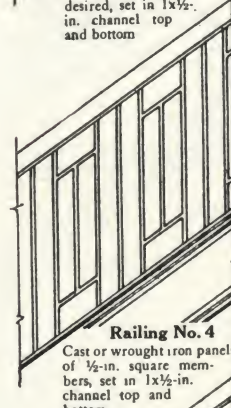
Railing No. 2

Wrought iron spindles, 1/2 in. square, grouped as desired, set in 1x1/2-in. channel top and bottom



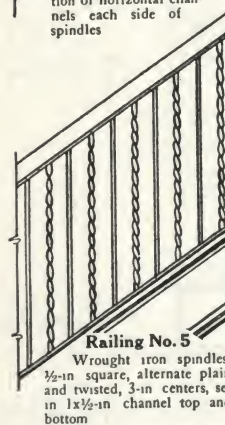
Railing No. 3

Same as No. 1, with addition of horizontal channels each side of spindles



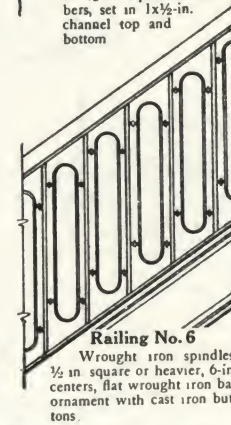
Railing No. 4

Cast or wrought iron panels, 1/2 in. square members, set in 1x1/2-in. channel top and bottom



Railing No. 5

Wrought iron spindles, 1/2-in. square, alternate plain and twisted, 3-in. centers, set in 1x1/2-in. channel top and bottom

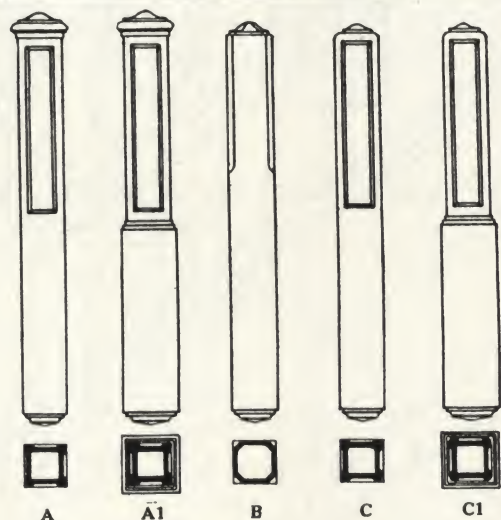


Railing No. 6

Wrought iron spindles, 1/2 in. square or heavier, 6-in. centers, flat wrought iron bar ornament with cast iron buttons

Standard Railings

Note. In all cases handrail can be of wood or metal. Any special railing and newel designs can be furnished.



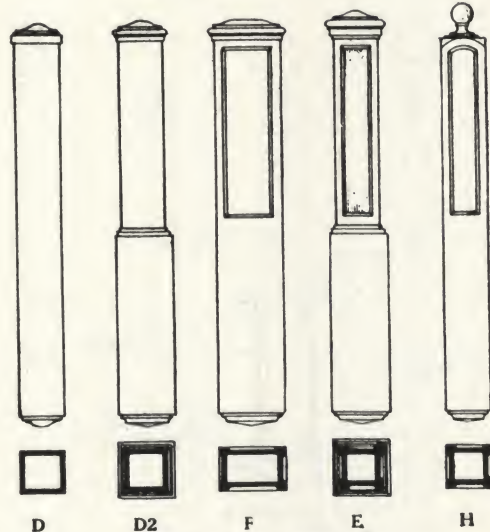
A

A1

B

C

C1



D

D2

F

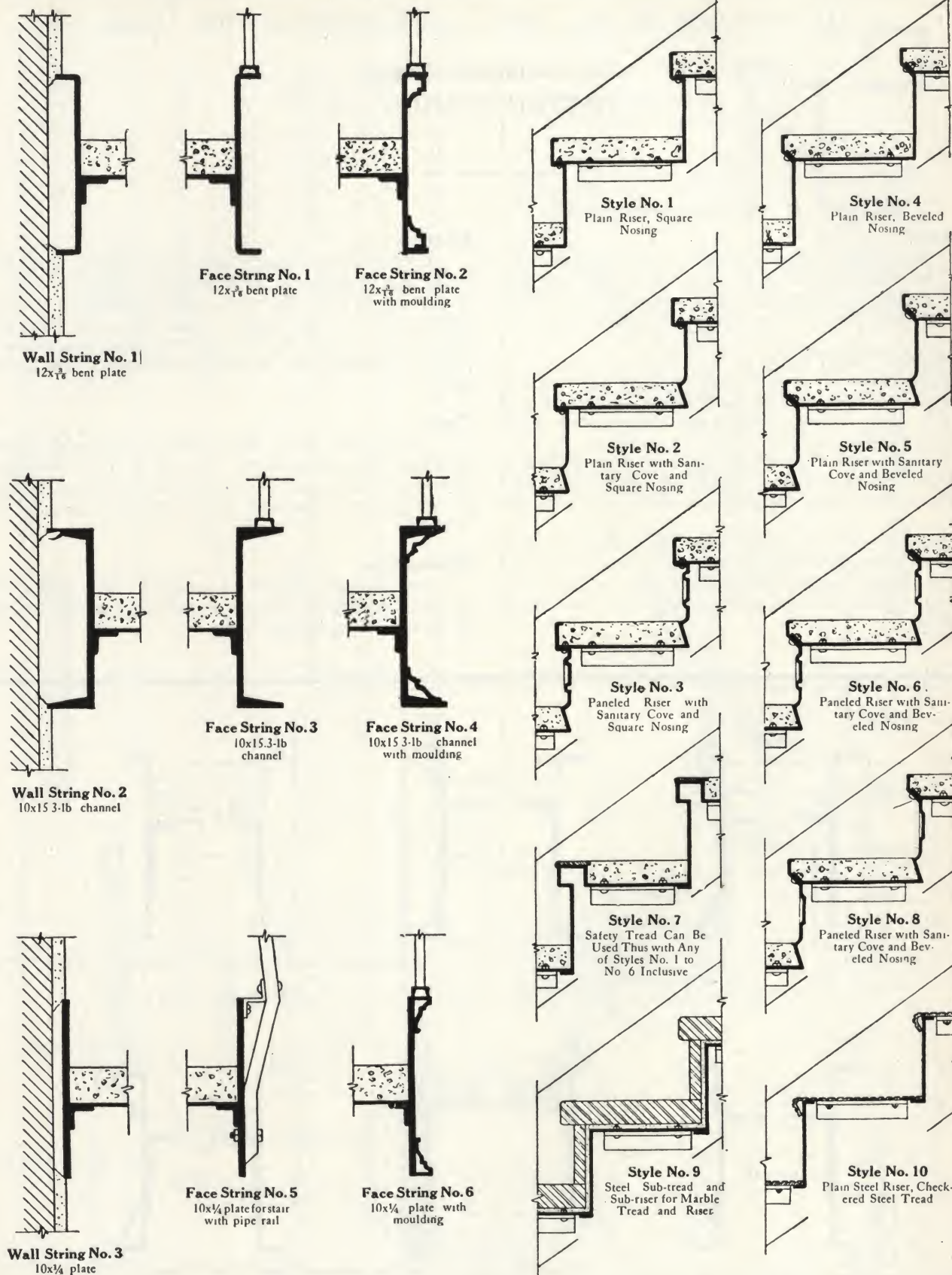
E

H

STANDARD NEWELS

Style	Shaft	Style	Shaft
A	3, 4 and 5-in. square	D	3, 4 and 5-in. square
A1	3, 4 and 5-in. square	D2	3, 4 and 5-in. square
B	4 and 5-in. square	F	6x4 in. rectangular
C	4 and 5-in. square	E	4-in. square
C1	4 and 5-in. square	H	4-in. square

DETAILS OF "IDEAL" STEEL STAIRS



DETAILS OF "IDEAL" STEEL STAIRS

WOLVERINE IRON WORKS

Manufacturers of Steel Stairs and Ornamental Iron Work

6782 Goldsmith Avenue

DETROIT, MICH.

Products

"WOLVERINE" STEEL STAIRS (a specialty).

Also Ornamental Iron Work, including cast iron Store Fronts, Spiral Stairs, Ornamental Railings, Window Guards, Elevator Enclosures, Marquises, etc.

"Wolverine" Steel Stairs

Stringers—Of rolled steel cut channel section, 10 to 15 in. wide; also of plate, 10 to 14 in. wide; $\frac{1}{8}$ to $\frac{1}{2}$ in. thick. Face stringers are covered with heavy steel mouldings, paneled.

Treads and Risers—Formed of Nos. 10, 12 or 14 gauge steel in one piece with nosing, and can be used for the various tread materials as illustrated in the details.

Newels—Are of steel; either plain square newels of sizes ranging from 2 to 5 in. square, or paneled steel newels of sizes ranging from $2\frac{1}{2}$ to $5\frac{1}{2}$ in. square, as illustrated in the details, with cast iron caps and drops attached.

Erection

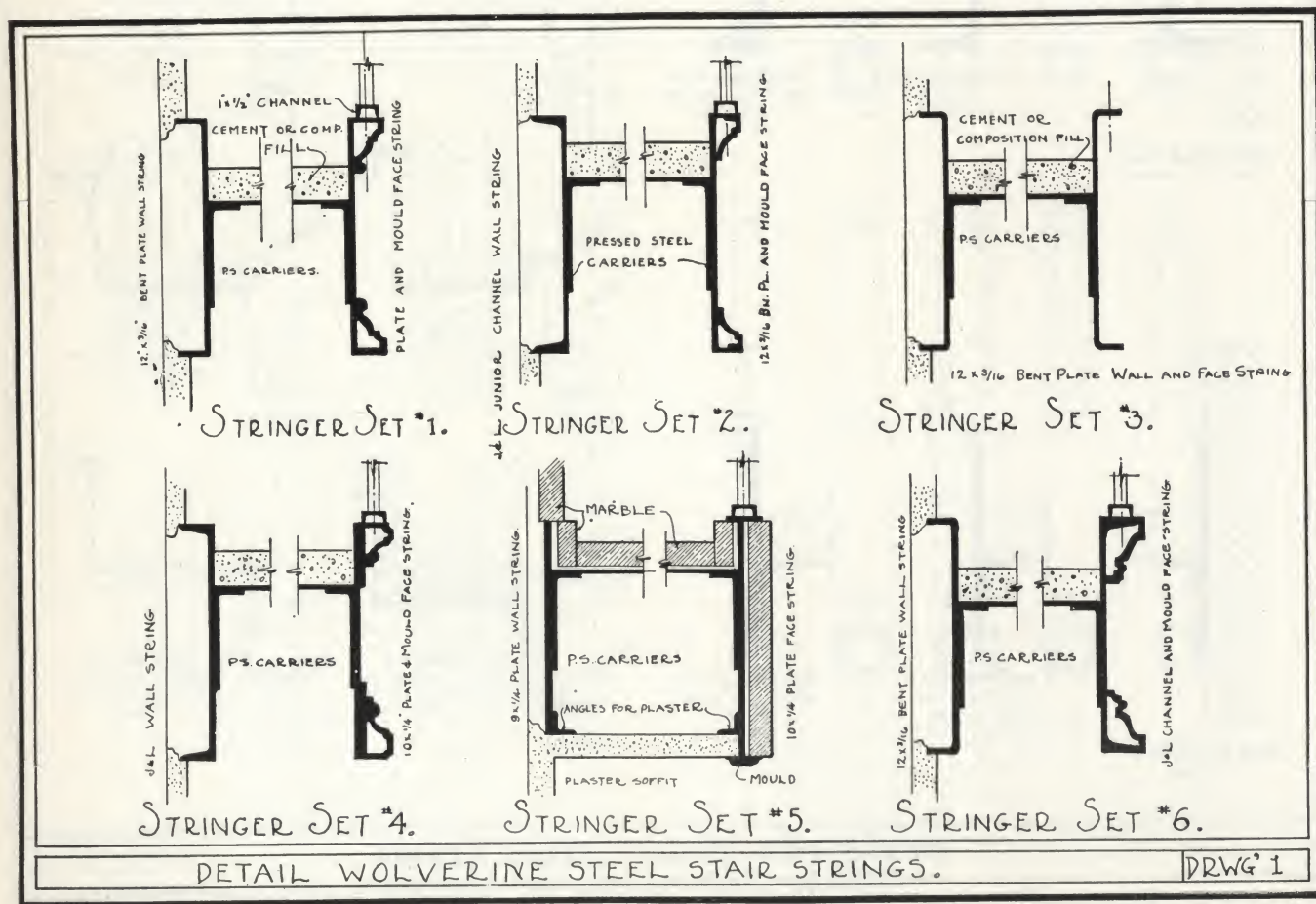
Correctly and scientifically constructed, these steel stairs are designed to be erected by ordinary tools as found on any job. Being so easily assembled, they are suitable for a wide range of use, from the checkered tread of fire escape stairs to the staircase decorated with period ornamentation, as used in buildings of the highest grade.

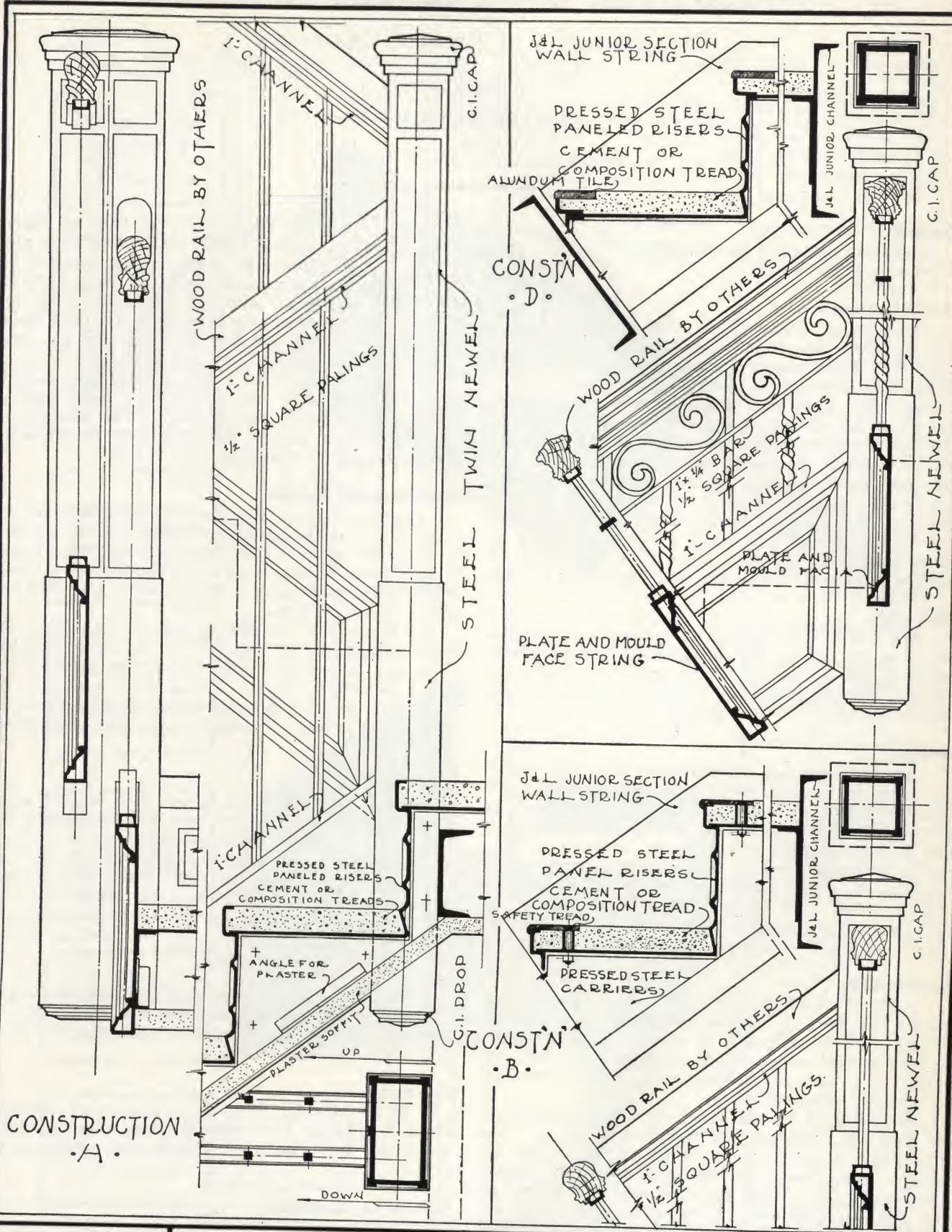
Costs

"Wolverine" steel stairs compare favorably in cost with any other metal stair. Not only is their installation cost low, but the cost of manufacture has been reduced to a minimum through the use of specially designed machinery.

Information

Information relative to weights, costs, deliveries, construction details, designs or existing installations will be furnished on request.





WOLVERINE
IRON WORKS.
DETROIT.

DETAILS OF
WOLVERINE STEEL STAIRS.

SCALE 1 1/2" = 1'-0"
DATE 7-5-27
DW'G 2.

WOODBIDGE ORNAMENTAL IRON CO.

Incorporated

Manufacturers of PresTeel Stairways

1521 Altgeld Street

CHICAGO, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES

Product

PRES-TEEL—"Tested for Strength"
—STAIRWAYS.

Strength Tests

Woodbridge Standardized Pres-Teel Stairways have been tested for strength. These tests were conducted at the Armour Institute of Technology, Chicago, Ill. Tests were made not only on completed stairways, but on each stringer, tread, riser, platform channel, tee, hanger rod connection, newel post connection, stringer connection and stringer lug. In each case the ultimate load was applied and from these loadings we are enabled to design stairways with not only the proper size stringers, but also all the component parts.

Each stair built by us is designed according to tables compiled from these tests, thus eliminating all guesswork as to the actual live load that can be carried.

Guarantee

We unequivocally guarantee, without any exception whatever, the satisfactory completion of any work with which we are intrusted; and, without reservation, guarantee all workmanship and materials against defects and to be exactly as represented.

Design

The Woodbridge Standardized PresTeel Stairways can be furnished plain or ornamental to suit any architectural design, with railings and newel posts to match. The risers may be plain or paneled, the treads can be arranged for marble, slate, cement, terrazzo, rezilite, alberene, asphalt, mosaic, cork, carpet, wood, linoleum, or any composition filling, with or without sanitary cove. The soffits of stairs are usually left open and present a neat finished appearance, but can also be arranged for plastering if desired.

Construction

Our construction provides a light, inexpensive, strong, durable, non-combustible and easily assembled stairway. It is adaptable to office, hotel, warehouse, factory, school, church, lodge hall and hospital construction; in fact, any building where fire-resistant construction is required.

Woodbridge Stairways are built with stringers made of PresTeel, thickness not lighter than $\frac{3}{16}$ in. The treads and risers are made of one piece of blue annealed steel pressed into the form required, platform plates are made of blue annealed steel reinforced with the necessary channels and tees, all securely bolted and riveted together. All rivets in our stairways are driven by machinery, insuring a permanently rigid and, therefore, noiseless connection. The thickness of metal used for the treads and risers as well as stringers depends upon the safe live load requirement and the length of span.



The Woodbridge Patented Standardized PresTeel Construction is reinforced at nosing, which prevents the nosing from breaking away from the tread filling. This stair tread will absolutely stand up at this point under the constant wear and tear the tread nosing must withstand.

The stair assembled forms a solid mass which is free from vibration under loading stress, both vertically and laterally. The strength of our construction insures the maximum of efficiency against damage or failure in case of fire.

Manufacturing Details

Special attention is called to the details of the Woodbridge standardized manufacture. Only the best of materials and workmanship goes into the makeup with a view to making these stairs last forever—if such a thing were possible—and thus reducing your cost and upkeep to a minimum.

Our product is made to last—to withstand the hardest usage—to embody all the necessary requirements and to give the greatest value possible for the money expended.

Cheap material and construction only increase the cost of an article, in added repair and replacement charges.

Installation

Woodbridge Stairs are exceedingly easy to erect. Each flight is erected, inspected and marked in our factory, then knocked down for shipment. If contractor desires to do his own construction work, we furnish shop details and printed erection instructions when shipment is made. A good man and helper can erect two flights of stairs per day, unless stair is extremely complicated. This company will be glad to handle the erection for those unable to take care of this work.

We often erect these stairs with the framework of the building, thus putting the stairs into immediate service, the tread filling is afterwards put in when the structure is nearing completion.

Painting

All Woodbridge Stairways are given one shop coat of battleship gray rust inhibitive metal coating, applied by the air brush process. We do no painting in the field.

Service to Architects

Our thoroughly organized Engineering, Estimating and Sales Departments are at the service of architects, engineers and builders. For those interested in designing and detailing stairway construction, our standardized construction, in $\frac{3}{4}$ -in. scale drawings for use in the drafting room, will be furnished upon request.

The Woodbridge Patented PRESTEEL Tread and Riser

Plaster Soffits unnecessary with this construction.

Made of one piece of No. 12, No. 14 or No. 16 Gauge Blue Annealed Steel, depending upon safe load required and length of tread

Construction allows for variation in width of treads.

By placing angle iron in this position one man can set treads and risers. No scaffolding or ladders necessary

Cement or Composition Filling

Construction strengthens risers, making braces or anchors unnecessary. Nosing positively will not break away from concrete or other fill.

No. 12, 14 or 16 Gauge Steel

All angle irons cut to the same length and carried in stock.

This construction partially conceals bolt heads.

All holes in angle iron are punched in 2 operations.

No unsightly construction from below.

The recess in treads positively gauges and positions treads.

Full strength of angle iron utilized in supporting tread.

Treads are recessed and punched in 1 operation.

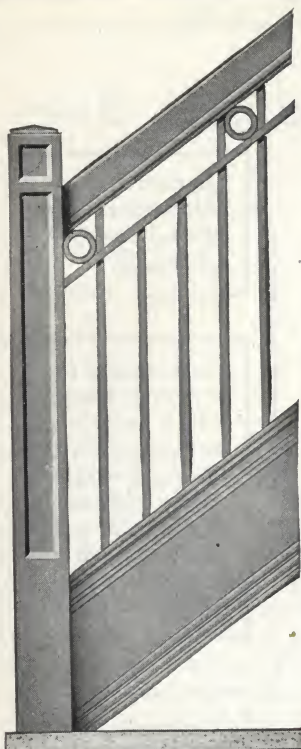
Note how accessible these bolts are from the top for tightening.

Only lower side of angle iron exposed.

No. 12, 14 or 16 Gauge Steel

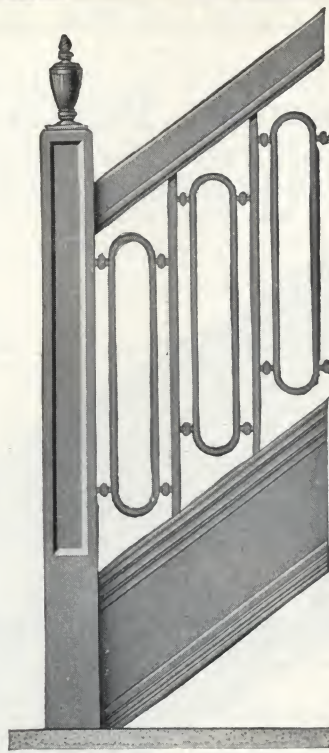
We do not depend on these 2 bolts to support treads.

THIS type of stair construction has passed the experimental stage as we have installed them in all principal cities of the United States. It meets all the requirements of the building and fire ordinances, and is recommended by leading Architects and Engineers.



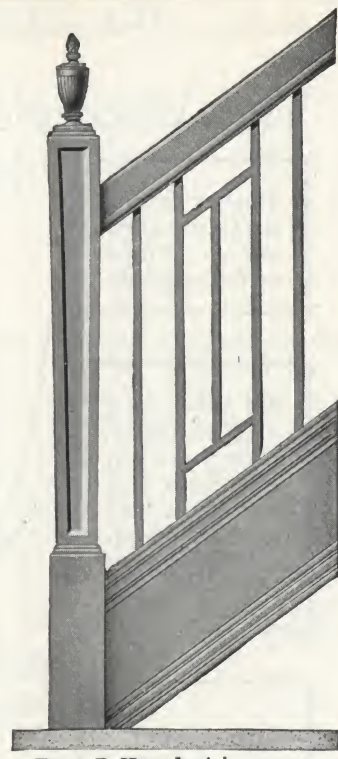
Type J Newel—4 in. square cast iron.

Design No. 12 Rail—Spindles are $\frac{1}{2}$ -in. square wrought iron bars, 3 in. on center, set in $1\frac{1}{2}$ -in. channels and with a $1\frac{1}{2}$ -in. flat bar at top and a $1\frac{1}{2}$ -in. channel at bottom.



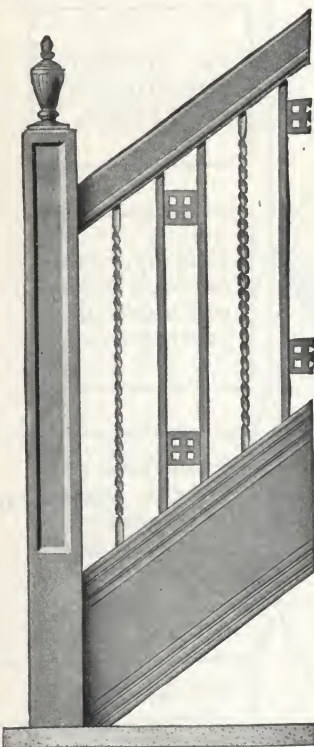
Type G Newel—4 in. square cast iron, rounded corners.

Design No. 14 Rail—Spindles are $\frac{1}{2}$ -in. square wrought iron bars, 6 in. on centers; ornament is $\frac{1}{2} \times \frac{3}{8}$ -in. wrought iron bar with ornamental iron separators between.



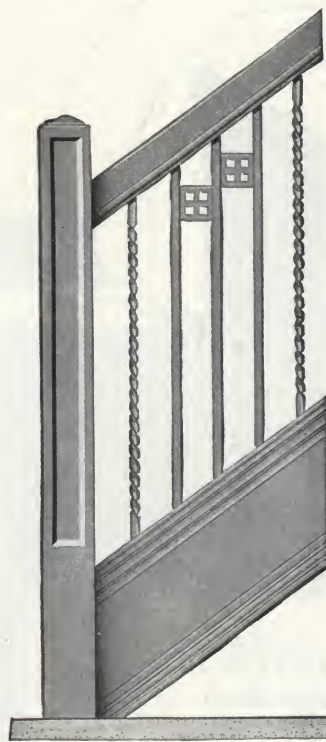
Type L Newel—4 in. square cast iron tapered shaft, bronze urn top.

Design No. 3 Rail—Spindles are $\frac{1}{2}$ -in. square wrought iron bars, 3 in. on centers, arranged in panel form with single spindle between panels. Spindles set in $1\frac{1}{2}$ -in. channels at top and bottom.



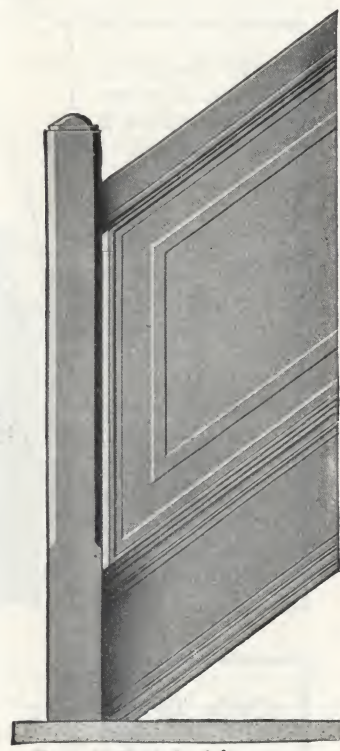
Type G Newel—4 in. square cast iron, rounded corners.

Design No. 20 Rail—Spindles are $\frac{1}{2}$ -in. square wrought iron bars, set 3 in. on centers, in a $1\frac{1}{2}$ -in. channel at top and bottom. Also available with two twisted spindles between panels.



Type F Newel—4 in. square cast iron, rounded corners.

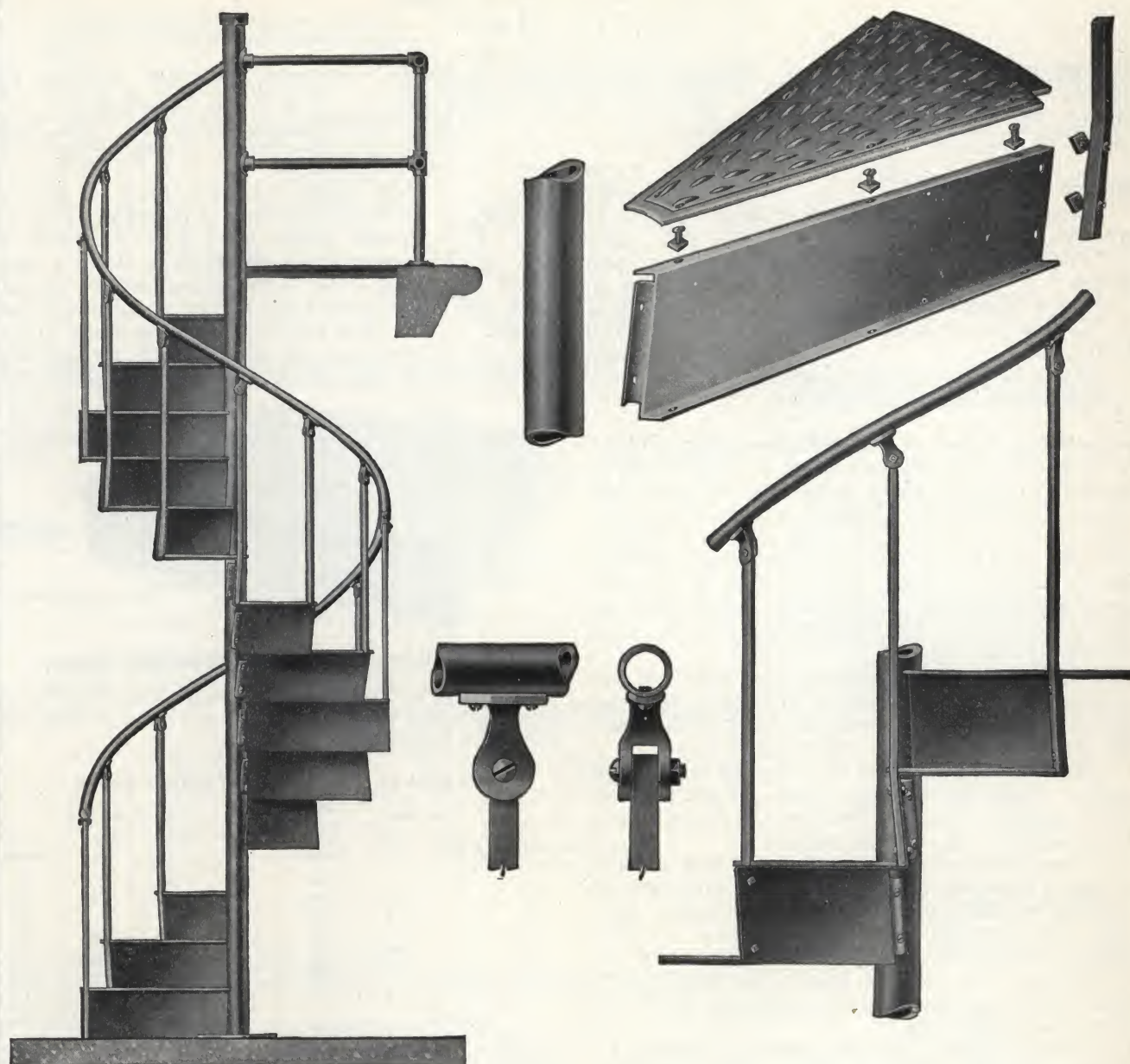
Design No. 19 Rail—Spindles are $\frac{1}{2}$ -in. square wrought iron bars, set 3 in. on center, in a $1\frac{1}{2}$ -in. channel at top and bottom. Two cast iron ornaments between spindles at top.



Type D Newel—4 in. square cast iron, beveled corners.

Design No. 22 Rail—Closed rail, adapted to schools, etc., made of No. 12 gauge steel paneled with $1\frac{1}{2}$ -in. flat bars. Can also be furnished with panels omitted.

Combinations of Railings and Newel Posts



Woodbridge Spiral Stairway Design No. 20B

Notice the greater beauty of this latest design. Compare it with other spiral stairways that are on the market.

This new spiral, like all Woodbridge Stairways, is exceedingly easy to erect. All parts are marked and treads and risers are interchangeable.

Description—

Treads are made of cast iron with diamond pattern surface to match steel diamond plate platform.

The same casting is used for right or left-hand

treads. All treads are interchangeable and easily removed.

The risers are made of No. 12 or 14 United States Standard gauge steel.

Each riser is flanged and bolts to the center pipe.

The uprights are made of $\frac{3}{4}$ -in. square bars and are bolted to each riser.

The handrail is made of $1\frac{1}{2}$ -in. inside diameter pipe and is rolled to exact radius required.

Platform is made of $\frac{3}{16}$ or $\frac{1}{4}$ -in. diamond plate steel which matches surface of treads.

The New Woodbridge Spiral Stairway

AMERICAN MASON SAFETY TREAD CO.

GENERAL OFFICE AND FACTORY
LOWELL, MASS.

REPRESENTATIVES

NEW ENGLAND STATES, METALLIC
EQUIPMENT CO., 10 High Street, Boston,
Mass.
EASTERN PENNSYLVANIA, METALLIC
EQUIPMENT CO., Philadelphia Bourse, Phila-
delphia, Pa.

GENERAL DISTRIBUTERS, JOSEPH T.
RYERSON & SON, New York, N. Y., Chi-
cago, Ill., St. Louis, Mo., Cleveland, Ohio,
Detroit, Mich., Minneapolis, Minn., Mil-
waukee, Wis.

WESTERN MISSOURI, KANSAS and
OKLAHOMA, JOHN B. RICKETTS, 604
Ridge Building, Kansas City, Mo.
CANADIAN REPRESENTATIVES, DARLING
BROTHERS, LTD., Montreal, Toronto, Hali-
fax, Ottawa, Winnipeg, Calgary, Van-
couver

Products

MASON SAFETY TREAD (lead or car-
borundum filled).

MASONCO SAFTRED (with slip-proof
nosing).

MASON STRUCTURAL TREAD.

"COOPER" STAIR NOSINGS (in brass or
aluminum).

MASON NON-SLIP LADDER SHOES.

KARBOLITH SANITARY FLOORING.



UNDERWRITERS' LABEL

Mason Safety Tread (Lead or Carborundum Filled)

Mason safety treads are made of rolled steel or extruded hard brass (delta metal) $\frac{1}{4}$ in. thick with alternate dovetailed and U-shaped grooves. The dove-tailed grooves are filled either with lead, or a mixture containing a large proportion of carborundum and other abrasive substances, firmly held in place by the continuous supporting ribs of hard metal, which give long wear, preserving the non-slipping quality of the tread for a number of years.

The open U-shaped grooves catch and hold any foreign substance, such as pencils, burned matches, cigar ends, wads of paper, etc., giving the foot a sure contact. They can be easily swept or washed out.

The lead can not spread or creep and fill the open grooves. There are no jagged edges for the retention of filth or germs. As the tread wears, it leaves no polished, dangerous, slip-inviting surface.

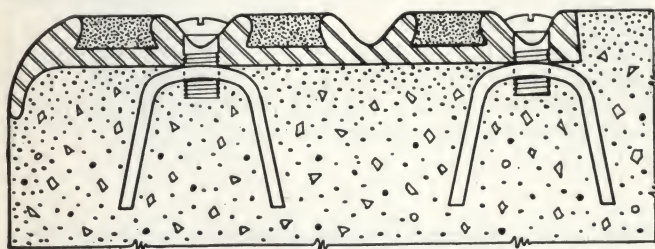
All wood screws, machine screws and nuts, anchors, etc., can be furnished for each installation, when ordered.

Uses of Mason Safety Treads—Mason safety treads are especially desirable for stairs in school buildings, department stores, industrial plants, factories, and wherever the traffic is heavy; for thresholds of doors, elevator openings and fire doors; for ramps and floors around machinery.

Adaptable to all situations, inside or outside of a building, where the surface is liable to become slippery or where steps have worn to an uneven surface.

They are suitable for use on granite, marble, slate, cement, iron or wood; and can be installed during new construction or on old work.

They are especially desirable on stairs of concrete, as they prevent the raw edge from chipping off. Special anchors are furnished, which are easily worked into the soft concrete.

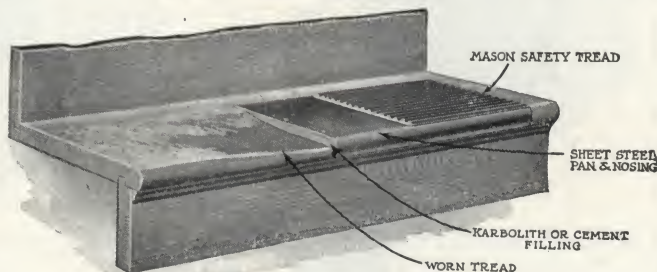


Mason Safety Tread as Applied to New Concrete

Repairing Worn Stairs with Mason Safety Tread—For repairing purposes, Mason safety tread is

ideal. Badly worn stair treads are repaired as shown, the worn portion being built up to the proper level with Karbolith or cement filling, on which is placed a sheet steel, brass or aluminum pan and nosing; the safety tread is then placed in position.

Our long experience enables us to give directions for the repair of any stairway, of any material and degree of wear. We



Mason Safety Tread as Applied to Worn Treads

will furnish without obligation suggestions, sketches or blue prints, showing just how the work can be done best and at the lowest cost.

STANDARD SIZES OF MASON SAFETY TREAD

Steel Base				Hard Brass Base			
No.	Number of ribs	Width, in.	With nosing	No.	Number of ribs	Width, in.	With nosing
1	7	6	No	7	8	6	No
1A	7	6	Yes	7A	6	5 1/4	Yes
2	5	4 3/4	No	8	5	4	No
2A	5	4	Yes	9	4	3	No
3	5	4	No	10	3	2 1/4	No
3A	4	3 3/4	No	11	4	3 1/2	Yes
4	4	3 1/2	Yes	11A	4	3	Yes
5	3	3	Yes	12	3	2 1/8	Yes
6	3	2 1/2	No	12A	3	2 1/8	Yes
				14	3	2 3/4	Yes
				14A	4	3 1/2	Yes

Cut to length, punched and countersunk for screws. If other than standard widths are ordered, an additional charge will be made for splitting.

For concrete work, treads should be ordered with anchors.

Any combination of Nos. 1, 2, 3, 3A and 6 will make any width tread desired without a nosing. The same is true of Nos. 7, 8, 9 and 10.

Any combination of No. 1A, 2A or 4 with No. 1, 2, 3, 3A or 6 will make any width tread desired with one nosing. The same is true of No. 7A, 11, 11A, 12, 12A, 14 or 14A with No. 7, 8, 9 or 10.

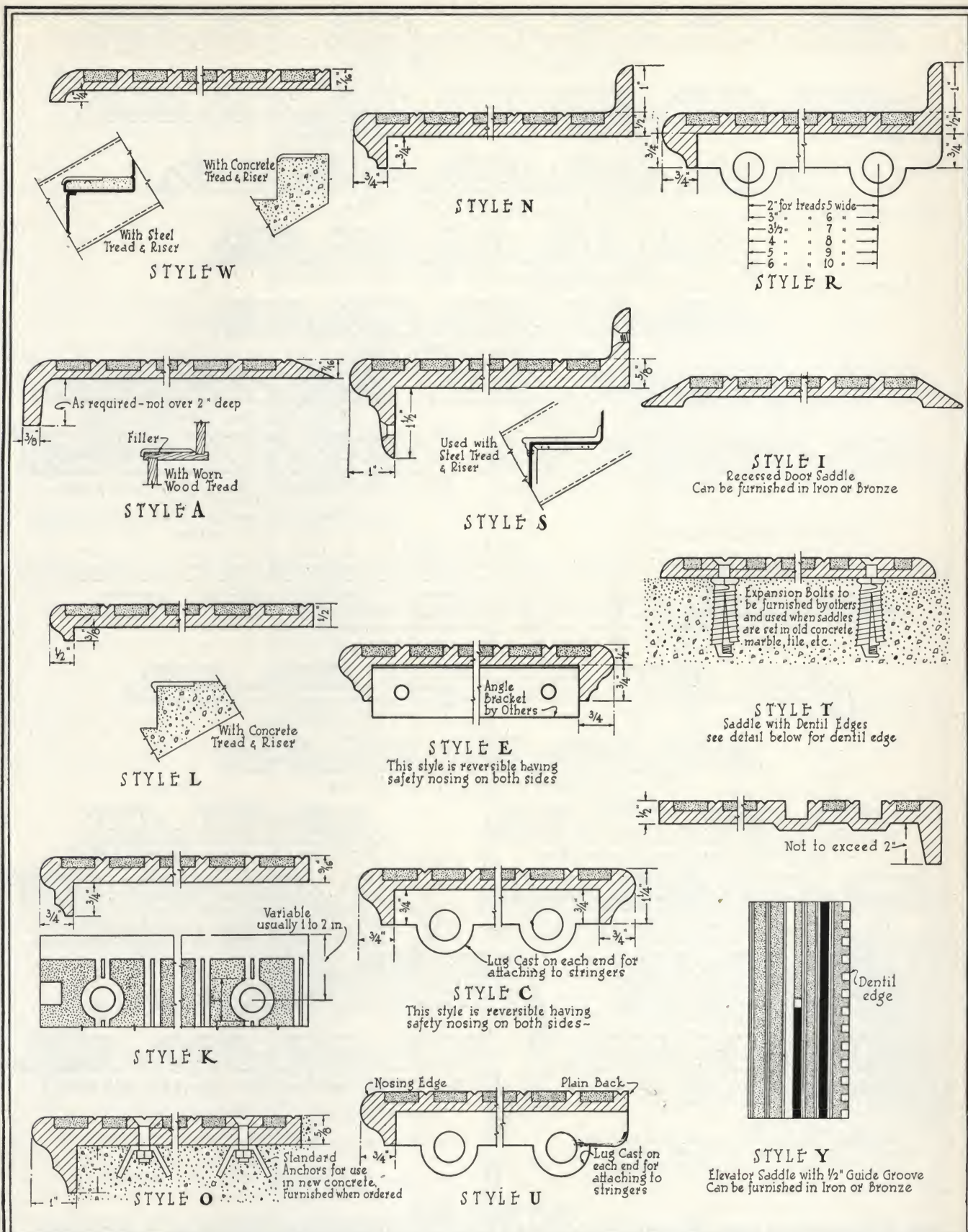
No. 5—with nosing and square back edge; especially made for cement and concrete work.

Insurance

Establishments employing labor find it desirable to equip their stairs with Mason safety tread, as accident insurance companies demand all reasonable endeavor to make the plant safe.

We know of no case where damages have been claimed for injuries from slipping or tripping that has been lost to the defendant when Mason safety treads have been used as a preventive and we have a record of many cases of such claims that have been decided in the defendant's favor. Many hundreds of school buildings are equipped with these treads and not a single accident has ever been reported to us from this use.

Mason safety treads have been used constantly for over 25 years, and over 8,000,000 sq. ft. have been sold.



SWEETS
CATALOGUE
SERVICE

DETAILS OF
MASON SAFETY TREAD

SCALE
1" = 1' 2"
DATE JULY 26
DRWG
1

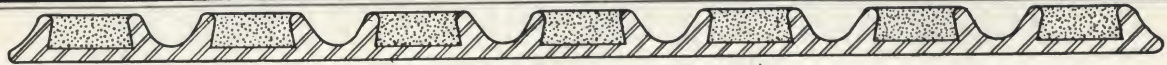


FIG. 1, Steel Base, 6 in Wide, 7 Ribs.

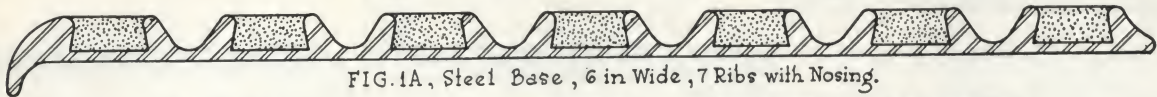


FIG. 1A, Steel Base, 6 in Wide, 7 Ribs with Nosing.

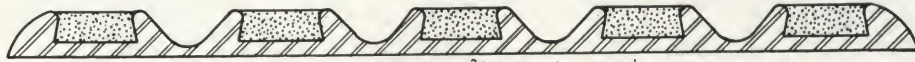


FIG. 2, Steel Base 4 3/4 in. Wide, 5 Ribs.

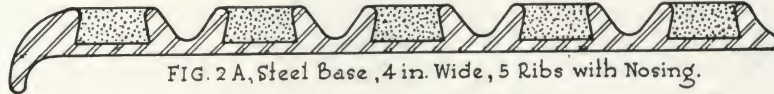


FIG. 2A, Steel Base, 4 in. Wide, 5 Ribs with Nosing.



FIG. 3, Steel Base, 4 in. Wide, 5 Ribs.



FIG. 3A, Steel Base 3 3/4 in. Wide, 4 Ribs.



FIG. 6, Steel Base 2 1/2 in. Wide, 3 Ribs.

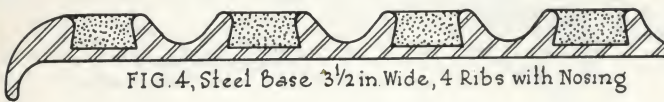


FIG. 4, Steel Base 3 1/2 in. Wide, 4 Ribs with Nosing



FIG. 5, Steel Base, 3 in. Wide, 3 Ribs, Nosing and Straight Back.

Especially made for granolithic work or for use with cork backing.

STEEL BASE

Base is rolled, unperforated steel with alternate U-shaped and dovetailed grooves filled with lead or carborundum.



Fig. 7, Hard Brass Base, 6 in. Wide, 8 Ribs.

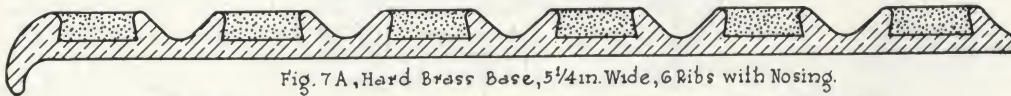


Fig. 7A, Hard Brass Base, 5 1/4 in. Wide, 6 Ribs with Nosing.

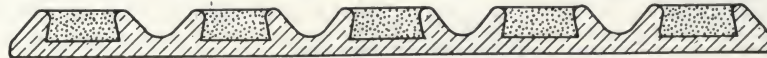


FIG. 8, Hard Brass Base, 4 in. Wide, 5 Ribs.



FIG. 9, Hard Brass Base, 3 in. Wide, 4 Ribs.

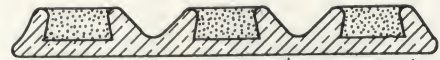


FIG. 10, Hard Brass Base 2 1/4 in. Wide, 3 Ribs.

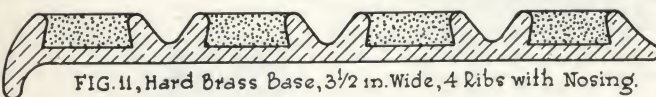


FIG. 11, Hard Brass Base, 3 1/2 in. Wide, 4 Ribs with Nosing.

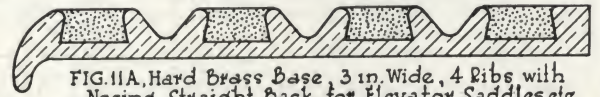


FIG. 11A, Hard Brass Base, 3 in. Wide, 4 Ribs with Nosing, Straight Back for Elevator Saddles etc.



FIG. 12, Hard Brass Base, 2 1/8 in. Wide, 3 Ribs with Nosing.



FIG. 12A, Hard Brass Base, 2 1/8 in. Wide, 3 Ribs with Nosing.

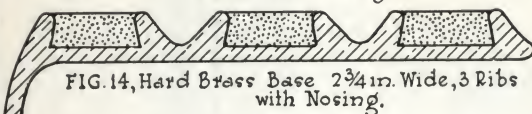
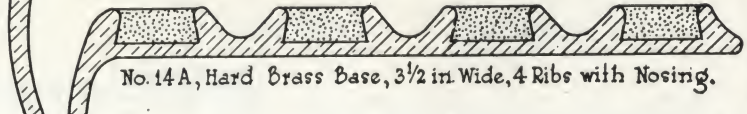


FIG. 14, Hard Brass Base, 2 3/4 in. Wide, 3 Ribs with Nosing.



No. 14A, Hard Brass Base, 3 1/2 in. Wide, 4 Ribs with Nosing.

A beautiful protective finish, especially for marble stairs, where its bright surface contrasts pleasingly with the white marble.

HARD BRASS BASE

Base of hard extruded brass (delta metal) with alternate U-shaped and dovetailed grooves filled with lead or carborundum.

SWEETS
CATALOGUE
SERVICE

DETAILS OF
MASON SAFETY TREAD

SCALE
FULL SIZE
DATE JULY 26

DRWG
2

Mason Structural Tread (Requires no Subtread)

Mason Structural Tread is a complete step and safety tread combined. It requires no subtread, can be installed with or without a riser. Furnished ready to bolt to staircase stringers if so desired.

This tread consists of a channel cast iron base, filled with Mason carborundum filling, which extends to the extreme front edge. The toothed nosing, which is similar to that of Masonco Saftred, prevents any possibility of slipping.

Uses—Mason Structural Tread can be used with any type of iron stair construction. It is particularly recommended for power plants, engine or boiler rooms, industrial plants, factories, schools and for heavy traffic conditions.

How Furnished—Mason Structural Treads are furnished in any tread width; in lengths up to 60 in.; and in thicknesses of $\frac{1}{2}$, $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. The $\frac{1}{2}$ -in. thickness is recommended for treads up to 36 in.; the $\frac{3}{8}$ -in. for treads up to 40 in.; the $\frac{5}{8}$ -in. for treads up to 48 in.; and the $\frac{3}{4}$ -in. for treads up to 60 in. long.

Masonco Saftred (Carborundum Filled Treads with Slipproof Nosing)

Masonco Saftred is designed to meet the present-day demand for a tread that will positively prevent accidents and combine appearance with durability.

Plain nosings of cast iron, steel or other hard materials may prove satisfactory from the standpoint of durability, but even though coated with a thin layer of abrasive, they soon become polished smooth and slippery. On the other hand, nosings which consist solely of tile or other non-slip materials may prevent slipping, but they do not possess durability.

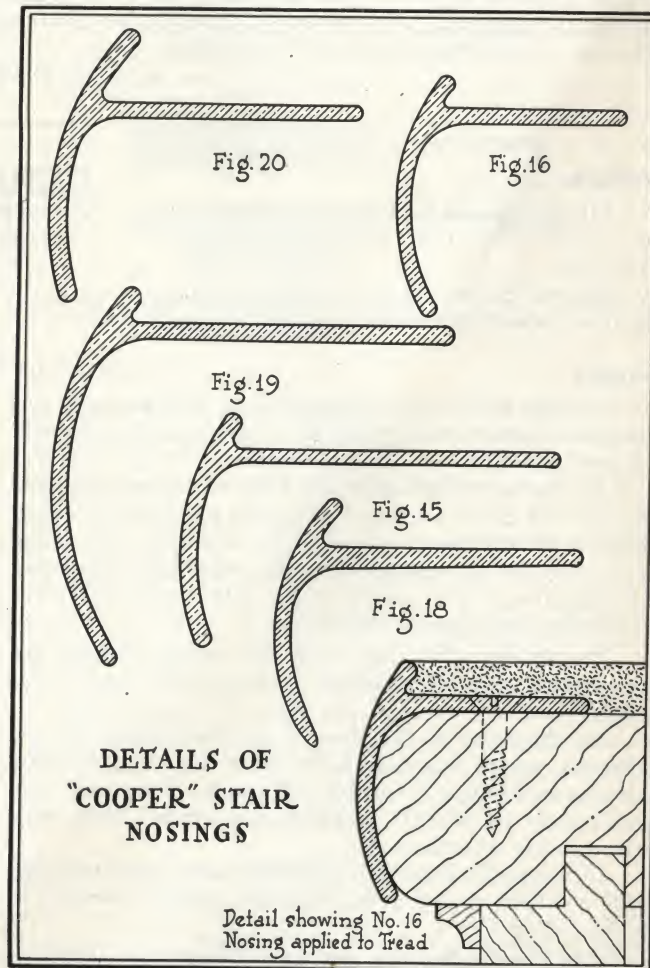
Masonco Saftred is a perfectly flat tread with a nosing consisting of alternate hard metal and carborundum teeth. The two wear down evenly together, thus insuring both durability and non-slip qualities.

This is the only type of metal-base safety tread with a nosing which not only prevents the foot from

apply Masonco Saftred with slip-proof nosing built to fit your stair nosing—thus, all evidence of wear or repair will be concealed.

"Cooper" Stair Nosings in Brass or Aluminum

"Cooper" Stair Nosing is used with cork composition, linoleum, rubber, interlocking rubber tile, carpet, or any other form of stair covering. All sizes have a vertical edge at top which protects the stair covering from wear at its edge and prevents slipping. Four sizes.

**Mason Non-slip Ladder Shoes**

Many thousands of these ladder shoes are in use throughout the country. They are indorsed and recommended by accident liability companies and recognized by the courts as an efficient safety device. Illustrations show method of application and abrasive material in bottom of shoes.

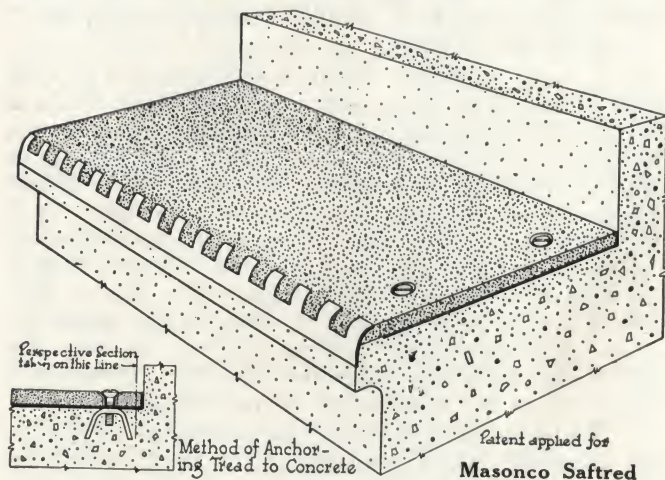


Mason Ladder Shoes

Karbolith Sanitary Flooring

A composition with a base largely of magnesium that produces a hard, durable, sanitary surface, proof against rats, fire and germs. It is impervious to heat, cold and dampness, and will not chip, crack, tear loose nor disintegrate. It can be laid over cement, iron or wood, and binds firmly to the base.

Extensively used for flooring of railway cars, industrial plants, offices, laboratories, garages, railroad stations, steamships, etc. We manufacture this flooring and furnish instructions for installing.



slipping forward over the edge of the step, but prevents it from slipping sidewise as well.

How Furnished—Masonco Saftreds are made in one piece, in widths to fit any tread, and in lengths up to 60 in. Nosings are regularly $\frac{1}{2}$ in. deep, but nosings of any special size or shape will be furnished to meet requirements. The treads are shipped with screw holes countersunk, ready for installation.

Repairing Worn Stairs with Masonco Saftred—Instead of tearing out worn stairs, they can be economically and durably repaired with Masonco Saftred. First build up the worn portions with Karbolith filler, then

AMERICAN ABRASIVE METALS CO.

Manufacturers of Anti-Slip Tread Surfaces

Hudson Terminal Building, 50 Church Street

NEW YORK, N. Y.

TELEPHONE

CORTLANDT 7444, 6467

BRANCHES

BOSTON, 136 Federal Street

CHICAGO, Conway Building

PHILADELPHIA, 1700 Walnut Street

PITTSBURGH, Farmers Bank Building

BUFFALO, Erie County Bank Building

SAN FRANCISCO, 444 Market Street

AGENCIES IN PRINCIPAL CITIES

Products

Manufacturers of FERALUN, BRONZALUN and ALUMALUN ANTI-SLIP TREAD SURFACES.

United States and Canadian Sales Representatives for CARBORUNDUM ANTI-SLIP TILE.

Feralun

Feralun is specially prepared iron with abrasive grit embedded in the wearing surface to provide an approved, durable and effective anti-slip tread.

This grit, embedded at the time of casting, projects slightly and bites, so that slipping is prevented. Being excelled in hardness only by the diamond and being firmly held by the metal partly surrounding each grain, the abrasive grit in combination with the metal gives to Feralun its extreme durability.

Durability—Feralun anti-slip stair treads are non-porous and "fire-proof," "rust-proof," and "slip-proof."

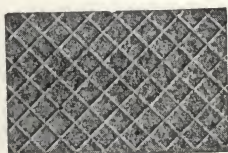
On the stairs of the New York subway and elevated railroads, where they are the accepted standard, Feralun anti-slip treads last from 5 to 12 years. They carry approximately 14,000,000 people on a stairway 30 in. wide before losing effectiveness.

In floors, 11 years' concentrated wear from trucking loads of 1200 to 1800 lbs. has not caused Feralun to become slippery.

Approval—Feralun anti-slip treads are approved without any qualifications as a fire-safe and anti-slip tread by the Underwriters' Laboratories, Inc., and by Pennsylvania and New York State Industrial Boards.

Sizes and Designs—Feralun may be obtained in practically any form in which metal is cast as a tread surface. Certain forms are so frequently demanded that they have become a standard. These are shown in a set of detail sheets from which tracings may be made, and which will be sent on request.

Uses—Feralun is especially suitable for treads and walkway surfaces where durability and protection against slipping is desired, such as stair treads, coal-hole covers, area covers, gutter plates, elevator door thresholds, freight elevator landings, floor plates, trench covers, shipping platforms, ramps, etc.



Hatch



Plain

Surface Design

FERALUN

Anti-Slip Treads

TRADE-MARK

Feralun Stair Treads

Feralun treads are made with a plain or hatch abrasive metal surface. The anti-slip element is carried down over the nosing. No dangerous, slippery nosing edge or heel-catching grooves. Made in the following styles:

Styles A and C—Used on a sub-tread of concrete, iron, steel, wood, marble, etc. Made $\frac{5}{16}$ or $\frac{3}{8}$ in. thick, usually 4, $4\frac{1}{2}$, 5 or 6 in. wide and not exceeding 60 in. long in one piece. Longer treads furnished in sections. On new stairs, length of safety tread Style A is usually 3 to 4 in. shorter than distance between stringers. Width should be not less than five-eighths the distance from nosing to riser and should cover nosing edge. Widths 6 to 9 in. are $\frac{3}{8}$ in. thick; 9 to 12 in., $\frac{7}{16}$ in. thick; over 12 in., $\frac{1}{2}$ in. thick. Style A standard lip extends $\frac{1}{4}$ in. from underside of tread. At times it may be necessary to use a longer lip, especially in repair work, where it is desirable to cover all signs of wear on nosing edges of old and worn steps. For this purpose a Style A lip from $\frac{1}{2}$ in. to 1 in. deep is furnished at a slight additional cost.

Style D—Made $\frac{3}{8}$ in. thick and in same widths and lengths as Styles A and C. Nosing is $\frac{3}{4} \times \frac{3}{4}$ in.

Style O—Requires no sub-tread. Made $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, or $\frac{3}{4}$ in. thick. Treads not exceeding 9 in. wide back of nosing by 60 in. long furnished $\frac{3}{8}$ in. thick, if desired, and should be supported by risers. Treads over 9x60 in., and not exceeding 12x60 in., should be not less than $\frac{7}{16}$ in. thick and should be supported by risers. Platforms and landings in sections not exceeding 20x36 in. should be not less than $\frac{1}{2}$ in. thick; not exceeding 36x48 in. should be not less than $\frac{5}{8}$ in.; and not exceeding 42x60 in. should be not less than $\frac{3}{4}$ in. thick. Platforms usually have a truss rib cast on the underside. Style O nosing extends $\frac{3}{4}$ in. beyond the riser line and $\frac{3}{4}$ in. down from underside of tread. If nosing is required 1x1 in., Style S will be furnished.

Style R—Bolted direct to stringers. Requires no sub-tread. Used extensively for open stairs, fire escapes, around machinery, in engine and boiler rooms, etc. Made $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ in. thick, according to span and has truss rib. Treads 48 to 60 in. long made not less than $\frac{5}{8}$ in. thick; 60 to 72 in. long, $\frac{3}{4}$ in. thick. This style is reversible, having anti-slip nosing at front and back.

Style R-G—Same as R with drainage perforations.

Style K—Does not require a sub-tread and is made $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. thick. Treads not exceeding 48 in. long will be furnished $\frac{7}{16}$ in. thick and 48 to 72 in. will be $\frac{1}{2}$ in. thick. When risers are omitted, treads should be $\frac{1}{2}$ in. thick, and when over 42 in. and not

over 60 in. long should also have a truss rib. From 60 to 72 in. long, treads should be $\frac{5}{8}$ in. thick with a truss rib.

Styles of Treads for Repairs to Worn Steps—Styles A, C or D are applied to existing steps. If necessary to remove old steps, they may be replaced by either Style O or R, without using a subread. If old and worn steps are to be repaired and Style A is preferred, it may be desirable to cover all signs of wear on the nosing edges. For this purpose, a lip $\frac{1}{2}$ to 1 in. deep will be furnished.

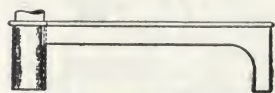
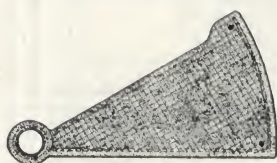


Method of Repairing Worn Wood, Concrete, Slate, Iron or Marble Steps with Style A Feralun Anti-Slip Treads

Anti-Slip Thresholds and Saddles—Styles L and T are extensively used. Made $\frac{3}{8}$ to 1 in. thick. Sizes up to 6x60 in. should be not less than $\frac{3}{8}$ in. thick; up to 9x82 in. should be not less than $\frac{7}{16}$ in. thick; and up to 12x108 in. should be not less than $\frac{1}{2}$ in. thick.

Elevator Thresholds—Style V made with one or two door grooves not less than $\frac{1}{2}$ in. thick and not exceeding 12 in. wide and 96 in. long in one piece. Longer saddles made in sections. Grooves are $\frac{1}{2} \times \frac{1}{2}$ in. or $\frac{9}{16} \times \frac{9}{16}$ in. Grooves are machine planed and therefore straight, true and free from fins. Lip at nosing is usually 2 in. over all. If a deeper lip is required the extra length is usually lap-jointed and bolted to the 2-in. piece. Door saddles without grooves are made $\frac{7}{16}$ to $\frac{3}{4}$ in. thick. Style W without grooves for counterbalanced door.

Floor Plates and Trench Covers—Made $\frac{1}{2}$ in. thick, in sections not exceeding 20x36 in. Sections not exceeding 36x48 in., not less than $\frac{5}{8}$ in. thick; 42x60 in., not less than $\frac{3}{4}$ in. thick.



Feralun Spiral Treads

Spiral Treads and Platforms—Cast complete in one piece with collar and flange; according to architects' or contractors' details. Thickness is usually $\frac{7}{16}$ to $\frac{3}{4}$ in. Hole in collar is for 3 $\frac{1}{2}$ or 4-in. outside diameter of pipe.

Safety Coalhole Covers and Frames—Have no heel-catching projections or depressions; flush with sidewalk. Hinges especially constructed to overcome breakage and are concealed. When open, they are enclosed on all sides and top, except toward curb where coal chute is inserted. Made in 3 sizes: 18, 20 and 24 in.

The Feralun safety covers and frames comply with the requirements of New York City Department of Public Works.

Strips for Inclines and Ramps—Made not less than $\frac{3}{8}$ in. thick in sizes up to 9x60 in.

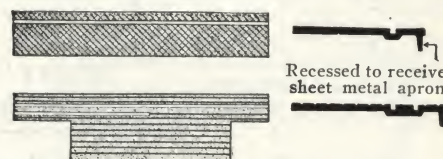
Steeper ramp grades may be used, and much space saved, if Feralun is used. Firm, even traction is essential in garages. When the ramps are tracked or covered with Feralun, they give a feeling of security to every car owner, and are positive protection against the damage

caused by one car skidding into another or into posts and walls.

Bronzalun

Bronzalun is a combination of bronze and abrasive grit manufactured in the same manner as Feralun. It has all the good qualities of Feralun. Architectural superiority is combined with durability and anti-slip effectiveness. It is made in either the hatch, standard fluted or bright fluted surface.

Uses—Bronzalun is largely used for tread surfaces such as entrance door saddles, elevator thresholds, safety treads on marble stairs, etc.



Typical Design of Bronzalun Elevator Threshold, Style V, Showing Hatch and Fluted Surface

Alumalun

Alumalun is a combination of aluminum and abrasive grit manufactured in the same manner as Feralun and Bronzalun. It has the anti-slip effectiveness and architectural value of Bronzalun and is extremely light in weight, weighing 1 lb. per sq. ft. for each $\frac{1}{16}$ -in. thickness. It is immune to the action of sea water and does not deteriorate on account of exposure.

Uses—Alumalun is very desirable for high grade work. Its silver color makes it especially suitable to harmonize with certain decorative schemes.

Alumalun is made in hatch and fluted surfaces.

Alumalun Sidewalk Doors—Light in weight, non-corrosive, durable, anti-slip. Have no projections or depressions and are flush with sidewalk. Hinges are especially strong and are concealed. Standard sizes, 3 ft. 6 in. x 3 ft. 6 in. and 4x4 ft.

Specifications for Anti-Slip Tread Surfaces

Concrete Steps, Platforms and Landings—All concrete steps, including nosing edges of platforms and landings, shall be equipped with "Feralun" [Style A, C or D] as made by AMERICAN ABRASIVE METALS Co. Style A shall extend continuously along the step to within . . . inches (3 to 4 in.) of stringers. Style C and D shall extend from string to string. Treads shall be . . . inches (at least 4 in., and preferably 6 to 7 $\frac{1}{2}$ in.) wide. Treads shall be set flush with the cement surface and firmly secured with anchors. Surface of treads shall be kept free from all cement finish.

Iron Stairs with Risers—All iron stairs with risers shall be equipped with "Feralun" [Style O, S or K] as made by AMERICAN ABRASIVE METALS Co.

Iron Stairs Without Risers—All iron stairs without risers shall be equipped with "Feralun" [Style R or R-K] as made by AMERICAN ABRASIVE METALS Co. Style R and R-K are cast with lugs to be bolted to the stringers. Style K may be used bolted to angles on stringers.

Elevator Door Thresholds—All elevator door thresholds shall be "Feralun" [Style V-1 or V-2] as made by AMERICAN ABRASIVE METALS Co.

Door Saddles, Exterior and Interior—All entrances, interior, and fire door saddles shall be "Feralun" [Style L, T, W or M] as made by AMERICAN ABRASIVE METALS Co.

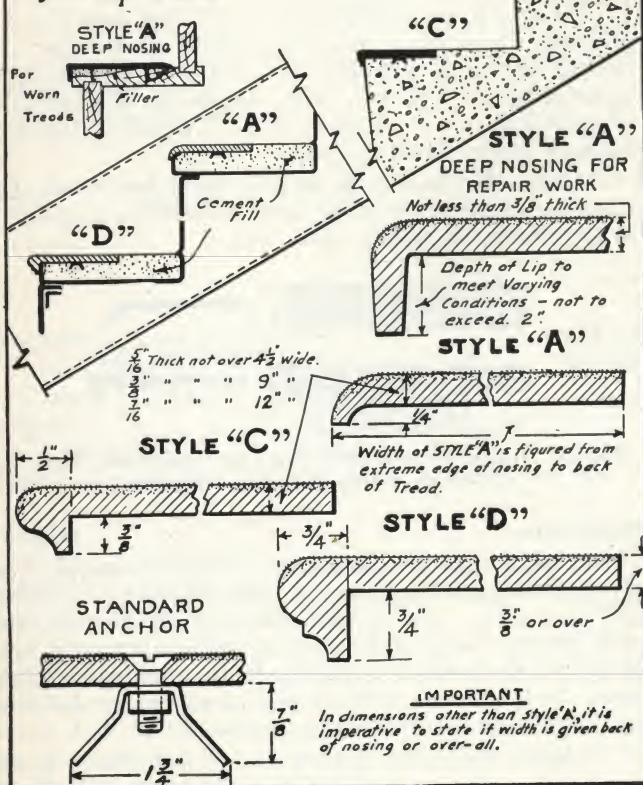
Walkway Surfaces—All (mention location, such as boiler room floors, floors around machinery, inclines, ramps, elevator floors, vestibules, freight corridors, trench covers, drainage gratings, coal hole covers, etc.) shall be "Feralun" as made by AMERICAN ABRASIVE METALS Co. and as shown on plans.

Note: At locations where architectural effect is desired, "Bronzalun" or "Alumalun" may be substituted for "Feralun" in the above.

Anti-Slip Tile—For specifications for Carborundum Anti-Slip Tile see third page following.

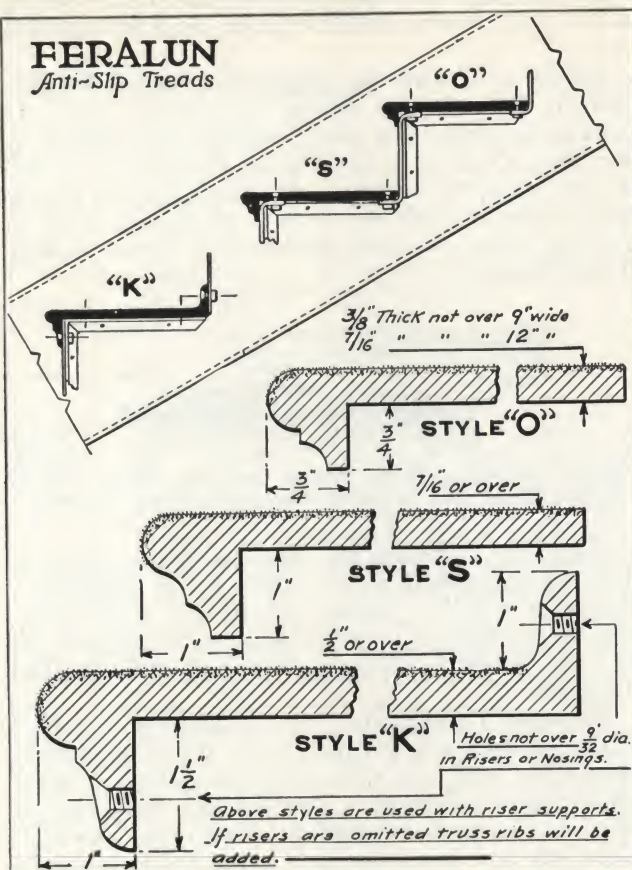
FERALUN

Anti-Slip Treads



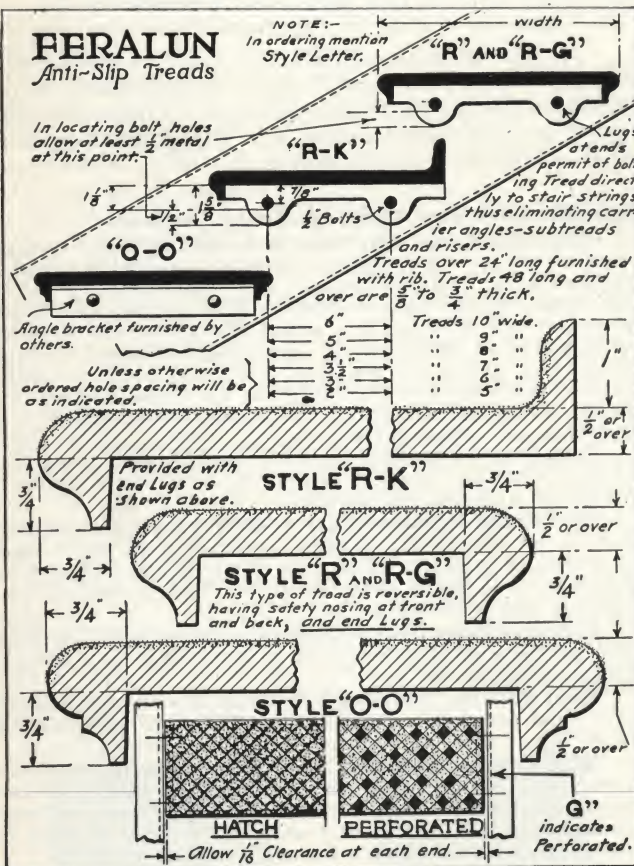
FERALUN

Anti-Slip Treads



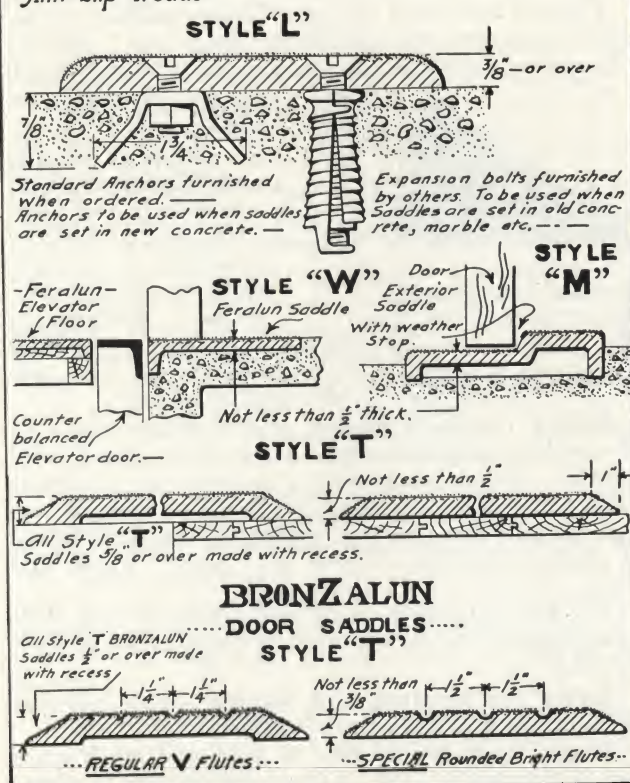
FERALUN

Anti-Slip Treads



FERALUN

Anti-Slip Treads



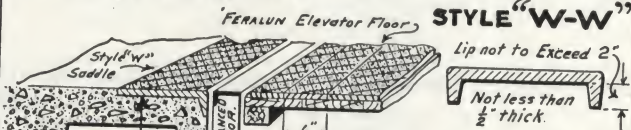
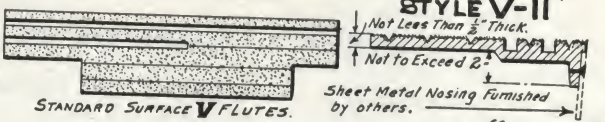
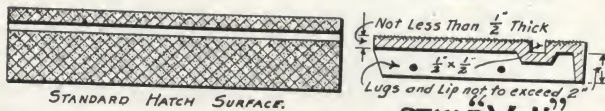
DETAIL OF STYLES AND SIZES—FERALUN ANTI-SLIP TREADS

FERALUN

Anti-Slip Treads

ELEVATOR DOOR SILLS

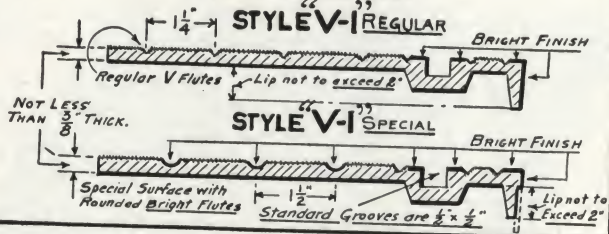
STYLE "V-I"



Showing Application of STYLE "W" to Counter-Balanced Elevator Door. Also 6" x 8" FERALUN Plates on Elevator Floor.

BRONZALUN

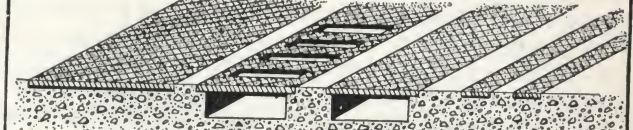
---ELEVATOR DOOR SILLS---
---SHOWING STANDARD FINISH---



FERALUN

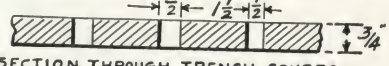
Anti-Slip Treads

Supported on Steel Members for Platforms, Floors etc.

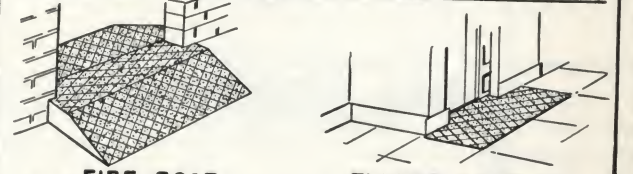


FLOOR PLATES, DRAIN AND TRENCH COVERS AND STRIPS

FLOOR PLATES.
Made 1/2" thick up to 20" x 36" Made 3/8" thick up to 36" x 48"
Made 3/4" thick up to 42" x 60"
FERALUN STRIPS. For side walks and ramps to have square edges - not to be less than 3" wide or 3/8" thick.



Not less than 3/4" thick - Wide spans are provided with Truss Ribs.



FIRE-DOOR SADDLE AND RUNWAY FLOOR PLATES AT ELEVATOR - LANDINGS

Three ways of applying FERALUN on either straight or curved ramps.

• GARAGE - RAMPS. • STORE - ENTRANCE AND • RAMP.

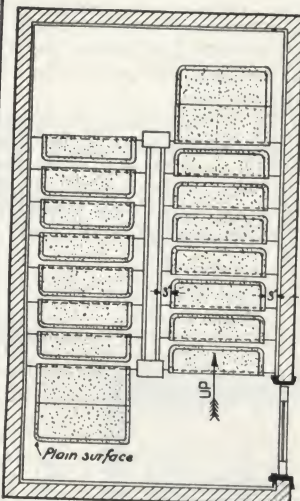
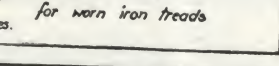
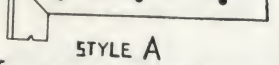
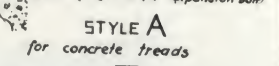
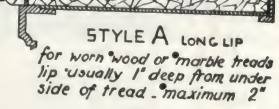
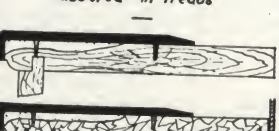
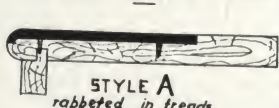
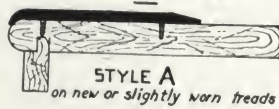
FERALUN

Anti-Slip Treads

REPAIR WORK

STYLE A

Minimum thickness 3/8"
Standard lip 1/4" deep



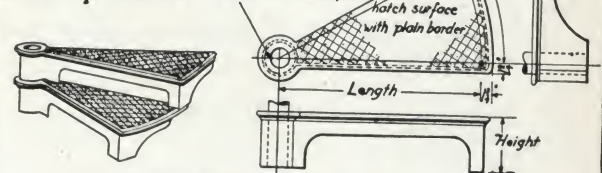
- TYPICAL STAIR PLAN -
Showing FERALUN anti-slip treads applied to worn stair treads & landings



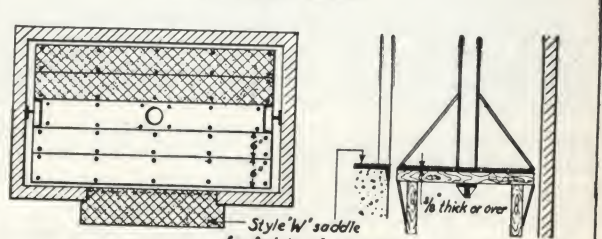
- SHOWING HATCH SURFACE -
When ordering please specify either plain or hatched surface and square or bevelled edges.

FERALUN

Anti-Slip Treads



- STANDARD SPIRAL TREAD -
Made not less than 7/8" thick



- ELEVATOR FLOOR PLATES AND SADDLE -



FERALUN MAT FOR REVOLVING DOOR

SUGGESTIONS FOR THE USE OF ANTI-SLIP MATERIALS IN BUILDING CONSTRUCTION

Carborundum Anti-Slip Tile

This tile is made of both Carborundum and Aloxite, abrasive products of the electric furnace. These manufactured abrasives have been recognized for years as among the greatest of all grinding materials, and are extensively used for the grinding of steel, iron, brass, bronze and other metals. Both are produced by fusing crude materials in electric furnaces at extremely high temperatures. The resultant crystal masses are taken from the furnace and are broken and crushed to standard sizes of grains or crystals. These crystals are mixed with clays and ceramic materials and moulded into the various sizes and shapes of tile. The tile are then vitrified in high temperature kilns.

Carborundum Anti-Slip Tile presents a gripping, safe surface that can not wear smooth. It is of the same structure and texture, and the same degree of hardness throughout. It retains its safe, anti-slip surface as long as the tile itself lasts.

Advantages of Carborundum Anti-Slip Tile

Carborundum Anti-Slip Tile never loses its anti-slip surface and is practically non-wearing. Under the slight wearing action of traffic it literally renews its safe surface.

It is safe under all conditions. Oil, water or grease does not affect its anti-slip qualities.

The tile is remarkably strong. Tests at room temperature have shown it to have a *transverse strength* of about 5500 lbs. per sq. in.

Carborundum Anti-Slip Tile presents a fine appearance and can be used with any building material such as concrete, marble, granite, brick, steel or wood.

Where this tile is used an even, flat surface is presented underfoot. The tile is laid flush with the stair tread or floor. There are no corrugations, ribs or ridges to cause tripping or to annoy by accumulating dirt.

The resistance of the tile to wear eliminates the cost of maintenance.

Uses of Carborundum Anti-Slip Tile

Stair Treads—For this purpose the tile is made with a rounded nose, giving a safe, secure footing even on the edge of the step.

Treads, such as concrete, slate, marble, wood, metal, etc., may be made safe by the use of Carborundum Anti-Slip Tile suitably applied.

In Concrete—Carborundum Anti-Slip treads can be used advantageously in reinforced concrete stairs, being placed at the time the concrete is poured. In conjunction with tile or terrazzo this tile provides an architecturally pleasing form of stair tread construction, which at the same time is absolutely slip-proof.

Floors—Entrances to shops, stores, moving picture theaters, swimming pool edges, floors in shower baths and lavatories, hotel and theater lobbies, restaurant kitchens, floor landings at elevators, and in industrial plants the floors around dangerous machinery, are made safe from the slipping hazard by the use of Carborundum Anti-Slip Tile. For such purposes the tile may be used solely or in varying proportions with ordinary tile forming designs. It is laid over old floors or incorporated in new construction in the same manner as ordinary tile.

Ramps—In no type of walkway surface is prevention of the slipping hazard so essential as in the construction of ramps. Here the Carborundum Anti-Slip Tile is especially suitable. It will stand up indefinitely under the severest traffic and its architectural

attractiveness for finer work does not preclude its use for heavy duty where its anti-slip qualities give needed foot purchase to workmen handling loads.

Entrances—Stores and building entrance floors are made safe for pedestrians by Carborundum Anti-Slip Tile. It eliminates the menace of slippery doorways, gives long service and provides architectural attractiveness. It can be laid solid or in conjunction with ordinary tile to form various designs.

Swimming Pools—Carborundum Anti-Slip Tile is particularly suitable for use along the edges of swimming pools, presenting a safe, secure footing for swimmers. Water does not affect its anti-slip qualities. Such borders should not be less than 18 in. in width.

Specifications for Laying Carborundum Anti-Slip Tile

In Concrete on Floors, Ramps, etc.—Tile to be soaked in water and laid in same manner as ordinary vitrified tile. (Note: detailed specification will be furnished on request.)

In Mastic on Wood, Steel and Concrete Surfaces—Surface shall be thoroughly cleaned and dry. Tile shall be thoroughly cleaned and dry. Surface shall be coated with boiling asphalt roofing mastic of the proper quality, $\frac{1}{4}$ in. thick, for an area of not more than 4 tile at one time. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be $\frac{1}{8}$ to $\frac{1}{4}$ in. wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer. It is recommended that this work be installed only by experienced men.

In Treads of Concrete Stairways—Pour concrete stairs and finish as usual. When tread is hard enough, just before concrete sets, from area to be covered by tile remove concrete for a depth of $\frac{5}{8}$ in. Tamp water soaked tile into concrete to level, even surface. Joints shall be $\frac{1}{8}$ to $\frac{1}{4}$ in. wide and filled with cement grout.

On Wooden Stair Treads—Tread shall be recessed for a depth of $\frac{1}{2}$ in. and for length and width to suit number and size of tile to be used. Recessed surface shall be thoroughly cleaned and coated with boiling asphalt roofing mastic $\frac{1}{8}$ in. thick. Lay tile in hot mastic, tamping to level, even surface, keeping joints true to line. Joints shall be $\frac{1}{8}$ to $\frac{1}{4}$ in. wide and filled with hot mastic, trimmed with a knife and ironed with a hot jointer.

Tile shall be held in position by 2 wood screws per tile, or by a No. 20 gauge brass, $1 \times \frac{1}{4}$ -in. angle, toe guard, the 1-in. leg being fastened to wood tread by screws.

On Metal Stair Treads—Metal surface shall be cleaned and a $1\frac{1}{2}$ -in. layer of 1:2½ cement mortar placed on tread and finished to proper level. When this bed of mortar is hard enough, just before it sets, from area to be covered by tile remove mortar for a depth of $\frac{5}{8}$ in. Tamp water soaked tile into mortar to level, even surface. Joints shall be $\frac{1}{8}$ to $\frac{1}{4}$ in. wide and filled with cement grout.

STOCK SIZES OF CARBORUNDUM ANTI-SLIP TILE

(Colors: white and reddish brown)

Stair tile (rounded nosing on long side)		Floor tile			
		Square		Oblong	
No.	In.	No.	In.	No.	In.
*T 642	6x 4x $\frac{1}{2}$	S 32	3x 3x $\frac{1}{2}$	R 3152	3x1 $\frac{1}{2}$ x $\frac{1}{2}$
T 643	6x 4x $\frac{3}{4}$	*S 62	6x 6x $\frac{1}{2}$	R 632	6x3 x $\frac{1}{2}$
*T 62	6x 6x $\frac{1}{2}$	S 63	6x 6x $\frac{3}{4}$	R 633	6x3 x $\frac{3}{4}$
T 63	6x 6x $\frac{3}{4}$	*S 94	9x 9x1	R 943	9x4 x $\frac{3}{4}$
*T 73	7x 7x $\frac{3}{4}$	*S 125	12x12x1 $\frac{1}{4}$	*R 963	9x6 x $\frac{3}{4}$
T 943	9x 4x $\frac{3}{4}$				
*T 944	9x 4x1				
*T 963	9x 6x $\frac{3}{4}$				
*T 125	12x12x1 $\frac{1}{4}$				

*In brown only.

Weight of material: $\frac{1}{2}$ in. thick, 6¼ lb. per sq. ft.; $\frac{3}{4}$ in. thick, 10 lb. per sq. ft.

Brown tile, 1.38 oz. per cu. in. White tile, 1.25 oz. per cu. in.

Diagonal halves furnished with squares at same square foot price.

Carborundum Anti-Slip Aggregates

Used in place of 10 to 20% of the marble chips in terrazzo, or troweled into a granolithic finish, these aggregates, developed especially for the purpose, make such walkway surfaces satisfactorily anti-slip and more durable.

STANDARD SAFETY TREAD CORP.

Manufacturers of Standard Safety Treads

110 East 42nd Street
NEW YORK, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

STANDARD NON-SLIP TREADS (Patent applied for).

Standard Non-Slip Treads

Standard Non-Slip Treads are castings of iron, aluminum or bronze with a flat wearing surface of a hard abrasive mixture.

They have three outstanding and distinctive features, viz.: the depth of the wearing surface, the absence of grooves and the design of the nosing.

The wearing surface is not superficial, but extends down almost to the base.

The absence of grooves and corrugations gives more non-slip surface and eliminates all chances of the shoe catching and tripping the wearer.

In the nosing the abrasive is likewise carried down to a considerable depth which affords absolute protection against slipping where the wear is the greatest.



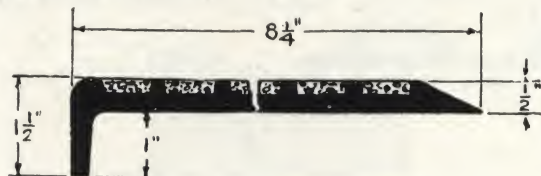
Standard Non-Slip Tread Showing Nosing with Abrasive Carried Down to a Considerable Depth

Absolute protection against slipping where the wear is greatest

This nosing feature, as well as the unusual depth of the abrasive, has resulted in the Standard Safety Tread receiving wide recognition in the profession.

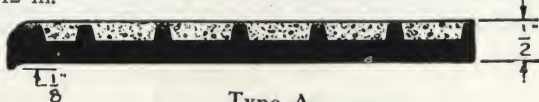
Types

Type "A", with Special Nosing 1 in. Deep—For badly worn wood, slate or marble steps. This style can also be furnished, with square instead of beveled back edges, when safety treads are to be rabbetted.



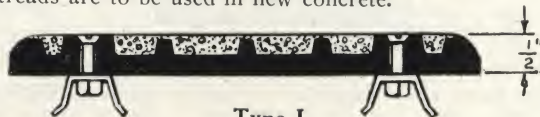
Type A with Special Nosing

Type "A"—Furnished either with lip nosing as shown or flat and with either square or beveled back, in widths from 4 to 12 in.



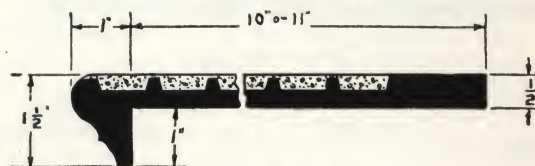
Type A

Type "L"—Furnished 3 3/4, 4 3/4 and 6 in. wide with full rounded nosing edges, reversible. Anchors attached complete with treads are to be used in new concrete.



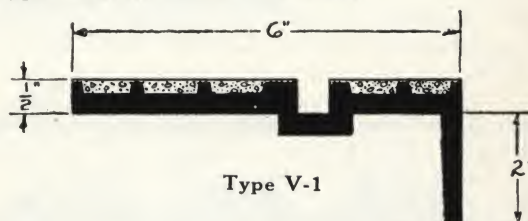
Type L

Type "S"—School tread, structural type, holes drilled ready to attach to either riser or stringer brackets.



Type S

Type "V-1"—Elevator door saddle.



Type V-1



Stairway with Standard Treads in the Lincoln High School, Jersey City, N. J.

JOHN T. ROWLAND, JR., Architect

Installations

A few other buildings in which Standard Safety Treads were specified and are now in service with satisfactory results, are as follows:

LOCATIONS	ARCHITECTS
Clifton High School, Clifton, N. J.	Lee & Hewitt
Comfort Station, City of New York, 148th Street and Willis Ave.	
Factory, Continental Can Co., Jersey City, N. J.	Francisco & Jacobus
Hospital Group, Hudson County, N. J.	John T. Rowland, Jr.
Freeport Public School, Freeport, N. Y.	F. J. Berlenbach
Factory, J. A. Deknatel & Son, Inc., Queens Village, N. Y.	Commonwealth Engi- neering Co.
Jersey Journal Office Bldg., Jersey City, N. J.	John T. Rowland, Jr.
Fink Bakery, New York, N. Y.	L. S. Beardsley
St. Barnabas Parochial School, Yonkers, N. Y.	Ward & Meete

THE SAFETY STAIR TREAD COMPANY

Wooster Architectural Bronze Thresholds

Wooster Safe-Groove Stair Treads

Wooster Kass Safety Treads

WOOSTER, OHIO

NEW YORK OFFICE: 1133 Broadway

CHICAGO OFFICE: 803 Transportation Building

REPRESENTATIVES IN PRINCIPAL CITIES

Product

STEEL BASE, YELLOW BRASS BASE and WHITE BRASS BASE WOOSTER SAFE-GROOVE TREADS.

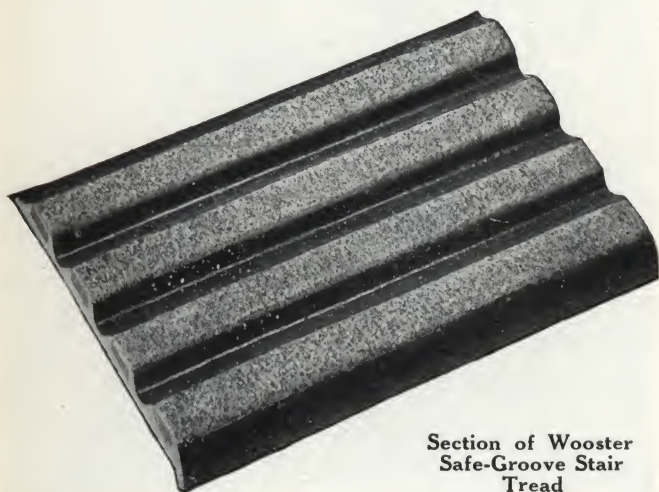
WOOSTER KASS SAFETY TREADS.

Also Wooster Architectural Bronze Thresholds.

For Wooster Security Nosings and Edgings, see page A681.

Wooster Safe-Groove Treads

Wooster Safe-Groove Treads are scientifically designed and proportioned in three metal bases to prevent stairs, saddles, thresholds and ramps, or any walking surface from becoming worn or dangerously smooth. They also protect stair steps from disfiguring wear under heavy traffic conditions.



Section of Wooster Safe-Groove Stair Tread

Material—Wooster Safe-Groove Treads are fabricated in black steel, highly polished yellow brass or in silvery white non-rusting and non-tarnishing white brass.

For the steel and yellow brass base treads the anti-slip filler may be of either carborundum or lead. For the white brass sections, lead only is used.

Design—Wooster Safe-Groove Treads are so designed as to present a walking surface of broad ribs of wear-resisting, abrasive material alternating with deep narrow grooves.

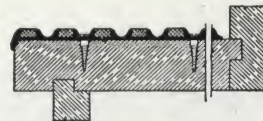
These antislip ribs extend clear to the bottom of the treads and the recess in which they are held is so shaped as to be wider at the bottom than at the top. This increases the area of the antislip material as the tread wears down after years of use, and increases the safety factor in proportion to the rate of wear.

Specifications—All stairs, platforms and landings to be provided with Wooster Safe-Grooves [Carborundum] [Lead] Filled Treads, to be 6 in. shorter than the

entire length of the steps and to be installed according to manufacturer's specifications.

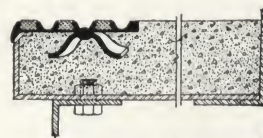
Each step shall be covered according to the amount of wear to which it will be subjected. For lightly used stairs, 3, 3½ or 4-in. width with lip nosing is sufficient provided the tread is set flush into the step. Where the tread is not rabbeted or set flush, at least two-thirds of the depth of the step shall be covered. On stairs subjected to heavy traffic the treads shall be 6 to 9½ in. wide.

Methods of Application—Cross section details below show methods of applying Wooster Safe-Groove Treads to various types of stairs. Wherever the treads are to be set in new concrete they are shipped with anchors riveted on, so that after the concrete has set, the treads become an integral part of the steps.



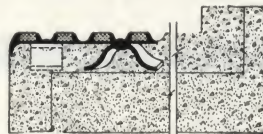
Wood, Slate, Marble, etc. Stairs

Treads shall be fastened to wood sub-treads by means of No. 10 1-in. wood screws. For marble, slate or stone stairs, treads are attached with wood screws in lead shield



Pressed Steel

Treads shall be set flush with cement surface to either extend from stringer to stringer, or if sweeping space is desired to be 6 in. less than entire length of the step. Anchors are riveted on for pressed steel installations



Concrete

Detail shows standard section 3½ in. with lip nosing. To give a wide walking surface 6 to 10 in. wide for stairs subjected to heavy traffic, this could be combined with one or more standard sections. Treads with anchors attached are centered between stringers and even with finish line of step



Concrete

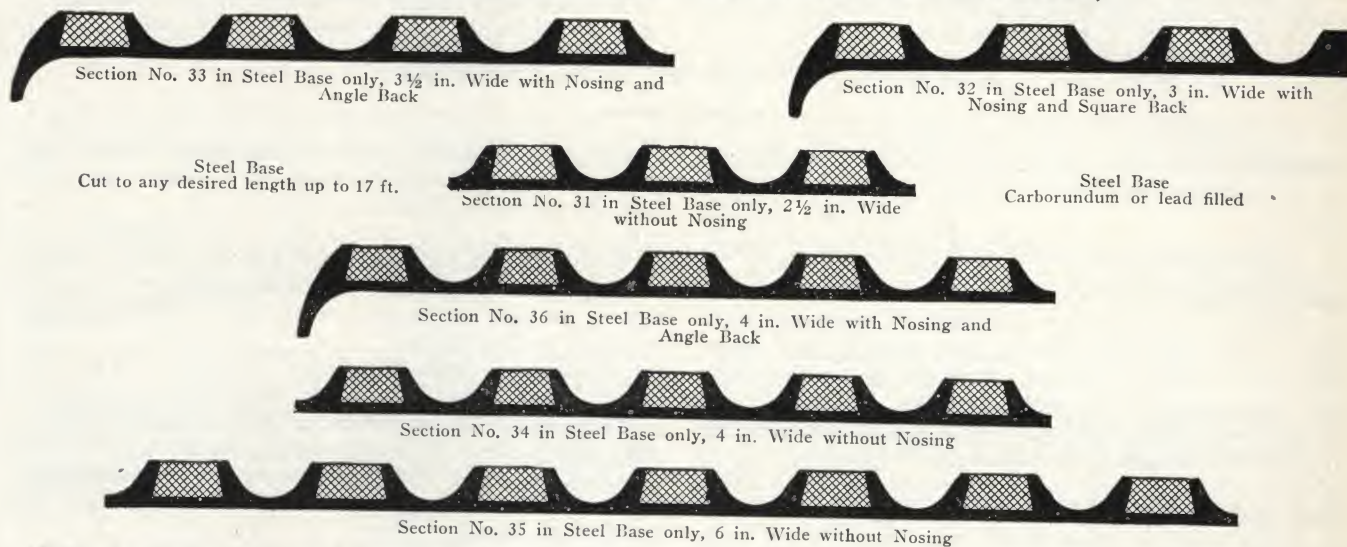
Detail shows tread installation on concrete for stairs subjected to normal traffic. Single tread section with nosing is used to make a walking surface 3 in. wide. Anchors are attached

Sizes of Treads—Sections of Wooster Safe-Groove Treads are made with and without nosing in square or angle back.

Any desired width to fit the amount of wear the stairs will receive may be obtained by combining standard sections.

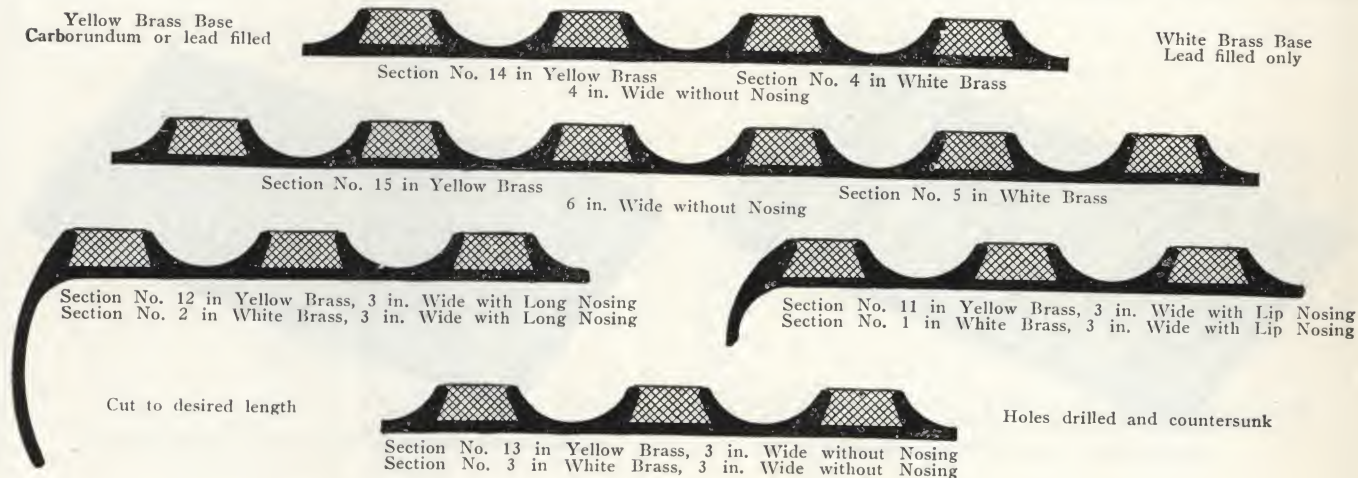
Standard sections are made in the following widths: 3 in. with nosing and square back; 3½ in. with nosing and angle back; 4 in. with nosing and angle back; 4 in. without nosing; 6 in. without nosing. Standard sizes of white brass and yellow brass sections are shown in the table below.

Full Size Cross Sections Wooster Safe-Groove Tread (Steel Base)



Note: Any desired width may be made by combining standard sections. Supplied with anchors securely fastened to tread when tread is to be placed in new concrete.

Full Size Cross Sections—Yellow and White Brass Base



Wooster Kass Safety Treads

Wooster Kass Safety Treads are made of copper-bearing, rust-resisting sheet metal in various gauges, depending on whether they are to be installed as plates upon another base or are to be self-supporting. Wooster Kass Safety Treads are lighter in weight than other types of treads and are made in any shape, with or without flanges, or curved to fit any application. The anti-slip surface of Wooster Kass treads is obtained by punching ⅛-in. holes through a series of bosses or buttons pressed into a steel plate. The cutting edge of these holes remains effective as an anti-slip surface even after years of hard wear.

Wooster Kass Treads are widely used in factory stairways, platforms, runways and in steam and electric railway cars.



Wooster Kass Safety Tread

UNIVERSAL SAFETY TREAD COMPANY

40 Court Street
BOSTON, MASS.

FACTORY
WALTHAM, MASS.

REPRESENTATIVES

NEW YORK, N. Y., REED IRON WORKS, 50 Church Street
PHILADELPHIA, PA., R. R. HAMMOND Co., 419 Widener Building
BALTIMORE, MD., V. D. EASTWOOD, 15 E. Fayette Street
CHICAGO, ILL., W. C. BURDICK, 1710 Conway Building
ATLANTA, GA., STEEL SPECIALTIES Co., 608 Walton Building

ST. LOUIS, MO., PONTIAC EQUIPMENT Co., 214 N. Sixth Street
SAN FRANCISCO, CAL., G. H. TRASK, 39 Natoma Street
LOS ANGELES, CAL., A. W. ARLIN, 519 Delta Building
SIOUX CITY, IOWA, O. S. DEAN, 308 Davidson Building

Products

UNIVERSAL ANTI-SLIP METAL TREAD (Abrasive)
TYPE I.

UNIVERSAL SAFETY TREAD (Lead-Filled) TYPE II.

General Uses

Surfaces to be protected include all stairs and landings of any material, such as iron, wood, slate, stone, concrete or marble; ramps, runways, platforms, train pits, elevator door thresholds, saddles, ladders, frames around vault lights, coalhole covers, and all surfaces that might become slippery.

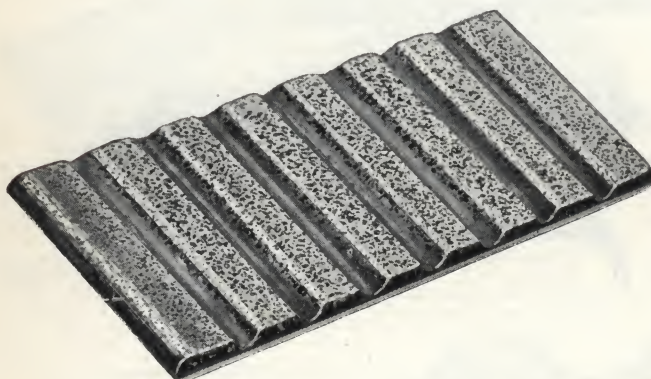
Universal Anti-Slip Metal Tread, Type I

This tread is constructed of a tinned steel baseplate to which is attached the hardest known abrasive with a soft lead binder. There are no hard metal surfaces exposed to the foot, but the diamond hard grains properly embedded to withstand the most severe wear under heavy traffic. Owing to the fact that the abrasive material extends throughout the whole thickness of the

tread to the baseplate, renders it non-slip for its entire life. The lead is simply used as a binder and filler between all the voids of the abrasive grains. It is moistureproof, frostproof, non-porous, and scuffproof, and made in a flat or corrugated form as preferred. During many years of experience in the manufacture of safety treads, we have perfected a tread which fulfills the most exacting requirements.

Surfaces and Nosing—Universal "Anti-Slip" Metal Tread Type I, is made with flat or corrugated surface—Style "A" representing the corrugated surface, plain edge; Style "C" representing the flat surface with plain edges; Style "B" representing the corrugated surface with "lip" nosing; Style "D" the flat surface with reinforced nosing.

The idea of having it reinforced as shown in Style "D" is to build the abrasive as a non-slip shoulder to a depth of almost $\frac{1}{2}$ in. on the edge, which is the point of heaviest wear. This reinforcement practically doubles the life of tread. For hospitals and similar buildings a flat surface is recommended for its sanitary advantages.



CORRUGATED STYLE A, PLAIN EDGE



CORRUGATED STYLE B, WITH REINFORCED NOSING

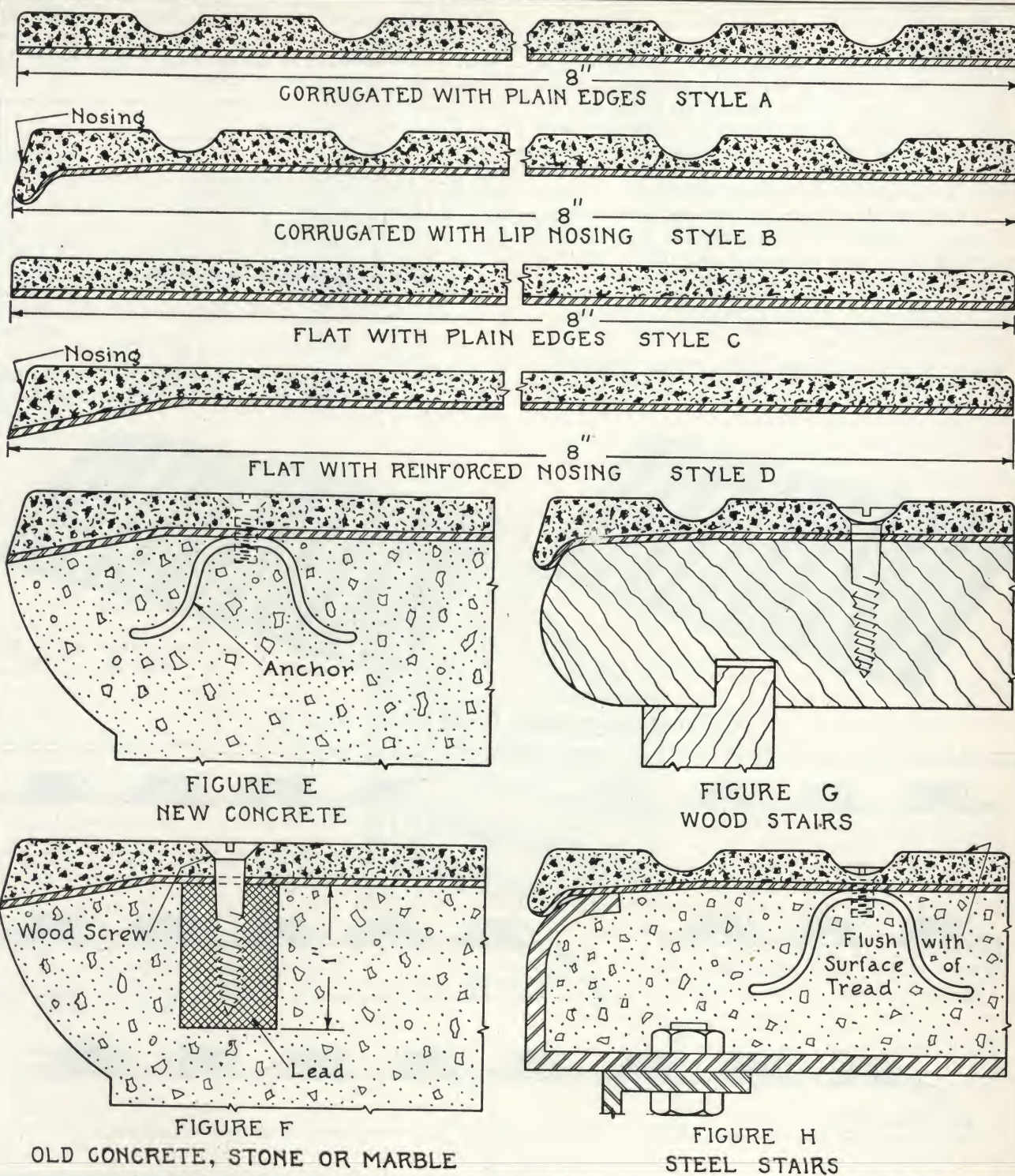


FLAT STYLE C, PLAIN EDGE



FLAT STYLE D, WITH REINFORCED NOSING

Universal Anti-Slip Metal Tread, Type I



FULL SIZE SECTIONS AND APPLICATION DETAILS OF TYPE I SAFETY TREADS

Installation—The above show the methods of attaching Universal Treads on new concrete with special anchors as shown at Figure E, and on old concrete as at Figure F. As applied to old concrete or stone, it is necessary to drill holes about 1 in. deep and fill same with lead plugs or expansion bolts. The safety treads are then attached by means of ordinary wood screws into these lead inserts in the same manner as in the case of wood

stairs as in Figure G. When the treads are to be installed on cast iron or steel, the subtreads have to be tapped and drilled for $\frac{1}{2}$ -in. tap screws, round or flat headed. The flat headed screws are generally preferred.

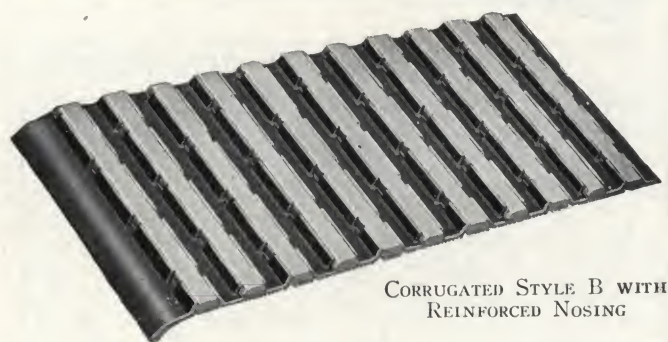
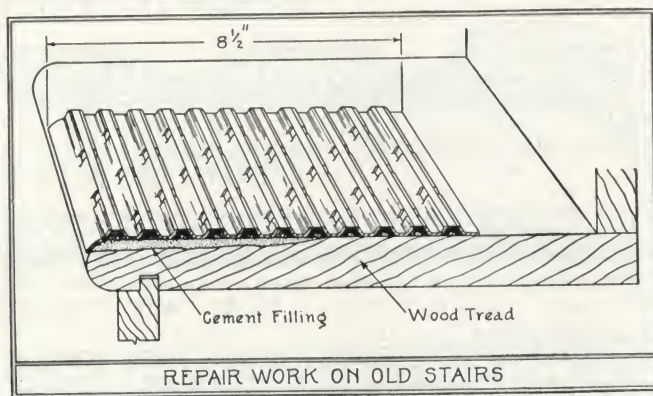
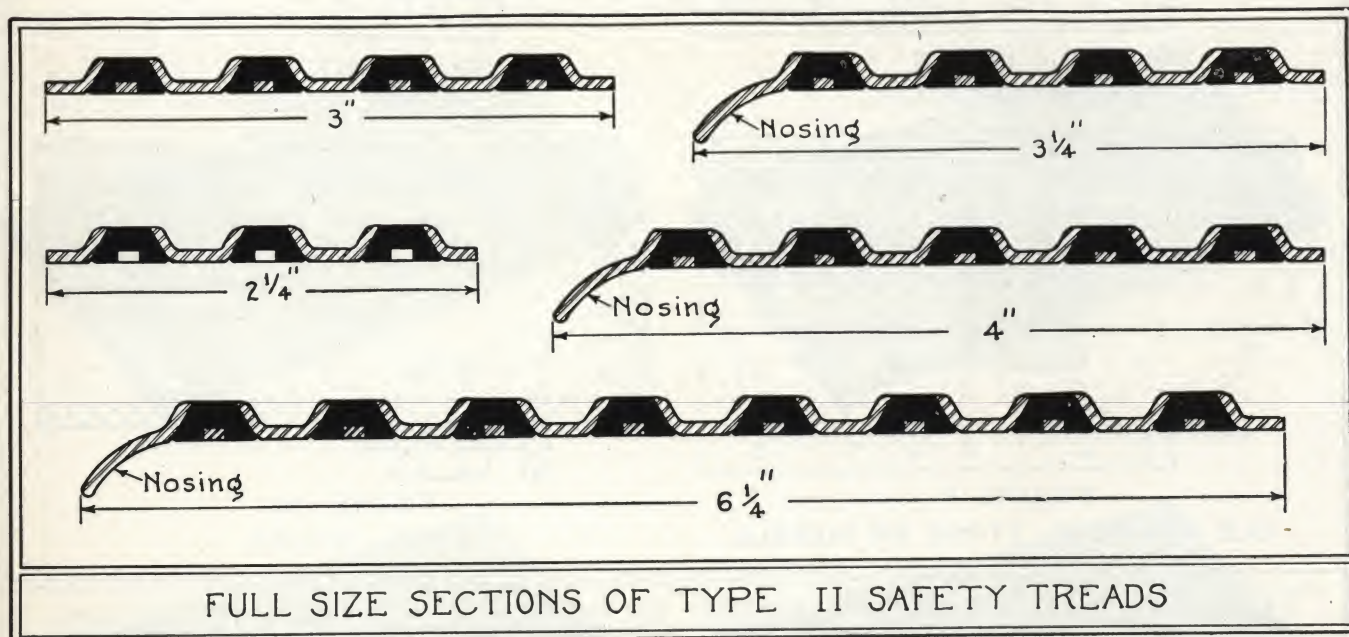
Holes—Universal Treads, Types I and II are provided with the required number of holes in the plates properly countersunk. In concrete work we furnish the special anchors as shown.

Universal Safety Tread (Lead-Filled), Type II

This tread is constructed of a steel, brass or aluminum baseplate, punched to receive the non-slip lead inserts which are rolled in and firmly clamped. The lead fills the perforations and a non-slip surface is presented for its full thickness. There are no continuous metal ribs on the outer edge, which is the danger point on all stairs, but the lead, being exposed between the steel or brass teeth, presents a non-slip edge at all times. This is especially important in descending stairways. A minimum of hard supporting metal and the maximum of non-slip lead form the wearing surface. Baseplate can be extended to form a nosing of any depth required. We can furnish alloy-coated or galvanized steel to resist the action of salt water or dampness. Our brass treads are also recommended where it is necessary to have a rustproof and safe surface.

Sizes—Universal Safety Tread can be furnished in almost any width up to 12 in. and in any specified lengths, either with or without nosing according to the

requirements of the stairs or landings. We show some of the widths which are most commonly specified and used. We also show the way it is used on repair work on which the nosing can be extended to any depth desired to cover evidences of repair.

**Universal Safety Tread (Lead Filled) Type II****Cost of Safety Treads**

The use of safety treads is a paid-up accident insurance during the life of the tread. All casualty companies demand a reasonable degree of safety on stair treads and traffic surfaces in all types of buildings and where their recommendations are followed, there is a consequent saving in the cost of insurance. Damages from tripping or slipping on surfaces where safety treads have been provided have invariably been decided for the defendant. Accidents from falls on stairs in one year

caused the death of 1149 people and crippled for life more than 4000 in this country. In New York City alone there were 118 deaths, and in Chicago 37, deaths in one year.

Although wood, iron, stone, marble or concrete surfaces are supposed to be safe at first, after a short period of wear they are sure to develop to some extent a slippery and unsafe condition. The use of any of the various types of UNIVERSAL SAFETY TREAD COMPANY'S products will reduce these hazards to a minimum.

AMBLUCO NON-SLIP BLUE STONE STAIR TREADS AND FLOORING

QUARRIES AND MILLS
AMBLUCO, WYOMING CO., N. Y.

Produced by
AMERICAN BLUE STONE COMPANY
101 Park Avenue, NEW YORK, N. Y.

Products

AMBLUCO NON-SLIP STAIR TREADS and LANDINGS for interior steel and concrete stairways; AMBLUCO FLOORING, THRESHOLDS and WALL BASE for interior and semi-interior uses.

For Genesee Valley Blue Stone for exterior uses, see page A319.

Facilities

This company has well developed quarries on its own property of about 200 acres, located at Ambluco, Wyoming County, N. Y. The mills and yards are equipped with the most modern machinery so that large volumes of business can be handled without delay.

One building 150 ft. long, devoted exclusively to the storing and finishing of AMBLUCO Products, is heated during the cold weather so that orders can also be filled in the winter.

Ambluco Non-slip Stair Treads and Landings

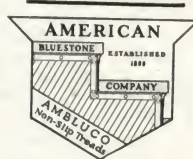
These treads and landings have established themselves wholly on their own merits, with practically no introduction on our part. By those who have studied their qualifications or used them, they are declared to be superior to and more economical than any other type.

Attractive (Color and Texture)—The uniformity in color, even grained texture and standard sand sawed finish (free from saw marks and imperfections) combine to give a splendid appearance. The distinctive shade of light-blue blends well with adjacent light color surfaces or gives a sharp clean contrast with dark material. It is a fine and close grained blue stone, being made up mostly of pure, hard quartz as shown below:

MINERALOGICALLY CONSIDERED
Fine, hard sand, mostly quartz..... 70%
Clay, as binding material..... 28%
Water 2%

Non-slip—The non-slip property, due to the fine grained quartz, does not grip the foot to cause tripping, but gives ample security against slipping at all times, whether wet or dry, without requiring resurfacing or replacing. These quartz particles are always uniformly distributed throughout the entire stone, a condition that is only produced by nature and prevents the surface from ever wearing smooth.

Durable—The extreme durability of the AMBLUCO Treads comes from the character of the material and the steadily increasing hardness of the stone brought on by the heat of the building, causing the treads to resist wear as they age. The density of the stone's structure



Reg. U. S. Pat. Off.

which helps to give the remarkable wearing quality is revealed comparatively in the following table:

CRUSHING STRENGTH	
Rockport granite (Kidder's Hand Book)	17,750 lb. per sq. in.
Vermont marble.....	13,500 lb. per sq. in.
Genesee Valley blue stone.....	19,970 lb. per sq. in.

This blue stone weighs only, approximately, 150 lb. per cu. ft. (or 25 lb. per sq. ft. 2 in. thick) when cut ready to set.

Sanitary—AMBLUCO Non-slip Treads and Landings are easily kept sanitary. Their great hardness prevents generation of dust and permits clean sweeping and mopping. The flat, non-porous surface has no grooves or pores to collect filth and disease germs. The soffits may be painted without danger of the stain coming through the stone to the top surface.

Quiet—They are practically noiseless and do not resound from footsteps nor become loose and rattle. This quiet feature is a truly essential quality for most buildings, and especially for hospitals where many human beings are undergoing great suffering, and for schools where it is so important that the pupils' minds are not distracted from their work.

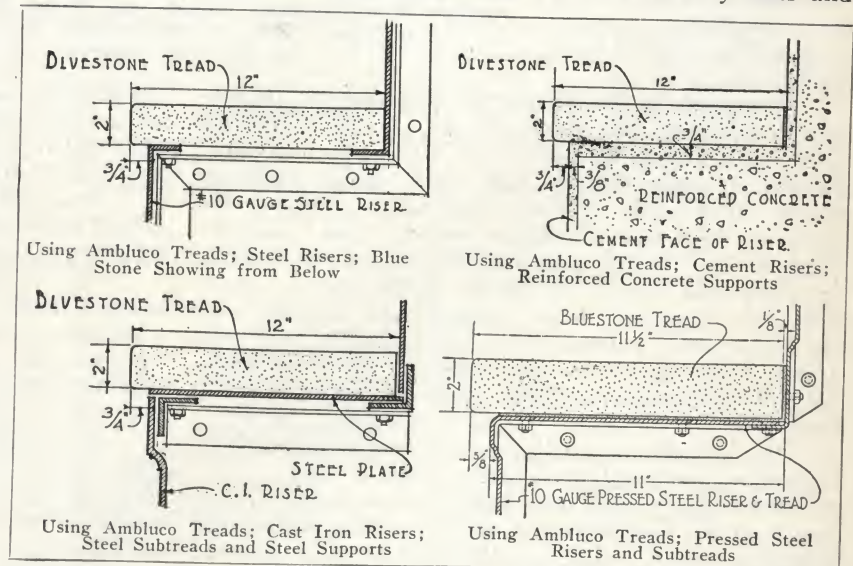
Fire Resisting and Rust-proof—The AMBLUCO Treads and Landings offer great resistance to extreme heat and are of inestimable value in fire-proof construction. In contrast to many other treads these AMBLUCO treads do not become rusty themselves nor stain other adjacent materials.

Permanent and Economical—“Lasts the life of a school” is a fitting slogan, for, as indicated by tests and



Ambluco Stair Treads, Hartford (Conn.) Fire Insurance Co. Building

PARKER, THOMAS & RICE, Architects
MARC EIDLETZ & SON, Contractors



Details of Ambluco Stair Treads

reputed records, AMBLUCO Non-slip Treads give satisfactory service in an average school for 50 to 60 years, while observance shows that at the existing rate of advancements in scientific design and construction, a school is considered obsolete in that length of time and is frequently replaced by a new building. In fact, there are records where these blue stone treads have been removed in the wrecking of a school and the same treads later installed in a new school.

The initial cost of the AMBLUCO Treads ($1\frac{1}{2}$ in. to 2 in. thick) is about the same or less than other natural stone treads and the ultimate cost much less even than the cheap metal and composition treads.

The facility with which they can be set on the regular types of fabricated or pressed steel stair construction eliminates the great expense of specially designed steel members.

No maintenance cost is necessary after these blue stone treads are properly installed.

As a matter of fact, the AMBLUCO Treads and Landings can be safely adopted without first experimenting.

Specification Suggestions—AMBLUCO Non-slip Treads and Landings should be called by their trade-name, and although in many localities this name is well known, we suggest (to avoid substitution of inferior material) giving the additional information that they are produced by the AMERICAN BLUE STONE COMPANY, New York, N. Y.

The sand sawed or wet sand rubbed are the only two finishes which should be allowed. The former has proved entirely satisfactory and we endorse it as a standard. Planed and axed surfaces should be avoided.

AMBLUCO Treads and Landings are universally used 2 in. thick, but can be furnished down to $1\frac{1}{2}$ in. Complete specifications will be supplied upon application.

Accepted as Standard by Prominent Users—Subsequently to the standardizing on the AMBLUCO Blue Stone Treads by the City of Boston and its many suburbs in their schools and other public buildings, nearly all the rest of New England, recognizing the superior features of these treads, did likewise. Many of the leading school architects in the Eastern, Southern and Middle Western States specify them. The use has not been confined to schools, but has also been extended to other public buildings, such as hospitals, museums, colleges, churches, clubs, railroad stations and high class commercial buildings.

Also AMBLUCO installations are frequently made to replace worn-out treads of other kinds.

AMBLUCO Treads and Landings are used, for the most part, by architects and engineers long accustomed to incorporating in their specifications the best material for their work.

A Few Ambluco Tread and Landing Installations

Brookline High School, Boston, Mass., Kilham, Hopkins & Greeley, Architects
 Abraham Lincoln School, New Britain, Conn., W. P. Crabtree, Architect
 Benjamin Franklin High School, Yonkers, N. Y., G. Howard Chamberlin, Architect
 Woodrow Wilson High School, New Rochelle, N. Y., Guilbert & Betelle, Architects
 Grade School, Locust Valley, L. I., N. Y., Coffin & Coffin, Architects
 Christian Sunday School, Hannibal, Mo., Malcolm S. Martin, Architect
 Junior High School, Linden, N. J., Harold B. Brady, Inc., Architect
 St. Hedwigs R. C. School, Floral Park, L. I., N. Y., Joseph A. Jackson, Architect
 Maternity Building, Lynn Hospital, Lynn, Mass., Kendall Taylor & Co., Architects
 Lehigh Valley Railroad Station, Easton, Pa., J. J. McCleece, Architect
 Prospect Presbyterian Church, Maplewood, N. J., Grant & Dahler, Architects
 Federal Reserve Bank, Boston, Mass., R. Clipston Sturgis, Architect
 Liberty Telephone Exchange, Boston, Mass., Parker, Thomas & Rice, Architects

Ambluco Blue Stone Flooring, Thresholds, Wall Base, and Swimming Pool Coping

In these days of the exacting of high liability for accidents to mankind, the fundamental requirement in flooring is that it does not become slippery under any conditions.

In this blue stone flooring, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface at all times and makes the floor slip-proof and very durable. Besides the rust-proof, non-porous, dustless and sanitary qualifications of this flooring, it is quiet to walk on.

AMBLUCO flooring is either $1\frac{1}{2}$ or 2 in. thick and is especially suitable for interior and porch floors in both regular and irregular designs, suggestions of which are shown on the following page. In case of an irregular pattern, it is advisable for economy to limit the number of sizes to about seven. If, however, a greater variety of sizes and shapes is desired, random sawed slabs may be shipped from



Ambluco Flooring, Base, Treads and Risers, Alumnae Hall, Vassar College, Poughkeepsie, N. Y.
 HUNT & HUNT, Architects

the quarries, and then fitted and jointed by local cutters on the job. Joints of $\frac{1}{8}$ to $\frac{1}{4}$ in. are usually used for the regular styles and $\frac{1}{4}$ to $\frac{1}{2}$ -in. joints are more in keeping for the irregular style floors.

Its sawed or rubbed finish gives a level surface on which chairs and other furniture do not rock, a feature so annoying with natural split stone.

Other delightfully artistic effects are gained by several methods. One, by varying the finishes—having some pieces sawed with sand and some with steel shot. Another, by omitting the washing of the stone after sawing, which gives a variegated coloring from the rust stain of the saws.

For interior swimming pools it is claimed to be in a class by itself for the border flooring and coping, for it is not dangerously slippery, does not injure the bare feet, and does not deteriorate and necessitate frequent replacements as do some manufactured floorings.

AMBLUCO Flooring is especially appropriate for,

and is being used extensively in churches, cathedrals, museums, libraries, clubs, hotels, railroad stations, residences, high class commercial buildings, and the vestibules and stair halls of hospitals, schools and college buildings.

Perhaps in no place is there greater and more noticeable wear than in thresholds or saddles, and therefore, for this purpose, this AMBLUCO non-slip sand rubbed product is unapproached. These are furnished $1\frac{1}{4}$ to 2 in. thick by the desired widths, and with a choice of bevels.

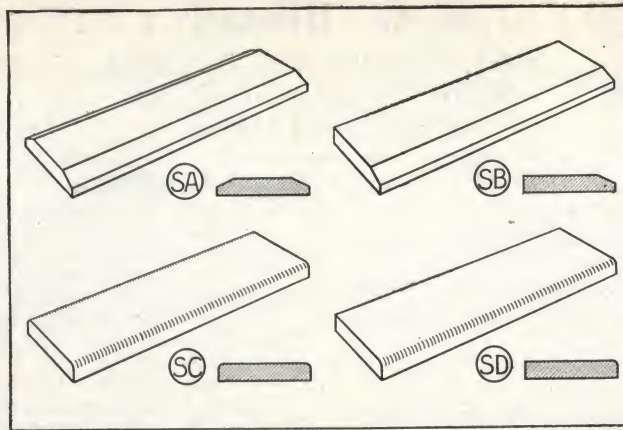
The AMBLUCO Wall Base and Plinths should be used to match the flooring and thresholds, landings and treads. The base and plinths are $1\frac{1}{4}$ to 2 in. thick by 7 to 14 in. high. A $\frac{1}{8}$ -in. radius round on the top front arris is usually given or a slight bevel is occasionally applied.

A fine sand rubbed finish is most appropriate, although the sand sawed finish frequently harmonizes better with certain styles of wall.

Specification Suggestions—It is important that this flooring, thresholds and base are specified by trade-name as described under the AMBLUCO Non-slip Treads.

For Flooring—The vestibules, lobbies, lounges (or whatever places desired) shall be of AMBLUCO Blue Stone, 2 in. [$1\frac{1}{2}$ in.] thick laid in regular [semi-irregular] [irregular] design (if irregular describe idea) with $\frac{1}{4}$ in. [$\frac{1}{2}$ -in.] joints. It shall be set over a concrete fill and set in, at least 1 in. of mortar composed of 2 parts sand and 1 part portland cement. The joints shall be neatly pointed flush with surface of floor with same mortar, to which shall be mixed enough lamp black or other coloring to produce the desired effect.

For Thresholds or Saddles—All interior doorways for (.....)



Four Types of Standard Thresholds

floors where cement, terrazzo or tile floor is used on either side, shall have AMBLUCO Non-slip Blue Stone saddles 2 in. [$1\frac{1}{4}$ in. to 3 in.] thick by the full thickness of the partition wall in width, and the full width of the opening in length, with sand rubbed finish and $1\frac{1}{4}$ -in. deep bevel on each side. Joiner strips of AMBLUCO Blue Stone $1\frac{1}{2}$ in. thick by 8 to 10 in. wide shall be used wherever different types of floor meet.

Typical Ambluco Flooring, Base and Threshold Installations

Museum of Fine Arts, Boston, Mass., Guy Lowell, Architect
Vassar College Alumnae Hall, Poughkeepsie, N. Y., Hunt & Hunt, Architects

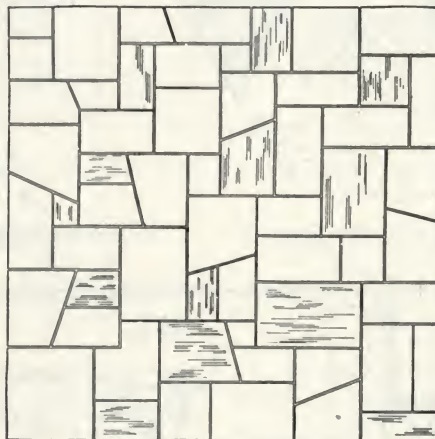
Christ Church, Bronxville, N. Y., Bertram Goodhue Associates, Architects

University of Maine Arts & Science Building, Orono, Me., Crowell & Lancaster, Architects

Baker Chocolate Co., Dorchester, Mass.

Carl Weeks Residence, Des Moines, Iowa, Rasmussen & Wayland, Architects

George W. Otis Residence, Maplewood, N. J., C. C. Wendehack, Architect
Church of the Redeemer, Morristown, N. J., Parish & Schroeder, Architects

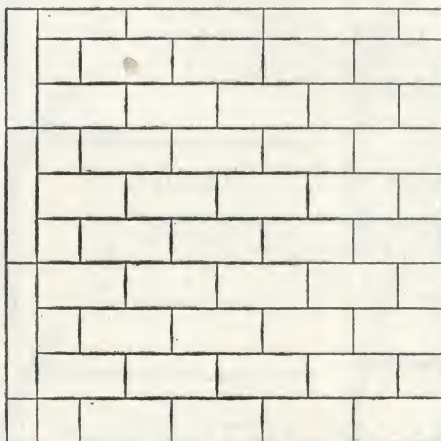


Irregular Design—FD

Random size blue stone slabs, showing variegated effect by combining sand sawed and shot sawed finishes. Laid with broken $\frac{1}{2}$ -in. joints

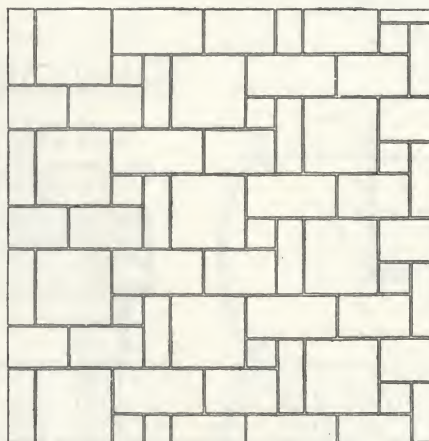
Suggestions for Care of Ambluco Products

After AMBLUCO Treads, Landings, Flooring, etc., have been installed they should be thoroughly scrubbed with sand and water until clean. No acid or other damaging substances should be used. If the light blue color is desired, coat with one or two applications of Truscon's Super Por-Seal. Repeat this six to eight times a year if needed. If it is preferred to have a darker shade, scrub and then paint with raw linseed oil. This can be done as often as will give the best results.



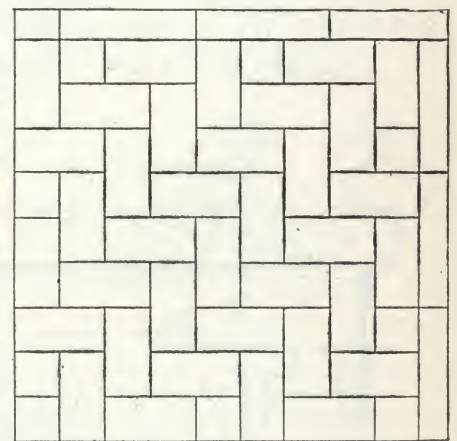
Regular Design—FA

Oblong blue stone slabs 24x12 in. laid with straight joints and transverse joints uniformly broken. Border of blue stone 8 in. wide



Semi-irregular Design—FC

Five different size blue stone slabs laid to a pattern with broken $\frac{1}{4}$ -in. joints



Semi-regular Design—FB

Oblong blue stone slabs laid herringbone. Border of blue stone 8 in. wide

Suggested Designs for Ambluco Flooring

J. G. BRAUN

Stair Nosings and Edgings
609-615 So. Paulina Street
CHICAGO, ILL.

537-541 West 35th Street
NEW YORK, N. Y.

1088 Howard Street
SAN FRANCISCO, CAL.

Products

STAIR NOSINGS, Plain and Non-slip.
STAIR EDGINGS with and without nosing.
DOOR SADDLES, Steel and Brass.

For Steel Mouldings, etc., see pages A748-749; for Window Sections, see page A929; for Perforated Sheets, see page C2807.

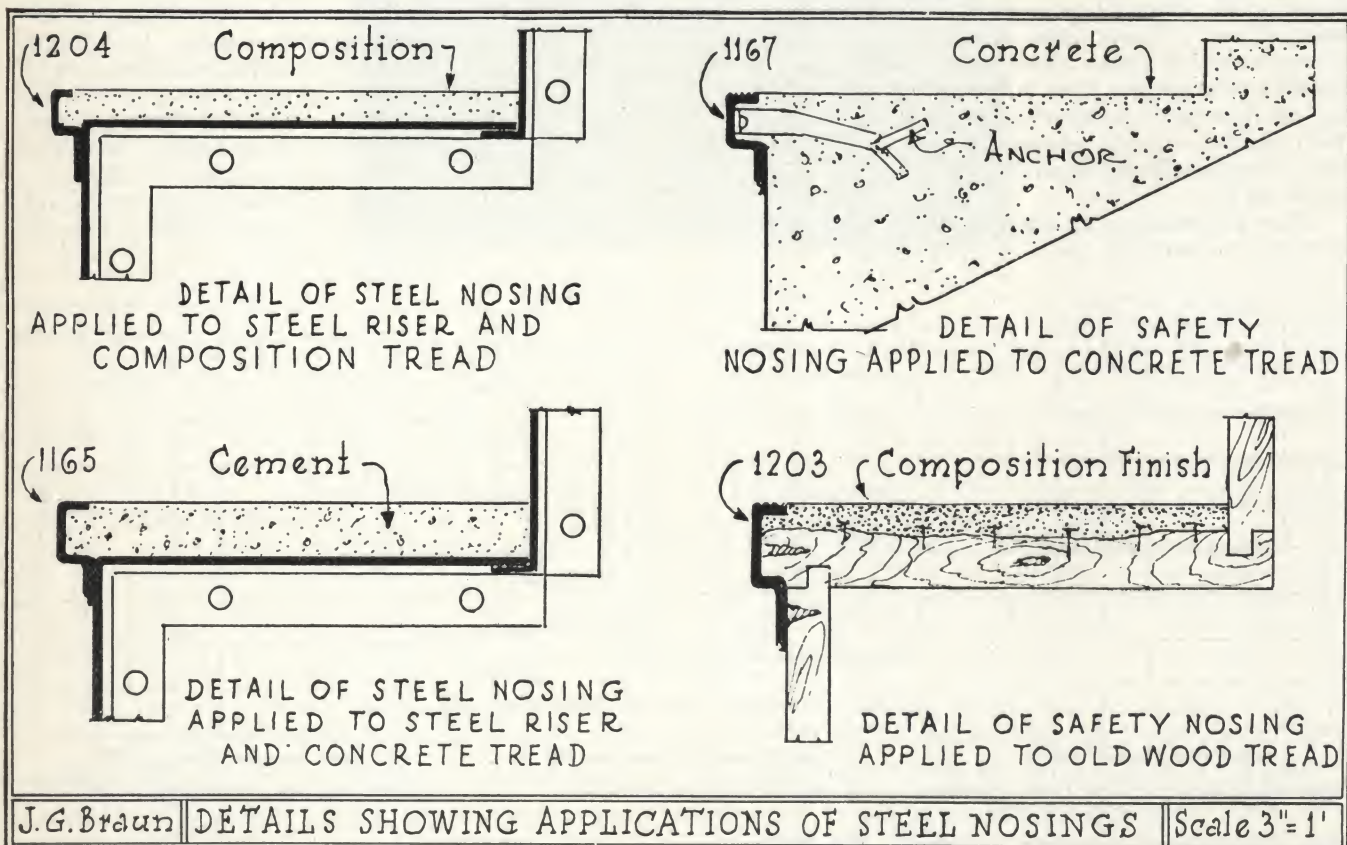
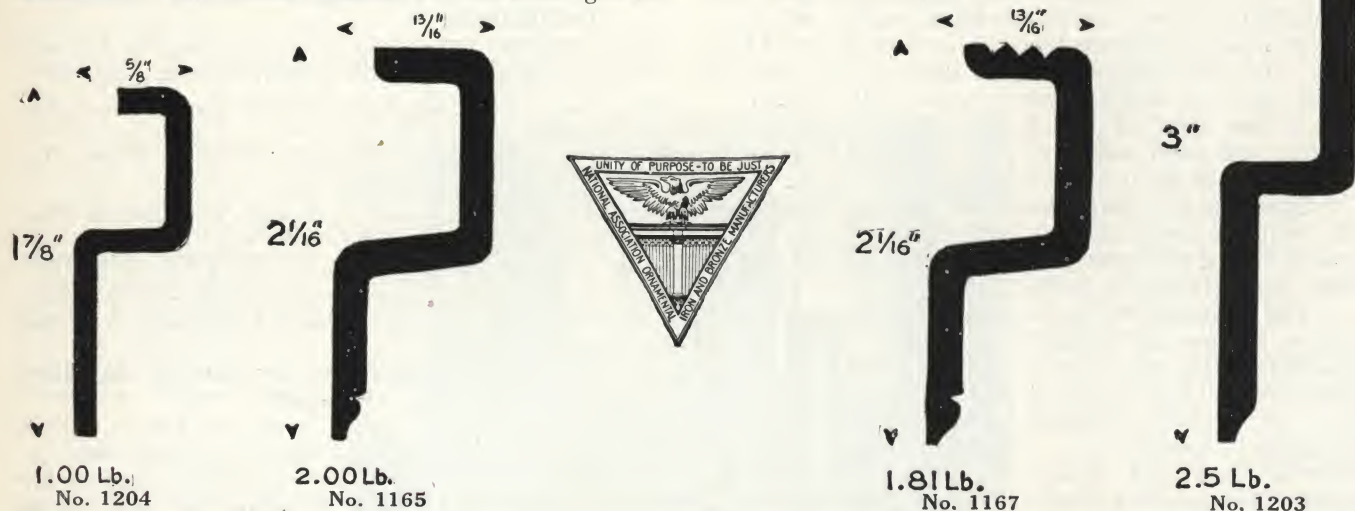
Sizes and Shipments

Can be furnished in bar lengths from 15 to 20 ft.; also cut to length, drilled and with anchors attached.

Shipments can be made from any of our three warehouses. For further illustrations ask for Catalogue 25.

Recent Installations

C. E. Osgood Co., Furniture Store, Boston, Mass., J. Wm. Beal & Sons, Architects
Crescent Telephone Co. Building, Buffalo, N. Y., Aug. Feine & Sons, Contractors
Cohan's Grand Opera House, Chicago, Ill., Rebori, Wentworth, Dewey & McCormick, Architects
Strand Theater, York, Pa., E. C. Horn Sons, Architects
Junior High School, Lynchburg, Va., Heard & Chesterman, Architects
Mountain State Telephone and Telegraph Co., Denver, Colo., Wm. N. Bowman Co., Architect



THE SAFETY STAIR TREAD COMPANY

Wooster Security Nosings and Edgings

WOOSTER, OHIO

NEW YORK OFFICE: 1133 Broadway

CHICAGO OFFICE: 803 Transportation Building

REPRESENTATIVES IN PRINCIPAL CITIES

Products

WOOSTER SECURITY NOSINGS.

WOOSTER SECURITY EDGINGS.

For Wooster Safe-Groove Stair Treads, see pages A672-673.

Wooster Security Nosings

Wooster Security Nosings are designed to protect from the scuffing wear of traffic, the edges of linoleum, composition, cork tile, rubber tile, or other flooring material when used on stairs, platforms or landings.

Material—Wooster Security Nosings are made of highly polished yellow brass and of silver white, non-rusting and non-tarnishing white brass.

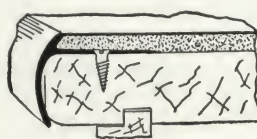
Design—Wooster Security Nosing is of sturdy design and retains its smooth even surface for many years. The body of the nosing which extends down over the front edge of the step cannot be bent or dented by the ordinary shocks of traffic. The nearly vertical lip securely locks the covering material in place, and the horizontal flange holds the nosing rigidly to the step. Flanges are featheredged, an exclusive Wooster feature.

Sizes—Wooster Security Nosings are made in sections of different thickness for use with any flooring material from $\frac{1}{8}$ to $\frac{1}{2}$ in. thick. Full size cross sections are shown below:

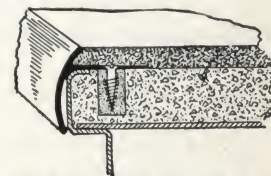
Method of Application—All nosings are delivered

cut to desired length, polished and drilled with proper number of screwholes for attachment. Wooster Security Nosings are fastened by means of screws through countersunk holes in horizontal flange. This flange is completely covered by flooring material, leaving nothing to show but attractive face of the nosing.

Detailed drawings below show methods of application to stairs of various material.



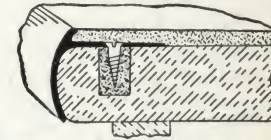
Wooster Security Nosing on Wood, No. 8 Wood Screw



Wooster Security Nosing on Pressed Steel Stairs, Installed with Wood Screw in Shield or with Anchors



Wooster Security Nosing on Concrete Stairs, Nosing Installed with Anchor Attached



Wooster Security Nosing on Slate, Marble or Stone Construction, No. 8 Wood Screw in Lead Shield

Wooster Security Edgings

Wooster Security Edgings are designed to protect the edges of linoleum, composition, cork tile, rubber tile or any flooring material, from wear when laid on floors of any kind.

Material—Wooster Security Edgings are made in highly polished yellow brass in $\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ -in. thicknesses to match flooring material.

Design—Wooster Security Edgings have a nearly vertical lip which locks the flooring material securely in place. A featheredged flange, screwed or anchored into the floor, holds the edging firmly in position and is entirely covered by the flooring material. This featheredged flange is an exclusive feature in Wooster Security Edging.

Note: Illustrations below show method of application and cross sections of Wooster Security Edging.

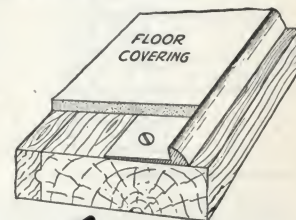


Fig. W. Wooster Security Edging, Yellow Brass
For material $\frac{1}{8}$ in. thick. Height of lip $\frac{1}{8}$ in.

Fig. X. Wooster Security Edging
For material $\frac{1}{4}$ in. thick. Height of lip $\frac{1}{4}$ in.

Fig. B. Long Yellow Brass
For material $\frac{1}{8}$ in. thick. Height of lip $\frac{1}{8}$ in.

Fig. A. Yellow Brass
For material $\frac{3}{16}$ in. thick. Height of lip $\frac{3}{16}$ in.

Fig. B. Short Yellow Brass
For material $\frac{3}{16}$ in. thick. Height of lip $\frac{3}{16}$ in.

Fig. BB. White Brass
For material $\frac{3}{16}$ in. thick. Height of lip $\frac{3}{16}$ in.

Fig. C. Yellow Brass
For material $\frac{3}{8}$ in. thick. Height of lip $\frac{3}{8}$ in.

Fig. D. Yellow Brass
For material $\frac{1}{4}$ in. thick. Height of lip $\frac{1}{4}$ in.

Fig. K. Yellow Brass
For material $\frac{1}{8}$ in. thick. Height of lip $\frac{1}{8}$ in.

Fig. HH. White Brass
For material $\frac{1}{4}$ in. thick. Height of lip $\frac{1}{4}$ in.

Fig. EE. White Brass
For material $\frac{1}{2}$ in. thick. Height of lip $\frac{1}{2}$ in.

Fig. KK. White Brass
For material $\frac{3}{8}$ in. thick. Height of lip $\frac{3}{8}$ in.

DUVINAGE SPIRAL STAIR CO.

(PIERRE DUVINAGE, PROPRIETOR)

Manufacturer of Spiral Stairs

1200-1208 Bush Street, BALTIMORE, MD.

Product

DUVINAGE IRON SPIRAL STAIRS.

Duvinage Iron Spiral Stairs

Duvinage spiral stairs have been erected and approved for their simple, durable construction as well as their economy in floor space, in offices, churches, theaters, stores, mezzanines, boiler rooms, sewage disposal pumping wells, power plants, gas houses, water towers, mines, cement plants, etc.

They are made of the best grade of iron; have single 1-in. pipe railing on stairs and double rail around well; and center pipe 3 in. for 42 and 48-in. stair, and 4 in. for 54 to 96-in. stair.

The regular stock treads of these stairs can be furnished either right or left hand (illustration shows right hand) and 12 or 16 treads to the circle. Riser heights are affected by height between floors.

To provide sufficient headroom under top platform, risers should not be less than $8\frac{1}{4}$ in. high. By calculating number of risers required, the relative positions of starting and landing points can be determined, and a right or left-hand stair decided upon.

In ordering, give diameter, distance between floors, starting point, and position of landings desired. The 60-in. diameter is the best to use.

Send for Catalogue No. 5.



Where Duvinage Stairs Have Been Installed

Chevrolet Motor Co., Flint, Mich.
Seybold Bakeries, Miami, Tampa and Daytona Beach, Fla.

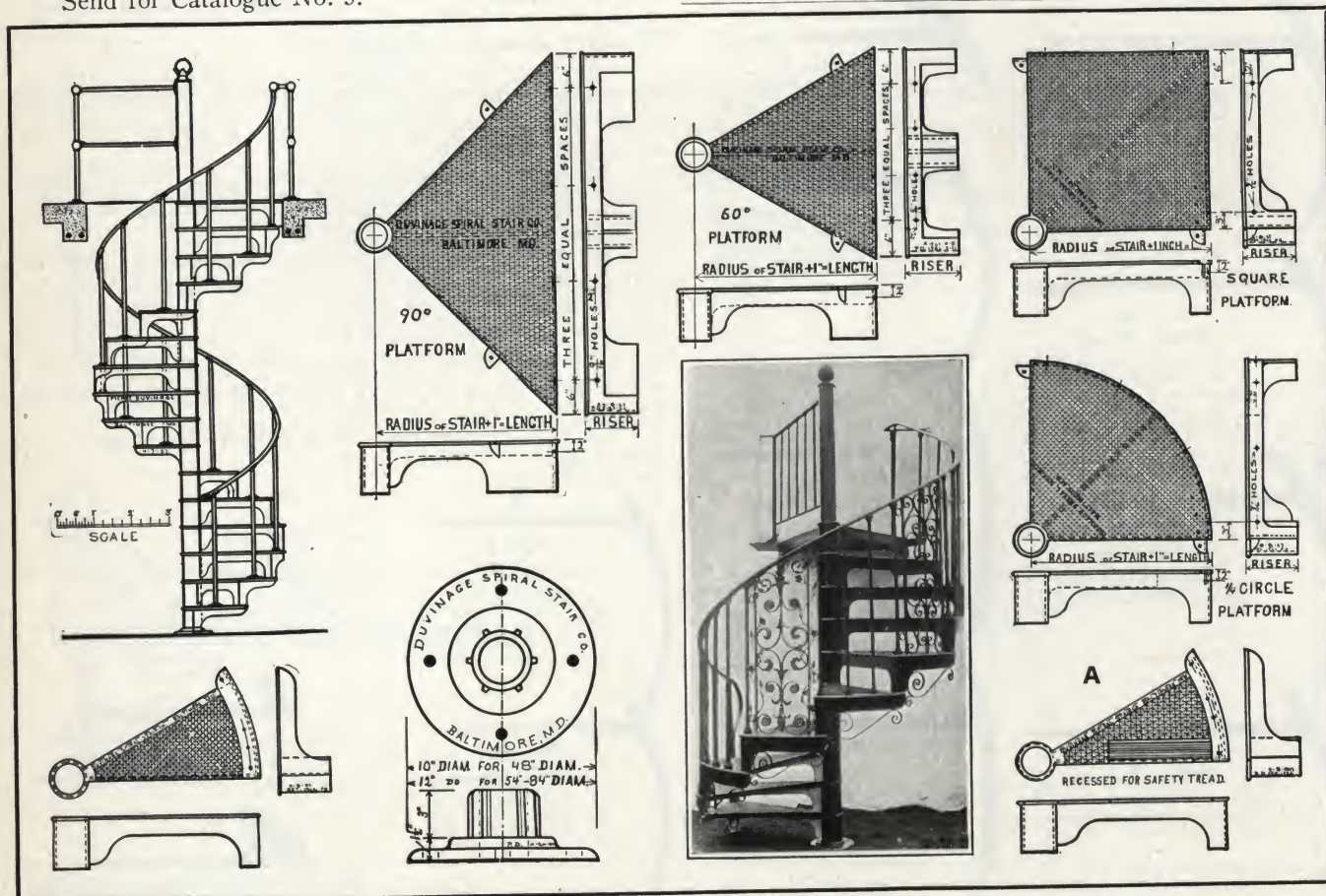
City National Bank of Commerce, Columbus, Ohio
New York Life Building, New York, N. Y.
Hearst Publications Building, New York, N. Y.
Church of Ascension, Philadelphia, Pa.
Century Club, New York, N. Y.
Thompson Dairy, Washington, D. C.

N. J. State Home for Boys, Jamesburg, N. J.
St. Elizabeth's Hospital, Elizabeth, N. J.
Woodstock Hotel, New York, N. Y.
Atlantic Delicatessen Warehouse, Atlantic City, N. J.
Baltimore City College, Baltimore, Md.
Roxy Theater, New York, N. Y.
Industrial Drive Pumping Station, East Chicago, Ind.
Dunn Sulphite Paper Co., Port Huron, Mich.

And many others.

SIZES OF PLATFORM AND FLOOR OPENINGS

Diam. of stair, in.	Center pipe, in.	Platform, in.		Floor opening, in.	
		Square	Circular radius	Square	Round (diameter)
42	3	22x22	22	44x44	44
48	3	25x25	25	50x50	50
54	4	28x28	28	56x56	56
60	4	31x31	31	62x62	62
66	4	34x34	34	68x68	68
72	4	37x37	37	74x74	74
84	4	43x43	43	86x86	86
96	4	49x49	49	98x98	98



Duvinage Riser Design, Iron Spiral Stairs
Detail A required by U. S. Post Office Specifications

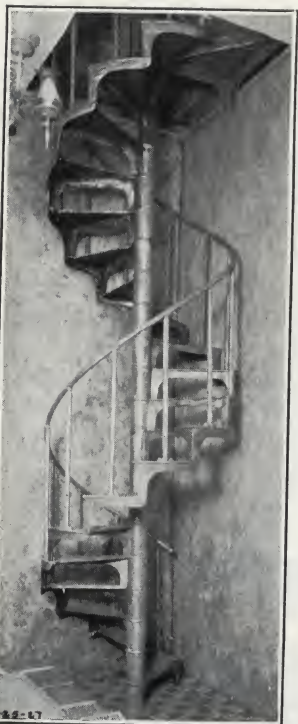
LIST OF TREADS, PLATFORMS AND STANDARD PATTERNS CARRIED IN STOCK

RADIUS TREAD	BOTTOM FLANGE	T R E A D S												P L A T F O R M S				W I N G E D H U B S	
		D U V I N A G E				R I S E R D E S I G N				R I S E R D E S I G N R E C E S S E D				S Q U A R E	C I R C L E	T R I A N G L E	T R I A N G L E		
		3"	4"	12"	16"	LH 12	RH 12	LH 16	RH 16	LH 12	RH 12	LH 16	RH 16	90°	90°	90°	60°	3"	4"
21"	10					100	100							10	5	2	3	5	
24"	10					100	100	20	30					10	5	2	3	5	
27"		10				50	100	30	30	30	30			10	5	2	3		5
30"		10				100	200	30	50	30	30	30	30	15	10	2	3		5
33"		10				40	50	30	30	30	30	30	30	10	3	1	1		5
36"		10	Do not use this design for 33" rad. and over				40	60	30	30				5	3	1	1		
42"																			
48"																			

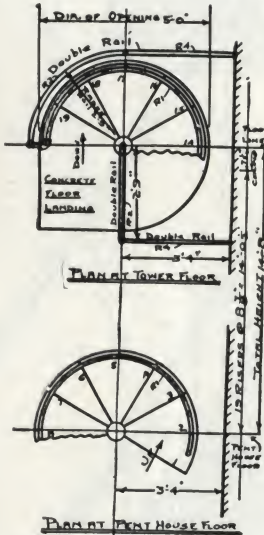
Circle indicates aluminum patterns on hand for this size. Number inside circle indicates minimum number of finished castings carried in stock. Bottom flange columns 3" and 4" indicate size of center pipe used. Under treads, figures 12 and 16 indicate number of treads to circle. Recessed means recessed 4"x16" to receive safety tread. We have patterns for sizes indicated. Duvinage Cantilever Stair Treads not carried in stock and manufactured only to order, two weeks delivery.



Looking down



Looking up
Installation of Riser Design
Iron Spiral Stairs



Shop Drawing for the
Installation Shown
at Left

This shows all the details necessary to give us when writing for information or quotations.

Similar drawing, together with complete bill of materials, is furnished with each order delivered.

Government specifications for post offices require the use of details A and B on preceding page



**Duvinage Patented Design,
Iron Spiral Stairs**

This type of iron stairs is lighter in construction than the Duvinage Riser Design shown on preceding page. For installations where it will receive only occasional use, it will prove perfectly satisfactory up to 5 ft. in diameter. However, where hard and constant use is expected of a spiral stairway, we recommend the Duvinage Riser Design.

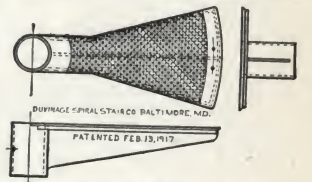
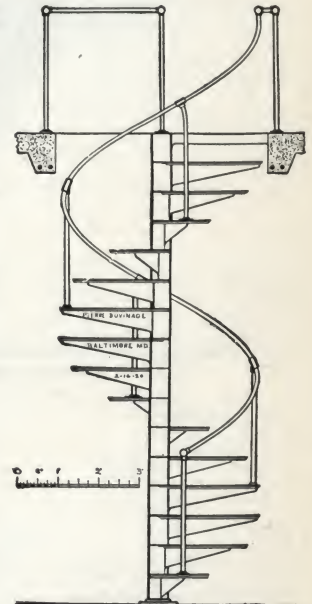
Spiral Stair Specifications

For convenience, the following specifications may be copied bodily:

Furnish and erect where shown on plans Duvinage Spiral Stairs as manufactured by the DUVINAGE SPIRAL STAIR CO., 1200-1208 Bush Street, Baltimore, Md.

Stairs in. diameter ft. high, of cast iron diamond surface treads, center pipe 3-in. inside diameter for 42 and 48-in. diameter stair, or 4-in. inside diameter for 54, 60, 66 and 72-in. diameter stair. Hand rail and uprights of 1-in. inside diameter pipe on stairs and around well opening.

Finished size of floor opening to be 2 in. larger than diameter of stair.



Duvinage Patented Design



A Corner of Our Stock Yard

THE BESSLER DISAPPEARING STAIRWAY CO.

AKRON, OHIO

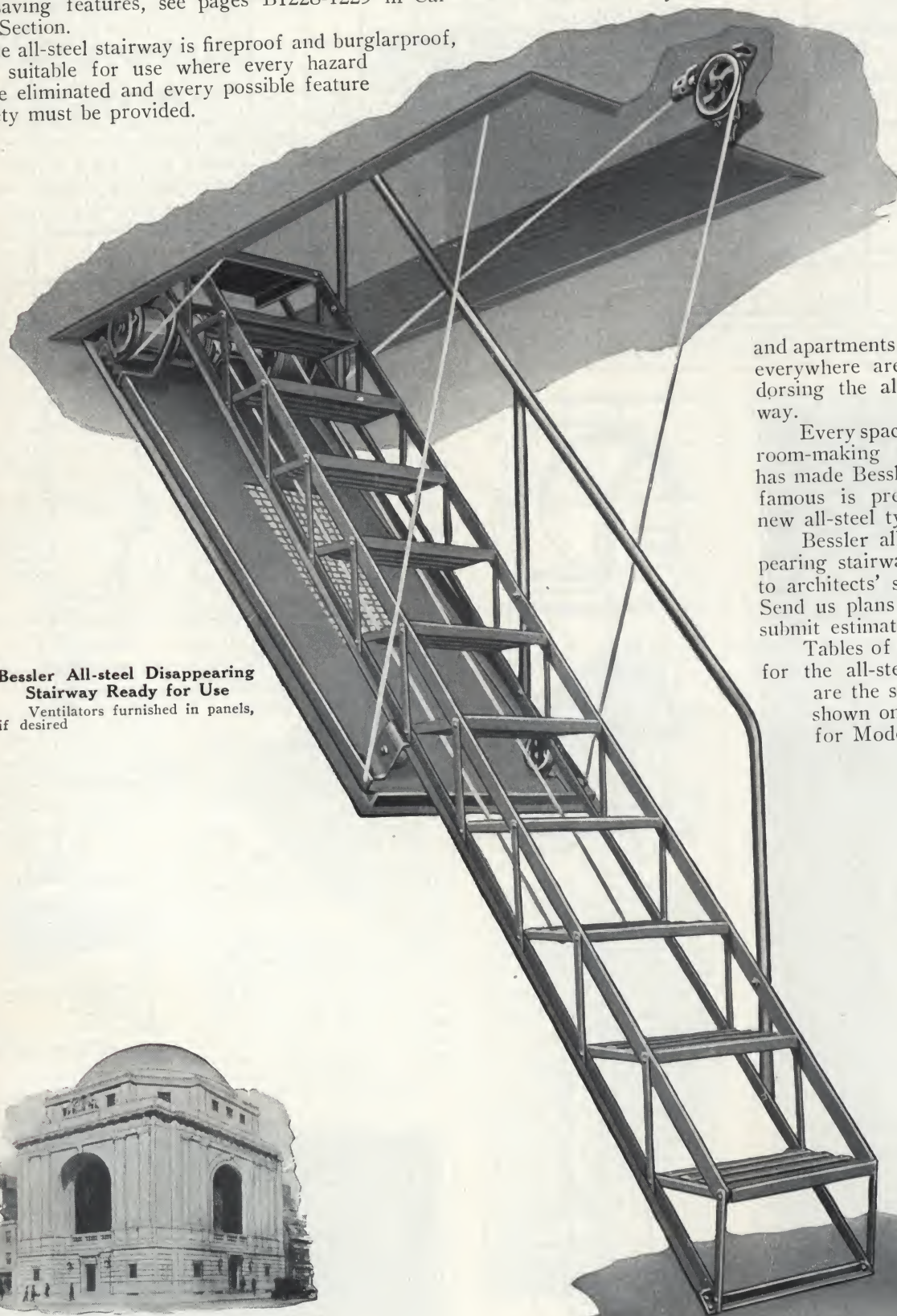
Bessler All-steel Disappearing Stairway

Note: For complete description of operation and space saving features, see pages B1228-1229 in Carpentry Section.

The all-steel stairway is fireproof and burglarproof, and is suitable for use where every hazard must be eliminated and every possible feature of safety must be provided.

It will last as long as the building in which it is installed.

Bessler stairways are in use in thousands of homes



Bessler All-steel Disappearing Stairway Ready for Use

Ventilators furnished in panels, if desired

and apartments. Architects everywhere are highly endorsing the all-steel stairway.

Every space-saving and room-making feature that has made Bessler stairways famous is present in the new all-steel type.

Bessler all-steel disappearing stairways are built to architects' specifications. Send us plans and we will submit estimates.

Tables of various sizes for the all-steel stairways are the same as those shown on page B1229 for Model No. 97.



Citizens Savings Bank, New York, N. Y.
CLARENCE WILSON BRAZER, Architect, New York, N. Y.
Bessler all-steel stairway installed

WALTER BATES STEEL CORPORATION

Manufacturers of Steel Floor-Grating and Step-Grating,
Structures and Building Specialties
GARY, IND.

SALES REPRESENTATIVES

ATLANTA, GA., E. A. THORNWELL
BIRMINGHAM, ALA., SHOOK & FLETCHER SUPPLY CO., INC.
BUFFALO, N. Y., E. S. STICKLE CO.
CLEVELAND, OHIO, E. S. STICKLE CO.

DALLAS, TEX., JACK MILBURN
NEW YORK, N. Y., LEE SKIPWITH & Co., Inc., and WOHAM BATES
& GOODE TRADING CORP.
PITTSBURGH, PA., CONTINENTAL SALES & ENGINEERING CO.

Products

WALTER BATES STEEL FLOOR-GRATING AND STEP-GRATING.

Also Walter Bates Steel Poles, Towers, Substations, Cross Arms, Roof Trusses, Joist Bridging, Railway Structures, Substation Fencing, Fabricating, Galvanizing.

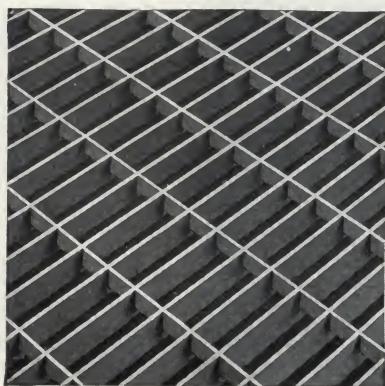
Walter Bates Steel Floor-Grating

Provides all the necessary flooring requirements peculiar to power plants, central stations, and certain types of industrial buildings. It is slipproof, strong, permanent, safe. Facilitates air circulation and light penetration. Relatively light in weight and low in cost. Requires no maintenance. Its even surface makes "easy going" for man or truck.

Non-clogging—Due to elimination of small openings and sharp angles it is impossible for dirt, grease or ice to form or accumulate. Always attractive and sanitary.

Positive Lock Joint—There are no welds, rivets or bolts in the construction of Walter Bates Steel Floor-Grating. The construction details below show how it is made. Once assembled no amount of jarring, loading or trucking can shake the grating loose. In effect, it is a single unit throughout. There can be no rattle or chatter, regardless of age.

WALTER BATES STEEL FLOOR-GRATING



Note that in preparing the members for joining the extreme, or edge, fibres of the Main Bar "A" are uncut. Thus the most important and strongest metal is neither disturbed or reduced.

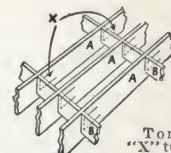
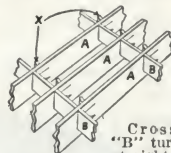
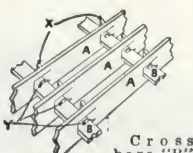
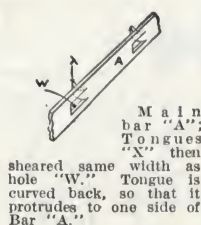
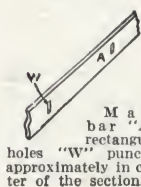
Applications and Uses—Floors and flooring in central stations, power plants, water works tunnels, galleries, walkways, runways, isles of safety, trolley loading platforms, railings, grilles, guards, fire escapes, ventilation shaft covers, sidewalk elevator covers, elevator and penthouse floors, etc.

Walter Bates Steel Step-Grating

Provides a safe, slipproof stair step for indoor or outdoor use. Construction features including positive lock joint, are similar to those on the floor-grating, assuring maximum strength, permanent life and lasting economy. Outer edge reinforced to prevent sag or wear. Furnished ready to be bolted to stair stringers.

Estimates and Descriptions

We will be glad to furnish additional information about any Walter Bates Steel Products; or to submit suggested layouts and estimates upon receipt of specifications or descriptions of requirements. No obligation incurred on the part of inquirer.



Main bar "A"; rectangular notches "X" punched approximately in center of the section.

Main bar "A"; rectangular notches "X" punched approximately in center of the section. Tongue is curved back, so that it protrudes to one side of Bar "A".

Cross bar "B"; notches "X" made in bar at correct spacing center to center of notch.

Cross bars "B" inserted in slots "W" of main bars "A".

Cross Bars "B" turned up at right angles to entry position so that notches "X" straddle upper portion of main bars "A".

Cross Bars "B" turned up at right angles to entry position so that notches "X" straddle upper portion of main bars "A".

Tongues "X" turned back to original position held before shearing. (Since width of slot "W" was same dimension as thickness of Bar "B", tongue "X" presses tightly against bar "B", forming a positive lock.)

SAFE LOAD TABLE WALTER BATES STEEL FLOOR-GRATING

Explanation of Numerals in Column "X"

(1) Maximum Safe Uniform Load per square foot
(2) Deflection Under Maximum Safe Uniform Load in inches

(3) Maximum Safe Concentrated Load per foot of Width
(4) Deflection Under Maximum Safe Concentrated Load

Code Word	Type	Specifications—Bar Size, in.—Centers, in.	Wt. per sq. ft., lbs.	X	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12
Flora	WB 100	Longitudinal.....	Black	1	855	547	380	279	214	169	137														
		1 x 3/8—1.....	Galv.	2	.056	.091	.131	.178	.233	.295	.364														
		Transverse.....	Galv.	3	827	684	570	489	428	380	342														
		¾ x ½—4½.....	Galv.	4	.045	.073	.105	.143	.186	.236	.291														
FLOOR	WB 125	Longitudinal.....	Black	1	1439	921	639	470	360	284	230	190	160	136	117										
		1½ x 3/8—1.....	Galv.	2	.050	.077	.112	.152	.198	.251	.310	.375	.447	.524	.608										
		Transverse.....	Galv.	3	1439	1151	959	822	719	639	575	523	480	443	411										
		¾ x ½—4½.....	Galv.	4	.040	.062	.089	.122	.159	.201	.248	.300	.357	.419	.486										
FLOAK	WB 150	Longitudinal.....	Black	1	2097	1342	932	685	524	414	336	277	233	199	171	149	131	116	104						
		1½ x 3/8—1.....	Galv.	2	.040	.065	.094	.128	.167	.212	.261	.316	.376	.442	.512	.588	.669	.755	.847						
		Transverse.....	Galv.	3	2097	1678	1398	1198	1049	932	839	763	699	645	599	559	524	493	466						
		¾ x ½—4½.....	Galv.	4	.033	.052	.075	.102	.134	.169	.209	.253	.301	.353	.410	.470	.535	.604	.677						
FLOUT	WB 175	Longitudinal.....	Black	1	2787	1785	1239	910	697	551	446	369	310	264	228	198	174	154	138	124	111				
		1½ x 3/8—1.....	Galv.	2	.035	.055	.079	.108	.141	.178	.220	.265	.316	.371	.430	.494	.562	.635	.712	.793	.879				
		Transverse.....	Galv.	3	2787	2230	1858	1593	1394	1239	1115	1014	929	858	796	743	697	656	619	587	557				
		¾ x ½—4½.....	Galv.	4	.028	.044	.063	.086	.112	.142	.176	.218	.263	.314	.370	.430	.495	.568	.649	.734	.824				
FLOZE	WB 200	Longitudinal.....	Black	1	3587	2296	1594	1171	897	709	574	474	399	340	293	255	224	199	177	159	143	130	119	108	100
		2 x 3/8—1.....	Galv.	2	.030	.047	.068	.093	.122	.154	.190	.230	.274	.321	.372	.427	.486	.549	.615	.686	.760	.838	.919	1.00	1.09
		Transverse.....	Galv.	3	3587	2869	2391	2050	1793	1594	1435	1304	1196	1104	1025	956	897	844	797	755	717	683	652	624	598
		¾ x ½—4½.....	Galv.	4	.024	.038	.055	.074	.097	.123	.152	.184	.219	.257	.298	.342	.389	.439	.492	.549	.608	.670	.735	.804	.875
FLONG	WB 225	Longitudinal.....	Black	1	4501	2881	2000	1470	1125	889	720	595	500	426	367	320	281	249	222	199	180	163	149	136	125
		2½ x 3/8—1.....	Galv.	2	.013	.042	.060	.082	.107	.136	.168	.203	.242	.284	.329	.377	.429	.485	.544	.604	.671	.740	.812	.887	.966
		Transverse.....	Galv.	3	4501	3601	3001	2572	2251	2000	1800	1637	1500	1385	1286	1200	1125	1059	1000	948	900	857	818	786	750
		¾ x ½—4½.....	Galv.	4	.011	.034	.048	.066	.086	.109	.134	.162	.193	.227	.263	.302	.344	.388	.435	.486	.541	.592	.650	.710	.773

BLAW-KNOX COMPANY

Steel Grating, Steel Hangers, Steel Bridging

GENERAL SALES OFFICES

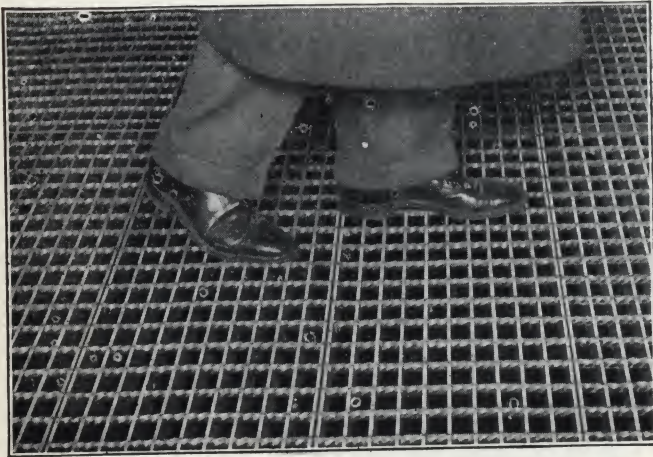
641 Farmers Bank Building, PITTSBURGH, PA.

EXECUTIVE OFFICES AND PLANT, BLAWKNOX (PITTSBURGH DISTRICT), PA.

SALES OFFICES

BALTIMORE, MD., Bayard and Warner Streets
BIRMINGHAM, ALA., Brown-Marx Building
BUFFALO, N. Y., Genesee Building
PHILADELPHIA, PA., 332 Widener Building

NEW YORK, N. Y., 30 E. 42nd Street
CLEVELAND, OHIO, Union Building
CHICAGO, ILL., Peoples Gas Building
DETROIT, MICH., Lincoln Building



SECURITY STEEL GRATING & FLOORING

greatest strength. Data as to comparative tests and sample will be gladly furnished to architects upon request.

Seven exclusive features of Blaw-Knox "Security" Steel Gratings are as follows:

Non-slip. Roughened edges of twisted cross bars protruding slightly above surface of bearing bars affords perfect traction.

Greatest strength. Electroforged one-piece construction—free from any cuts in metal—utilizes full strength. Certified tests prove this grating the strongest.

Longest life. "Security" Grating is entirely free from joints and cracks. It is the only grating which can be 100% galvanized or painted.

One-piece. The exclusive method of electroforging cross bars and horizontal bars makes "Security" Grating the only one-piece grating on the market.

Self-cleaning. Because "Security" Grating is free from acute angles or projections. An examination illustrates this fact.

Better light and ventilation. Clean-cut rectangular openings. Minimum opaque surfaces interposed between light and objective assure maximum light and ventilation.

Installation and sizes. "Security" Grating is simple to install because of a simple and secure method of fastening, eliminating need for scaffold and ladder. "Security" Grating is furnished in standard sections, or to meet your order, painted or galvanized.

Security Steel Grating and Flooring

Blaw-Knox "Security" Steel Grating and Open Flooring is made by a resistance welding process in which longitudinal bars and cross bars are electroforged into an actual—not theoretical—one-piece construction. No slots, rivets, nor cuts in the metal. In a series of tests first conducted at Columbia University, New York, and lastly under the auspices of the Pittsburgh Testing Laboratory, in which six leading commercial gratings were tested, as to comparative strength, Blaw-Knox "Security" Steel Grating and Open Flooring was conclusively proven to have the

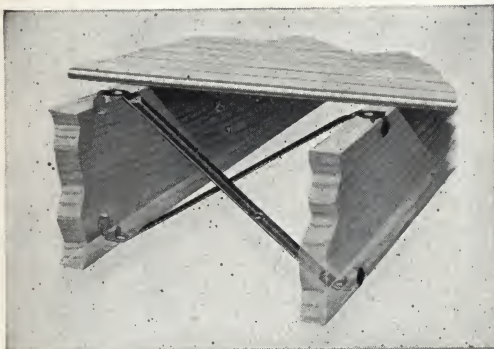


Steel Steps

Blaw-Knox Steel Steps are made doubly visible by means of an additional set of cross bars placed between the two outer bearing bars as shown.

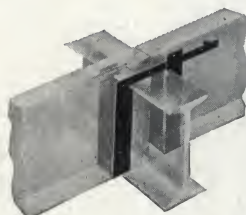


Blaw-Knox Steel Steps are made in accordance with the same principle as "Security" Grating. These steps are furnished in all sizes.



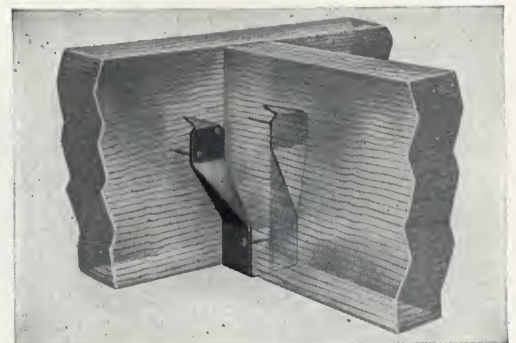
TRU-TYE STEEL TENSION BRIDGING

Blaw-Knox Tru-Tye Steel Bridging holds joists in tension, clinging with a bulldog grip. Unaffected by shrinkage. Floors bridged with Tru-Tye have been proved under test to remain true under excessive load conditions. Sample free to architects



QUICKSET HANGER FOR I-BEAMS

A prominent architect suggested the Blaw-Knox Quickset Hanger—a hanger which holds joists in position despite shrinkage; which thus prevents sagging floors. Quickset ties joists together across I-beams, and carries full weight of floor. Samples free to architects



JUNIOR HANGER FOR HEADERS

Blaw-Knox Junior Hanger provides non-failing steel support for headers at stairways, fireplaces, etc. Gaining out, loose nails, sagging are all eliminated. Junior Hanger assures against sagging since it holds joists firmly in place before and after shrinkage. Sample free to architects

Blaw-Knox Better Building Products

HENDRICK MANUFACTURING COMPANY

"Mitco" Interlocked Steel Floor Grating and Shur-site Treads

51 Dundaff Street, CARBONDALE, PA.

SALES OFFICES AND REPRESENTATIVES

ATLANTA, GA., BOILER EQUIPMENT SERVICE Co.
BALTIMORE, MD., J. B. EMBICK
BEAUMONT, TEX., LATEX STEEL & MACHINERY Co.
BIRMINGHAM, ALA., KEISER-GEISER ENGINEERING Co.
BOSTON 9, MASS., UNIVERSAL SAFETY TREAD Co.
CHARLESTON, W. VA., W. A. ROSS Co.

CHICAGO, ILL., ERNEST E. LEE Co.
CLEVELAND, OHIO, A. E. QUERE Co.
DALLAS, TEX., W. A. SEDWICK Co.
DETROIT, MICH., GLENN H. BROWN
GREENVILLE, S. C., J. E. BEATTIE
HAZLETON, PA., HENDRICK MFG. Co.
INDIANAPOLIS, IND., JAS. H. CARNINE
LOS ANGELES, CAL., CONTINENTAL BUILDING SPECIALTIES Co.
MONTREAL, QUE., ECONOMY RAILWAY APPLIANCE Co.

NEW YORK, N. Y., MITCHELL-TAPPEN Co.
PHILADELPHIA, PA., ENGINEERING Co. OF PHILADELPHIA
PITTSBURGH, PA., HENDRICK MFG. Co.
ST. PAUL, MINN., ERNEST V. WALSH
SAN FRANCISCO, CAL., BADT-FALK Co.
SEATTLE, WASH., CROWE-MATTHEWS Co.
TULSA, OKLA., CIRCLE CORPORATION
UTICA, N. Y., H. H. FREY

Products

Sole manufacturers of "Mitco" INTERLOCKED STEEL FLOOR, SIDEWALK and DRIVEWAY GRATING; "Mitco" SHUR-SITE STAIR TREADS and "Mitco" ARMORGRIDS.

Also manufacturers of Window Guards and Perforated Metal Screens and Grilles.

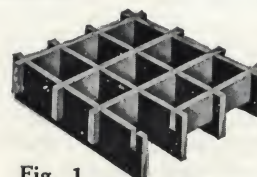


Fig. 1
Patented Interlocked
Construction of "Mitco"
Gratings and Treads

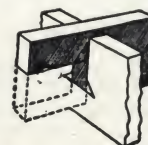


Fig. 2, Joint
Prepared



Fig. 3, Lock
Completed

"Mitco" Interlocked Steel Grating (Patent No. 1,158,154)

Non-slipping, non-clogging steel flooring of great strength and rigidity. Made of high tensile strength, square edge, steel bars, permanently locked in position. No rivets, bolts or welding used in its construction. 90% open area, providing maximum light and ventilation.

Furnished in various types and depths to fit openings of any size and shape. Most requirements are met by panels up to 38 in. wide, in lengths to suit the span. To meet special conditions, panels of greater width can be furnished without additional cost.

Construction—A series of dovetail slots are punched on fixed centers in the deep or bearing bars. Into these slots are set the lateral or transverse bars, also slotted. Under hydraulic pressure of 300 tons the lateral bars are pressed down into the slots, making a flush surface, spreading the metal and completely filling the dovetail slots. As the dovetail slots are always above the neutral axis, and as these slots are completely filled by the transverse bars, the bearing bars develop the full strength of the metal. The lateral bars not only serve as struts, but provide transverse strength, firmly lock the entire construction into an integral unit and distribute any concentrated load over the entire panel of grating.

Applications—Primarily designed to meet the need for non-clogging sidewalk grating for subway construction (approved by the Transit Commission of New York City) "Mitco" Interlocked Steel Floor Grating is now used extensively in chemical process plants, power plants, blast furnaces and steel mills, coal mines and tipples, marine floors and steps, and many other industries requiring strong, non-clogging and non-slipping steel floors.

"Mitco" Shur-site Stair Treads (Patent No. 1,536,636)

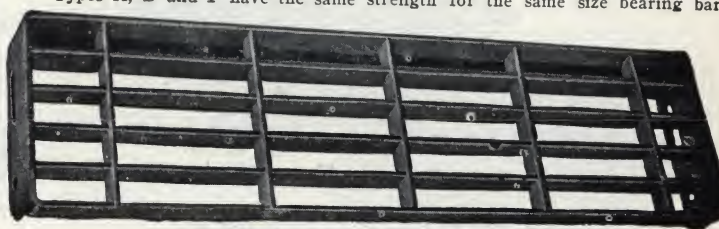
Made of 1-in. Type C "Mitco" Grating. A deep nosing bar, bent back (patented), clearly defines the front edge of the tread and prevents accidents caused by overstepping the edge of the step. The nosing bar is self-cleaning and will not collect dirt, snow or ice.

Furnished in five standard lengths and three widths or in special lengths and widths to meet requirements.

Bearing bars punched with dovetail slots; transverse bars slotted and set into place so that they stand about $\frac{1}{8}$ in. above bearing bars (Fig. 2). Grating is then put under a 300-ton hydraulic press and transverse bars forced down flush (Fig. 3). This pressure automatically spreads metal in the dovetail slots, completely filling them and making a perfect and permanent joint. Grating panels supplied with flush sides.

Depth and Type	Bearing Bars		Cross Bars		Weight Sq. Foot	SPAN IN FEET										
	Size	Spacing C to C	Size	Spacing C to C		2'0"	2'6"	3'0"	3'6"	4'0"	5'0"	6'0"	7'0"	8'0"	9'0"	10'0"
1" Light "D"	1 x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	$\frac{3}{4}$ x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	5.5 lbs.	560	360	250	186	140						
1" "D"	1 x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	$\frac{3}{4}$ x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	7.8 lbs.	835	534	370	273	208	133	93				
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	6.3 lbs.	208	133	93	68	52						
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	9.5 lbs.	1410	900	627	445	352	225	157	111			
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	6.7 lbs.	352	225	156	111	88	56					
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	11.0 lbs.	1875	1200	834	612	468	300	208	153	117	93	
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	7.1 lbs.	468	300	208	153	117	75	52				
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	12.5 lbs.	2560	1640	1140	838	640	410	285	210	160	127	103
1 $\frac{1}{2}$ " "D"	1 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	7.5 lbs.	640	410	285	210	160	103	71	52			
2" "D"	2 x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	14.0 lbs.	3340	2140	1480	1090	834	534	371	272	208	165	133
2" "D"	2 x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	7.9 lbs.	835	535	370	272	209	134	93	68	52		
2 $\frac{1}{2}$ " "D"	2 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	15.5 lbs.	4220	2700	1875	1380	1055	675	470	345	264	208	169
2 $\frac{1}{2}$ " "D"	2 $\frac{1}{2}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	1 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	8.2 lbs.	1055	675	470	345	264	169	117	86	66		
"MITCO" DRIVEWAY GRATINGS (For Heavy Traffic, Coal "Grizzlies", Etc.)																
2 $\frac{1}{4}$ " C	2 $\frac{1}{4}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	2 x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	36.8 lbs.	8440	5400	3750	2760	2100	1350	940	690	528	416	338
2 $\frac{3}{4}$ " C	2 $\frac{3}{4}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	2 $\frac{1}{2}$ x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	44.6 lbs.	13900	8880	5640	4530	3470	2220	1540	1130	865	685	555
3 $\frac{1}{4}$ " C	3 $\frac{1}{4}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	2 $\frac{3}{4}$ x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	51.7 lbs.	12400	7850	6310	4840	3100	2150	1580	1210	955	775	
3 $\frac{3}{4}$ " C	3 $\frac{3}{4}$ x $\frac{1}{2}$ "	1 $\frac{1}{8}$ "	2 $\frac{3}{4}$ x $\frac{1}{2}$ "	4 $\frac{3}{4}$ "	58.7 lbs.	16500	10470	8410	6440	4120	2860	2100	1610	1272	1031	

"D"—Deflection in inches for uniform live load.
Types C and E have same deflection for same spans.
Driveway can also be furnished in Type B having same strength as Type C and weighing approximately 6 lb. per sq. ft. more.
For safe concentrated load at center of span multiply tabulated load by span and divide by 2. This applies to both tables above.
Types A, B and F have the same strength for the same size bearing bars.



"Mitco" Shur-site Stair Tread

"Mitco" Armorgrids

For reinforcing concrete floors and platforms. "Mitco" Armorgrids, furnished in convenient sizes, are set on the concrete base so that the finishing fill of concrete or cement brings the surface of floor flush with top of panel. "Mitco" Armorgrids not only protect the surface of the floor but also provide traction for industrial trucking in places subject to oil and grease.

IRVING IRON WORKS COMPANY

Manufacturers of Open Steel Flooring, Walkway, Grating and Safety Steps
Dutchkill Creek and Third Street, LONG ISLAND CITY, N. Y.

Products

This company is the sole manufacturer of IRVING OPEN STEEL FLOORING in "Irvico" and other types, and of IRVING "VIZABLEDGF SAFSTEP" ALL-STEEL STAIR and LADDER STEPS; also of "Subway," "Sunway," "Sublit," "Eggcrate," "Honeycomb," "Reticuline," and other forms of flooring, grating, and accessories.

Trade-marks

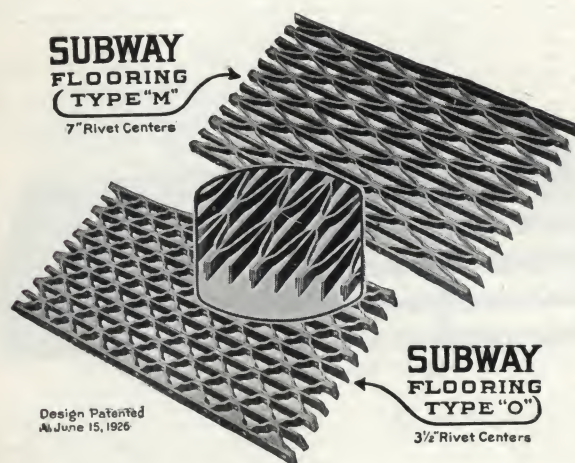
The trade-mark names "Irvico," "Subway," "Sunway," "Sublit," "Safstep," "Vizabledg," and "Reticuline" are registered in the U. S. Patent Office, are the exclusive property of this company, and can not be legally used in connection with any grating, grating-flooring or safety step made by any other company.

Irving "Irvico" Open Steel Flooring

Construction—"Irvico" Flooring consists of alternate straight and "reticuline" bars of steel assembled edge-on and solidly riveted together in convenient-sized panels. The straight bars are of greater depth than the "reticuline" bars; the latter have an elongated "S" curve and meet the straight bar at a wide angle. The design embodies the "truss" principle by which a concentrated load is distributed among many bars over a wide area. The rivet holes are punched above the neutral axis of the straight bars, each of which is supported in its upper section where the buckling stress is greatest, by the adjoining reticuline bars. Thus the full tensile strength of each member is usefully employed.

The use of bars of two depths and the curve given the "reticuline" members, give the following structural superiorities distinctive of Irving types: (1) greatest load capacity per unit of weight; (2) greatest effective area for lighting; (3) least opportunity for lodgment of dirt, ash, snow, etc.; (4) all bars absolutely flush on working face of panel; (5) all panels absolutely flat—no warping or twisting; (6) a permanently non-slipping surface; (7) a superior surface for trucks or tractors; (8) a pleasing flooring design, smooth and regular.

Types—"Irvico" Steel Flooring is made in the two standard types pictured below: "M," with 7 inches



Two Standard Types of "Irving Subway" Open Flooring

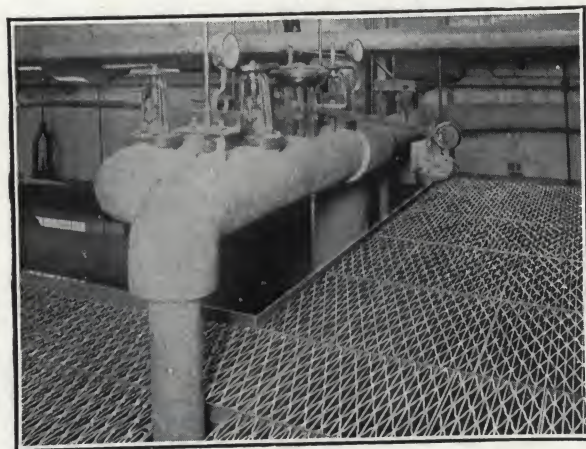
OPEN STEEL
IRVING
SUBWAY
FLOORING

IRVING
VIZABLEDGF
SAFSTEP

between rivets; "O," with 3 1/2 inches between rivets. There are also several other standard "Irving" Floorings, differing from "Irvico" only in the shape of the "reticuline" bar. Load capacity is the same for all "Irving" types.

Field of Application—The architect, engineer, designer or builder will recognize, in his work, the logical place for "Irvico"

Flooring: a smooth but permanently non-slipping safety flooring; an open flooring for ventilation and lighting; a flooring moderate in first cost and with practically no maintenance costs; a sectional flooring easily installed and requiring a much lighter supporting structure; a flooring easily moved or rearranged, and using no bolts or screws, drilling or tapping, in its installation.



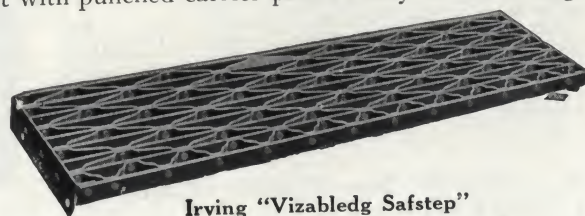
Central Station Floored with "Subway," "Irvico" Type

Facilities—"Irvico" Flooring is manufactured in quantities, to uniform standards, in the world's largest steel flooring factory. Large stocks of steel are always on hand, and specialized equipment makes prompt delivery possible, in any quantity.

Irving "Vizabledg Safsteps"

These are light, strong, all-steel units made of standard type "M" "Irvico" mesh except that the "reticuline" bar next to the nosing bar has the Type "O" crimp. This abrupt change in mesh pattern forms a visible edge (Vizabledg) which makes the "Safstep" miss-proof; while the non-slipping "Irvico" surface makes the "Safstep" slip-proof under all conditions.

There are 24 standard sizes, each a self-contained unit with punched carrier plates ready for mounting.



Irving "Vizabledg Safstep"

Bulletin

Bulletin H16, sent on request, gives complete description with construction drawings, load ratings, spans, weights, etc.

Standard Construction of "Irving Subway"

Spacing—Types "M" and "G"— $1\frac{1}{8}$ inches from center to center of straight bars when $\frac{3}{8}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{1}{2}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

Types "O" and "E"— $1\frac{1}{8}$ inches from center to center of straight bars when $\frac{3}{8}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{1}{2}$ inch thick; rivet spacing, $3\frac{1}{2}$ inches center to center on straight bars.

Types "Q" and "K"— $1\frac{1}{8}$ inch from center to center of straight bars when $\frac{3}{8}$ inch thick; $\frac{7}{8}$ inch from center to center of straight bars when $\frac{1}{2}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

Standard Made-to-order Units—All types of "Irving Subway" are also made to order for prompt shipment, to fit any opening and to meet any conditions. When made to order, "Irving Subway" is shipped in units or panels properly marked and accompanied by setting plans.

These units—in the $\frac{1}{2}$, $\frac{3}{4}$ and 1-inch depths, if no larger than 24 inches wide by 72 inches long—and in the $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 and $2\frac{1}{4}$ -inch depths, if no larger than $13\frac{1}{2}$ inches wide by 72 inches long—sell at the regularly quoted square foot rates.

If larger than these sizes, there is a small extra charge. Anything smaller than these units is also standard and sells at the regularly quoted square foot rate.

We limit the size of the units, not only to simplify manufacture, but also to facilitate installation and to make removal or rearrangement easy.

Paint and Fastening Devices—Quoted prices always include one shop coat of paint, and fastening devices.

Orders—Orders should designate type, symbol and depth, to avoid mistake; thus, "Irving Subway Type M, 3S, $1\frac{1}{4}$ inch deep."





Show the supporting structure and outline the area to be covered. Let us make the "Irving Subway" layout for your approval.

TABLE OF SAFE LOADS FOR "IRVING SUBWAY"—ALL TYPES

Maximum allowable fiber stress, 16,000 lb. per sq. in.

L—safe load in lb. per sq. ft.

C—deflection constant

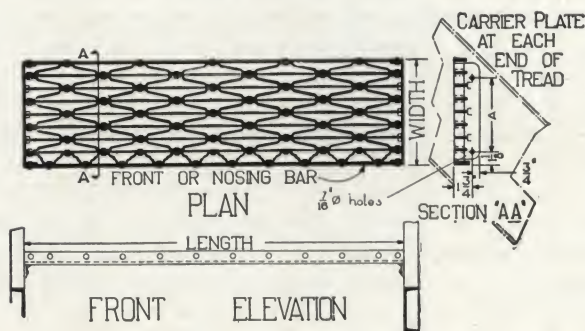
		TYPE "M"					TYPE "G"			TYPE "E"						
Size and symbol of flooring	Specification		1 ft.-6 in.	2 ft.	2 ft.-6 in.	3 ft.	3 ft.-6 in.	4 ft.	4 ft.-6 in.	5 ft.	5 ft.-6 in.	6 ft.	7 ft.	8 ft.	9 ft.	
$\frac{1}{2}$ in. deep Symbol, OS	Straight bars, $\frac{1}{2} \times \frac{1}{8}$ in. Reticuline bars, $\frac{3}{8} \times \frac{1}{8}$ in.	L C	308 .00029	173 .00092	110 .00227	77 .0048	Note: Spans to right of heavy line are not recommended									
$\frac{3}{4}$ in. deep Symbol, 1S	Straight bars, $\frac{3}{4} \times \frac{1}{8}$ in. Reticuline bars, $\frac{1}{2} \times \frac{1}{8}$ in.	L C	695 .000045	390 .00011	250 .00069	173 .00143	127 .00265	97 .0040	77 .0055	63 .0083						
1 in. deep Symbol, 2S	Straight bars, 1 $\times \frac{1}{8}$ in. Reticuline bars, $\frac{3}{4} \times \frac{1}{8}$ in.	L C		695 .00012	445 .00029	308 .0006	227 .00112	173 .0019	138 .00305	112 .00465	93 .0068					
1 in. deep Symbol, 2SA	Straight bars, 1 $\times \frac{3}{16}$ in. Reticuline bars, $\frac{3}{4} \times \frac{1}{8}$ in.	L C		1040 .00008	665 .00019	460 .0004	340 .00075	260 .00127	206 .00204	167 .0031	140 .00454	116 .00645				
$1\frac{1}{4}$ in. deep Symbol, 3SA	Straight bars, $1\frac{1}{4} \times \frac{1}{8}$ in. Reticuline bars, 1 $\times \frac{1}{8}$ in.	L C			700 .00015	480 .00031	358 .00057	273 .00097	215 .00155	175 .00235	143 .00348	120 .0049				
$1\frac{1}{4}$ in. deep Symbol, 3S	Straight bars, $1\frac{1}{4} \times \frac{3}{16}$ in. Reticuline bars, 1 $\times \frac{3}{16}$ in.	L C			1100 .0001	730 .00021	535 .00038	410 .00065	325 .00105	265 .0016	215 .0024	185 .0033	135 .0062	100 .0105	80 .0169	
$1\frac{1}{2}$ in. deep Symbol, 4SA	Straight bars, $1\frac{1}{2} \times \frac{1}{8}$ in. Reticuline bars, 1 $\times \frac{1}{8}$ in.	L C			1020 .000087	707 .000178	516 .000333	396 .00057	314 .00091	253 .00138	210 .00203	173 .00287	130 .0053	100 .00903	77 .0145	
$1\frac{1}{2}$ in. deep Symbol, 4S	Straight bars, $1\frac{1}{2} \times \frac{3}{16}$ in. Reticuline bars, 1 $\times \frac{3}{16}$ in.	L C			1530 .00006	1050 .00012	775 .00023	595 .00038	470 .00061	380 .0009	315 .0014	265 .0019	202 .0036	150 .0061	115 .0097	
$1\frac{3}{4}$ in. deep Symbol, 5S	Straight bars, $1\frac{3}{4} \times \frac{1}{8}$ in. Reticuline bars, 1 $\times \frac{1}{8}$ in.	L C			2060 .00004	1435 .00008	1050 .00014	810 .00024	635 .00038	520 .00058	425 .00085	360 .0012	265 .0022	200 .0038	160 .0061	
2 in. deep Symbol, 6S	Straight bars, 2 $\times \frac{3}{16}$ in. Reticuline bars, 1 $\times \frac{3}{16}$ in.	L C			2700 .00003	1875 .00005	1375 .00009	1055 .00016	830 .00025	675 .00039	560 .00057	470 .0008	345 .0015	265 .0026	210 .0041	
$2\frac{1}{4}$ in. deep Symbol, 7S	Straight bars, $2\frac{1}{4} \times \frac{1}{8}$ in. Reticuline bars, 1 $\times \frac{1}{8}$ in.	L C			3460 .00002	2400 .00004	1765 .00007	1350 .00011	1065 .00018	865 .00027	715 .0004	600 .00057	440 .0011	340 .0018	265 .0029	

Deflections—To obtain the deflection under any uniform load per square foot on a given span, multiply your load per square foot by the deflection constant "C" from the table for your given span. The result will be the deflection in inches at center of span under your actual load.

Standard Sizes and Dimensions of Irving "Vizabledg Safsteps"

The tables in the opposite column show the standard sizes of "Irving Vizabledg Safsteps," which are complete units assembled with punched carrier plates attached, ready for setting.

Type "M" flooring is used for all sizes.



"Irving Vizabledg Safstep" Dimension Diagram

VIZABLEDGF SAFSTEP No. 1—SPECIFICATIONS

Straight bars in. $\frac{3}{4} \times \frac{1}{8}$ | Nosing bars in. 1 $\times \frac{1}{4}$
Reticuline bars in. $\frac{1}{2} \times \frac{1}{8}$ | Carrier bars in. $2\frac{1}{2} \times \frac{1}{8}$

Width, in.	Length, ft.-in.		Distance A, in.
5 $\frac{3}{8}$	1-7	1-10 $\frac{1}{2}$	2 $\frac{1}{2}$
7 $\frac{1}{8}$	1-7	1-10 $\frac{1}{2}$	4 $\frac{1}{2}$
10 $\frac{3}{8}$	1-7	1-10 $\frac{1}{2}$	7

VIZABLEDGF SAFSTEP No. 2—SPECIFICATIONS

Straight bars in. 1 $\times \frac{1}{8}$ | Nosing bars in. $1\frac{1}{4} \times \frac{1}{4}$
Reticuline bars in. $\frac{3}{4} \times \frac{1}{8}$ | Carrier bars in. $2\frac{1}{2} \times \frac{1}{8}$

Width, in.	Length, ft.-in.		Distance A, in.
5 $\frac{3}{8}$	2-5 $\frac{1}{2}$	3-0 $\frac{1}{2}$	2 $\frac{1}{2}$
7 $\frac{1}{8}$	2-5 $\frac{1}{2}$	3-0 $\frac{1}{2}$	4 $\frac{1}{2}$
10 $\frac{3}{8}$	2-5 $\frac{1}{2}$	3-0 $\frac{1}{2}$	7

VIZABLEDGF SAFSTEP No. 3—SPECIFICATIONS

Straight bars in. $1\frac{1}{4} \times \frac{1}{8}$ | Nosing bars in. $1\frac{1}{2} \times \frac{1}{4}$
Reticuline bars in. 1 $\times \frac{1}{8}$ | Carrier bars in. $2\frac{1}{2} \times \frac{1}{8}$

Width, in.	Length, ft.-in.		Distance A, in.
8 $\frac{1}{4}$	3-7 $\frac{1}{2}$	3-11	4-6
10 $\frac{3}{8}$	3-7 $\frac{1}{2}$	3-11	4-6
12 $\frac{1}{2}$	3-7 $\frac{1}{2}$	3-11	4-6

KERLOW STEEL FLOORING COMPANY

Manufacturers of Steel Flooring, Steps and Allied Products

TELEPHONE
BERGEN 8932

222-238 Culver Avenue, JERSEY CITY, N. J.

Products

STEEL FLOORING, SAFETY STEPS, CONCRETE ARMORING, WINDOW GUARDS, RADIATOR GUARDS for all industrial, marine and architectural purposes. All products are guaranteed.

Design

The original construction of a Kerlow Steel Floor is permanent. Riveted at the center, or neutral axis of the bars, Kerlow Steel Floors cannot become concave nor convex, even after years of service and continuous traffic. There are no integral

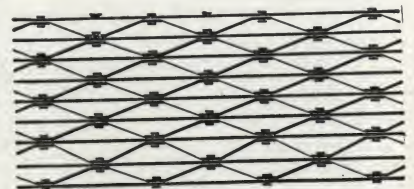


tension or compression strains to cause buckling. Kerlow units cannot be knocked apart. There is no wrong side to a Kerlow Floor, and no attempt is made to reduce cost by eliminating steel. Kerlow Floors are all steel.

Uses for Kerlow Grating Products

Kerlow grating floors, steps and guards, have been used repeatedly for powerhouses, coal tipples, smoke-houses, elevator shafts, engine room

floors, sidewalk areas and doors, car platforms, fruit canneries, door mats, armoring concrete floors, loading platforms, refineries, oil stills, dry kiln floors, refrigerator plants, warehouses, steel mills, cement plants, for every conceivable purpose that a walking, working, or ventilating surface should be used.



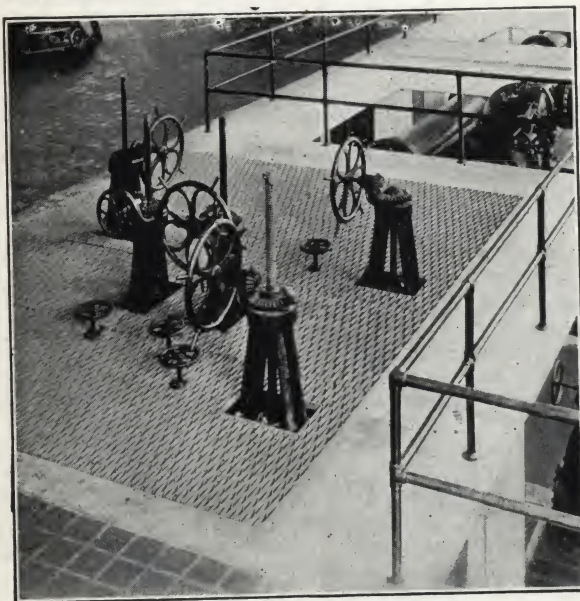
Type V

Standard mesh for all floors and steps. Straight bars $1\frac{1}{8}$ in. apart. Rivets $6\frac{3}{4}$ in. on center. See table for depths and safe loads

UNIFORM SAFE LOADS—SPANS LESS THAN 6 FEET

Loads, depths and weights per square foot
Straight bars, Types V1, V2, V4, V6, V8, V10, V12— $\frac{1}{8}$ in. thick
Straight bars, Types V3, V5, V7, V9, V11, V13— $\frac{3}{16}$ in. thick

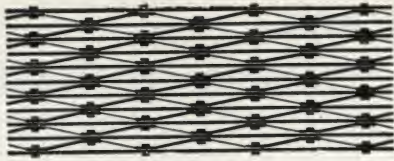
Type	Depth, in.	Weight, lb.	Span in feet and inches						
			2' 6"	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"	5' 6"
V1	$\frac{3}{4}$	7	319	221	164	125	99	80	.....
V2	1	9	565	389	287	222	174	142	116
V3	1	10	719	498	368	281	222	180	149
V4	$1\frac{1}{4}$	10.7	881	617	454	345	274	223	184
V5	$1\frac{1}{4}$	13	1127	783	577	444	346	281	232
V6	$1\frac{1}{2}$	13.2	1312	910	671	513	404	329	271
V7	$1\frac{1}{2}$	16	1762	1230	899	688	543	440	364
V8	$1\frac{3}{4}$	17	1837	1275	938	719	565	460	380
V9	$1\frac{3}{4}$	18	2230	1554	1142	873	688	552	462
V10	2	19	2580	1803	1267	985	796	642	534
V11	2	21	2930	2030	1495	1143	904	733	607
V12	$2\frac{1}{4}$	22	3333	2311	1700	1298	1027	834	689
V13	$2\frac{1}{4}$	24	3736	2592	1904	1458	1151	934	772



A High School Installation

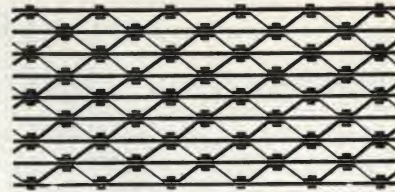


A Powerhouse Installation



Type E

Car mesh for special floors and steps. Straight bars $\frac{3}{4}$ in. apart. Rivets $\frac{5}{8}$ in. on center



Type R

Close mesh for special floors and steps. Straight bars $1\frac{1}{8}$ in. apart. Rivets 4 in. on center. See table for depths and safe loads

Industrial Safety Steps

Kerlow safety steps are manufactured in regular and special lengths, in widths of $5\frac{1}{4}$, $7\frac{3}{4}$, 9 and $10\frac{1}{4}$ in.—complete with carriers ready to bolt in place.

Kerlow safety steps constitute a perfect industrial tread—non-slip and clean always. A heavy impact section is provided at the front of each step.

The carriers or supporting shelf on the safety steps are manufactured with a positive and a slotted hole at each end which preclude any reaming, drifting, or re-drilling of bolt holes in the field.



Type V—Step

Industrial step, carrier hole dimensions "A," 2 in. for $5\frac{1}{4}$ -in. wide step; $4\frac{1}{2}$ in. for $7\frac{3}{4}$ -in. wide step; $5\frac{1}{2}$ in. for 9-in. wide step; 7 in. for $10\frac{1}{4}$ -in. wide step

UNIFORM SAFE LOADS—SPAN 6 FEET AND OVER

Loads, depths and weights per square foot
Straight bars, Types V1, V2, V4, V6, V8, V10, V12— $\frac{3}{8}$ in. thick
Straight bars, Types V3, V5, V7, V9, V11, V13— $\frac{1}{2}$ in. thick

Type	Depth, in.	Weight, lb.	Span in feet and inches						
			6' 0"	6' 6"	7' 0"	7' 6"	8' 0"	8' 6"	9' 0"
V1	¾	7	....	....	....	....	....	....	....
V2	1	9	99	83	....	....	....	....	....
V3	1	10	125	106	94	....	....	....	....
V4	1 ¼	10.7	152	131	112	104	90	....	....
V5	1 ¼	13	196	166	144	123	110	98	86
V6	1 ½	13.2	228	191	168	148	136	119	107
V7	1 ½	16	302	270	224	175	162	136	128
V8	1 ¾	17	320	275	234	204	180	160	142
V9	1 ¾	18	388	333	285	250	218	195	172
V10	2	19	448	385	320	290	253	226	200
V11	2	21	508	437	374	330	287	257	227
V12	2 ¼	22	581	498	442	375	325	292	258
V13	2 ¼	24	652	560	477	420	364	327	289

Co-operative Service

All that is necessary to secure prompt service and shipment is to submit size of the area to be covered together with the uniform safe load desired. Recommendations and guarantees will be given to suit the existing conditions.

Prices are made on a square foot or lump sum basis as may be desired.

All Kerlow floor units are furnished with standard fastening devices, standard finish, erection diagram, and unit list. Catalogues upon request.



A University Installation



A Refinery Installation

THE TRI-LOK COMPANY

Manufacturers of "Tri-Lok" Ventilated Steel Flooring and Tread

5531 Butler Street
PITTSBURGH, PA.

Product

TRI-LOK GRATING and TREAD, a ventilated steel flooring for purposes of transmitting light or air to areas above or beneath, or where extreme strength, durability, or fire-proof construction is required with a minimum of weight.

Adaptations

In addition to the use of *Tri-Lok* as hereafter mentioned, it is excellently adaptable to the *reinforcement or surface armoring of concrete floors* wherever additional strength is required or wear is excessive.

A specialty is made of *safety stair treads and landings*, either in open form or concrete filled. The nosings, or front edges of these steps, are positively visible when ascending or descending the stairway. Style BD *Tri-Lok* Nosing is positively non-slipping. (See illustration "C"). *Tri-Lok* Nosing is positively non-slip.

Accessories

Continuity bars for the purpose of joining sections of *Tri-Lok* Ventilated Flooring into a continuous span, thus making one integral floor with ample strength and no projections above the surface.

Tri-Lok Fasteners for making all attachments to supporting structures.

Construction

Consists of steel load bearing bars and load distributing bars, triple locked at right angles to each other. (Illustration A). The bearing bars are punched with curved slots exactly the same width and over-all depth as the cross or load distributing bars. In assembling, the bearers are set on edge with the slot uppermost, in a rigid steel frame which accurately spaces them and assures rectangularity of the finished unit. The bearers are arranged in such a way that the slots curve alternately right and left in adjacent bars. The cross bars are then started into the slots by hand to insure perfect alignment after which the entire unit is subjected to 1600 tons hydraulic pressure.

This drives the distributors to the bottom of the slots in the bearers and completes the triple or twist-and-turn lock, in other words, twists the lower edge of the distributing bars to the right and left at each side of the bearing bars.

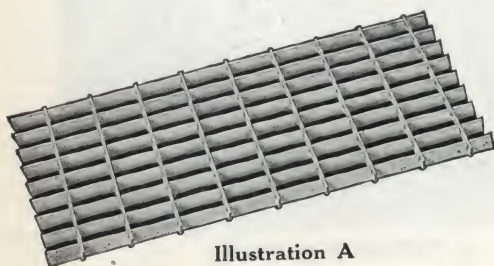


Illustration A



Advantages

Strength and Deflection—*Tri-Lok* possesses maximum strength per unit of weight of material.

Since the bearing bars are not slotted or otherwise deformed below the neutral axis, and since all slots are solidly filled by the distributing bars forced into them, the carrying strength of the whole construction is the full equivalent of a solid of equal weight and depth. Deflection is a minimum.

Rigidity and Durability—The twisting of the distributors, alternately to the right and left as they cross the bearers, and the solid filling of the slots in the bearing bars by the cross bars, results in a joint which for rigidity, durability, and virtual indestructibility is unexcelled in this field.

Laboratory tests by Columbia University, the University of Pittsburgh, the Pittsburgh Testing Laboratory and Massachusetts Institute of Technology reveal that *Tri-Lok* joints remain absolutely unimpaired up to, and beyond, the failure point of the material.

Light Weight—Owing to the fact that every ounce of *Tri-Lok* construction represents the effective full strength of the steel, lighter materials may be used than when connections are made by means of rivets, bolts or welds. Comparison of safe load tables will disclose this fact.

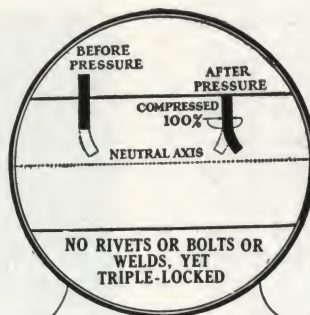
Tri-Lok is approximately 90% open, thereby transmitting most effectively light and air to areas above or beneath, at the same time assuring absolute cleanliness.

Standard anchors, or fastening devices, which seem best suited to the conditions, are furnished with each installation of *Tri-Lok*.

Due to the triple lock construction a continuous flooring is assured and installation costs are reduced approximately 50% over other types.

Economy—In addition to the lower installation cost, the simplicity of *Tri-Lok* construction and its tremendous strength per unit of weight permits the accomplishment of a desired result with *Tri-Lok* at less cost than usual.

Our Service Department will gladly supply detailed literature and engineering data.



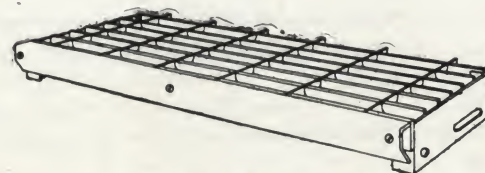
What a difference three locks make!

First, there is a right-twist lock in every other bar.

Second, there is a left-twist lock in alternate bars.

Third, there is the 1600-ton hydraulic pressure-lock, which is effected by pressing the cross bars into the two twist-locks.

Time nor wear can not open the three locks of TRI-LOK.



Tri-Lok Safety Tread
Illustration C

Some Uses for Tri-Lok

(1) "Tri-Lok" Ventilated Steel Flooring for—Area gratings, sidewalk doors, manhole covers, heating radiator guards, heating and ventilating grilles, automobile and truck radiator guards, conveyor walkways, boiler room walkways and platforms, window guards, cooling floors, fire escape landings, theatre overhead walkways, flooring and walkways for power plants, pumping stations, waterworks, filtration and sewage disposal plants, chemical plants, oil refineries, foundries, cold storage plants, gas plants, etc. and sidewalk gratings for subways.

(2) "Tri-Lok" Concrete Armoring and Reinforcing for—Loading platforms, industrial floors, armories, stairs, roads and sidewalks.

(3) "Tri-Lok" Safety Treads for—Grain elevators, fire escapes, stairways in boiler rooms, power plants, pumping stations, waterworks, filtration and sewage plants, gas plants, etc., subway exits, street cars, railroad locomotives, freight and tank cars.

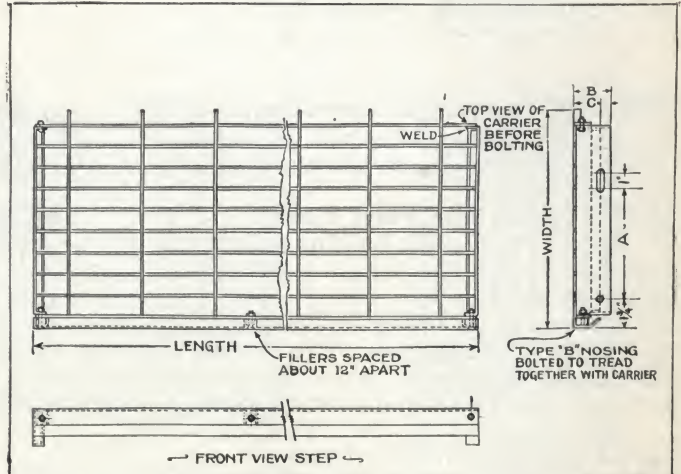
Some Users of Tri-Lok

United States Government for various departments
United States Steel Corp.
Delaware River Bridge Commission
N. Y. Board of Transportation for N. Y. Subway
Philadelphia & Reading R. R. Co.
West Virginia Pulp & Paper Co.
Consolidated Gas & Electric Co.
Union Light & Power Company
West Penn Power Co.
Dewey Portland Cement Company
Packard Motor Co.
Tidewater Oil Company
Aluminum Company of America
Essex Rubber Company
City of Cincinnati, Ohio
United States Gypsum Co.
Stone and Webster, Inc.
Dwight P. Robinson & Co.
Ford Motor Company
General Motors Corp.
The Toledo Furnace Co.
A. E. Staley Company
Pittsburgh Coal Company
Electric Bond and Share Co.
Phoenix Utility Co.

Standard Tri-Lok Safety Steps

The table of standard sizes as shown below, covers safety steps carried in stock for prompt shipment. Architects, engineers and designers are coming to realize the advantages in detailing their structures to conform with these standards as their building operations may be more effectively carried forward by the prompt service which can in this way, be given.

The cleanliness and simplicity of these safety steps may be seen from a study of illustration "C."



DIMENSIONS TYPE T3B "TRI-LOK" SAFETY STEPS

G 1								G 1 1/4							
Bearing bars, 1" x 3/8" x 1 1/8" C to C								Bearing bars 1 1/4" x 3/8" x 1 1/8" C to C							
Cross bars, 1/2" x 1/8" x 4" C to C								Cross bars, 5/8" x 1/8" x 4" C to C							
Width	Length							Width	Length						
							A B C								
6	1' 7"	1' 10 1/2"	2' 2"	2' 5 1/2"	3' 0 1/2"	3' 1 1/2"	1 1/2 2 1/2 1 1/2	8 1/2	3' 7 1/2"	3' 11"	4' 6"	3 1/2	2 3/4	1 3/4	
8 1/2	1' 7"	1' 10 1/2"	2' 2"	2' 5 1/2"	3' 0 1/2"	3' 1 1/2"	4 2 1/2 1 1/2	11 1/2	3' 7 1/2"	3' 11"	4' 6"	5 2 3/4	1 3/4		
9 1/2	1' 7"	1' 10 1/2"	2' 2"	2' 5 1/2"	3' 0 1/2"	3' 1 1/2"	5 2 1/2 1 1/2	12 1/2	3' 7 1/2"	3' 11"	4' 6"	5 2 3/4	1 3/4		
11	1' 7"	1' 10 1/2"	2' 2"	2' 5 1/2"	3' 0 1/2"	3' 1 1/2"	6 2 1/2 1 1/2								

SAFE LOAD TABLES

Based on Actual Tests Conducted at University of Pittsburgh

TYPE "G"				SPANS															
Bearing bars 1" apart cross bars 4" c. to c.																			
Mark	Bearing bars	Cross bars	Weight per sq. ft. lb.		1' 6"	2' 0"	2' 6"	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"	6' 0"	7' 0"	8' 0"	9' 0"	10' 0"		
G 3/4 AB	3/4" x 1 1/8"	3/8" x #14G	3.5	L	.778	.428	.281	.194	.143	.109	.87								
				C	.000064	.000207	.000492	.001027	.002487	.003248	.005152								
G 1 A	1" x 1 1/8"	1/2" x 1 1/8"	5.53	L	.1380	.777	.497	.346	.254	.194	.154	.124	.86						
				C	.000041	.000085	.000208	.000432	.000832	.001374	.002182	.003347	.006949						
G 1	1" x 1 1/8"	1/2" x 1 1/8"	7.00	L	.1557	.1167	.746	.518	.381	.292	.231	.186	.130						
				C	.000024	.000057	.000139	.000283	.000534	.000909	.001455	.002231	.004597						
G 1 1/4	1 1/4" x 1 1/8"	5/8" x 1 1/8"	8.61	L	.3239	.1822	.1168	.809	.596	.456	.360	.292	.203	.149					
				C	.000009	.000029	.000072	.000148	.000273	.000466	.000747	.001137	.002355	.004367					
G 1 1/2	1 1/2" x 1 1/8"	5/8" x 1 1/8"	10.41	L	.4660	.2625	.1680	.1167	.857	.656	.519	.420	.292	.214	.164				
				C	.000005	.000017	.000041	.000085	.000158	.00027	.000431	.000658	.001364	.002534	.004318				
G 1 3/4	1 3/4" x 1 1/8"	3/4" x 1 1/8"	12.12	L	.6355	.3580	.2256	.1590	.1170	.895	.707	.572	.398	.292	.224	.177	.143		
				C	.0000106	.000026	.000054	.000099	.000166	.000272	.000415	.000658	.001598	.003159	.004345	.006643			
G 2	2" x 1 1/8"	7/8" x 1 1/8"	13.95	L	.8300	.4666	.2987	.2079	.1525	.1176	.924	.748	.519	.381	.292	.231	.187		
				C	.0000073	.000017	.000042	.000072	.000113	.000182	.000277	.000415	.000658	.001068	.001821	.002910	.004432		
G 2 1/4	2 1/4" x 1 1/8"	1" x 1 1/8"	15.61	L	.10500	.5910	.3780	.2625	.1930	.1478	.1167	.945	.656	.482	.369	.292	.236		
				C	.0000038	.000012	.000038	.000072	.000113	.000182	.000277	.000415	.000658	.001068	.001821	.002910	.004432		

L—Safe load in lbs. per sq. ft. C—Deflection constant.

To obtain the deflection of any span, multiply the safe load figure by the deflection constant ($L \times C = \text{Deflection}$). We do not recommend spans greater than those shown on the left of the heavy line in the table.

Type "GS"—Bearing bars 1" apart; cross bars 2 1/8" c. to c.

Mark "GS" 2 1/4 approved by Board of Transportation City of New York for Subways. Safe loads same as Type "G"

Type "GO"—Bearing bars 1 1/8" apart; cross bars 1 1/8" c. to c. Safe loads same as Type "G"

For use where 1" square spacing is desired.

Other Types of Tri-Lok

Type "K"—Bearing bars 3/4" apart; cross bars 4" c. to c.

Type "KS"—Bearing bars 3/4" apart; cross bars 2 1/8" c. to c.

Type "KQ"—Bearing bars 3/4" apart; cross bars 7/8" c. to c. Gives 3/4" square spacing.

For safe loads multiply Type "G" loads by 1.28.

Type "H"—Bearing bars 1 1/4" apart; cross bars 4" c. to c.

Type "HS"—Bearing bars 1 1/4" apart; cross bars 2 1/8" c. to c.

Type "HQ"—Bearing bars 1 1/4" apart; cross bars 1 3/8" c. to c. Gives 1 1/4" square spacing.

For safe loads multiply Type "G" loads by .83.

Type "L"—Bearing bars 1 1/2" apart; cross bars 4" c. to c.

Type "LS"—Bearing bars 1 1/2" apart; cross bars 2 1/8" c. to c.

Type "LQ"—Bearing bars 1 1/2" apart; cross bars 1 1/8" c. to c. For safe loads multiply Type "G" loads by .71.

For Car Steps and Running Boards

Type "F"—Bearing bars 5/8" apart; cross bars 4" c. to c.

Type "FS"—Bearing bars 5/8" apart; cross bars 2 1/8" c. to c.

Type "FQ"—Bearing bars 5/8" apart; cross bars 3/4" c. to c.

For safe loads multiply Type "G" loads by 1.42.

Especially for Concrete Armoring

Type "G"—Bearing bars 2 3/8" apart; cross bars 4" c. to c.

Type "CS"—Bearing bars 2 3/8" apart; cross bars 2 1/8" c. to c.

Type "CO"—Bearing bars 2 3/8" apart; cross bars 2 1/8" c. to c.

For safe loads multiply Type "G" loads by .46.

ALAN WOOD IRON AND STEEL CO.

Rolled Steel Floor Plates, Pig Iron, Billets, Blooms, Slabs, Sheared Steel Plates and Blue Annealed Sheets

GENERAL OFFICES

Widener Building, PHILADELPHIA, PA.

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DALLAS, TEX., Santa Fe Building
SEATTLE, WASH., Dexter Horton Building

1826—101 Years of Quality and Service—1927

"A.W." quality and service have, for over a century, been continuously known to the trade.

"A.W." Rolled Steel Floor Plates

Rolled from open hearth steel especially suited for this purpose, in our own plants, from raw material to finished product. They combine neatness, attractive appearance and strength with a patterned surface designed to prevent slipping. The beveled edges on the raised oval diamond and ribbed pattern assures *firm foothold without cutting*. They are self-draining and cleaning.

Manufactured in Two Patterns—"A.W." Diamond and "A.W." Ribbed pattern.

Either pattern can be matched at any time—they are always uniform.



A Permanent Flooring and a Secure Foothold—"A.W." floor plates, unlike cast iron, will withstand the roughest usage without breaking.

Note: Graphic chart of deflections and safe loads in comparison with cast iron on request.

A Few Principal Uses—Although "A.W." floor plates are used for all industrial and construction purposes generally, a few specific uses are:

Public buildings, schools, depots, theaters, hotels.
Sidewalk doors, manhole covers, trench and duct covers.
Traffic treads for bridge floors and railroad crossings.
Engine room floors, charging floors.
Power plants, gas works, ships, cars.
Trucks, stairways, fire escapes.
Locomotive running boards; aprons and bumper plates; steps.

SIZES AND WEIGHTS OF "A.W." DIAMOND PATTERN FLOOR PLATES

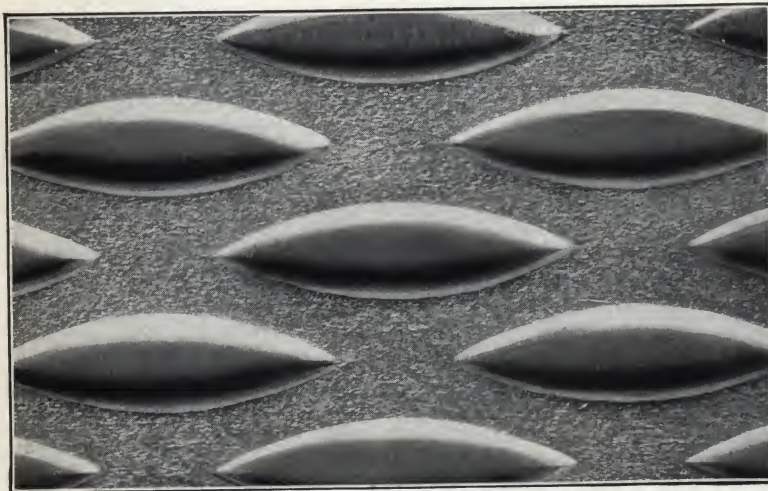
*Thick- ness, in.	Width, in.												†Wgts. per sq.ft. in lb.
	20	24	30	36	40	44	48	52	56	60	66	72	
	Length, in ft.												
1/8	20	20	20	20	20	20	20	20	20	20	...	...	7.75
3/16	25	25	25	25	25	25	25	25	25	25	...	...	8.75
1/4	25	25	25	25	25	25	25	25	25	25	20	...	11.25
5/16	25	25	25	25	25	25	25	25	25	25	25	20	13.75
3/8	25	25	25	25	25	25	25	25	25	25	25	20	16.25
1/2	25	25	25	25	25	25	25	25	25	25	25	20	21.5
5/8	25	25	25	25	25	25	25	25	25	25	25	20	26.5
3/4	25	25	25	25	25	25	25	25	25	25	25	20	31.75

*Thickness is measured through body of plate, i.e., exclusive of pattern.

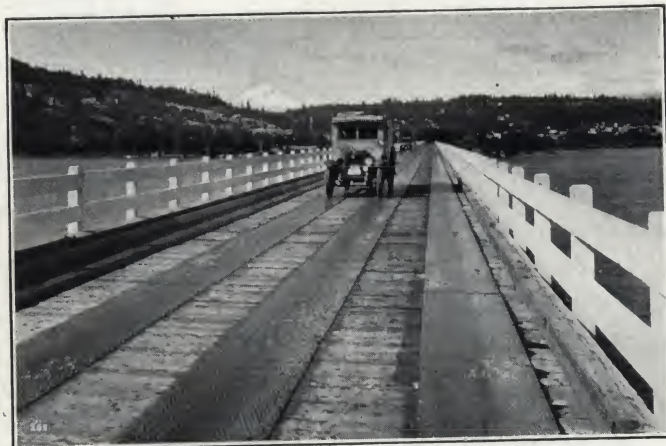
†Weights are approximate only and may vary according to the size of the plate.

"A.W." RIBBED PATTERN FLOOR PLATES

Can be furnished in
Thickness, 1/8" to 3/4" | Widths, up to 48" | Lengths, up to 120'



"A.W." Diamond Pattern Floor Plate
Actual size



"A.W." Diamond Pattern Rolled Steel Traffic Treads Eliminate Replanking of Wooden Floor Bridges

Approved by engineers. Provide an easy driving surface, reduce vibration to a minimum and prevent nails and spikes from working up through the floors. They make an exceptionally neat appearance and are economical

BARNES WIRE FENCE CO.

Ornamental Iron and Wire Work and Wire Signs

10371 Northlawn Avenue

DETROIT, MICH.

Products

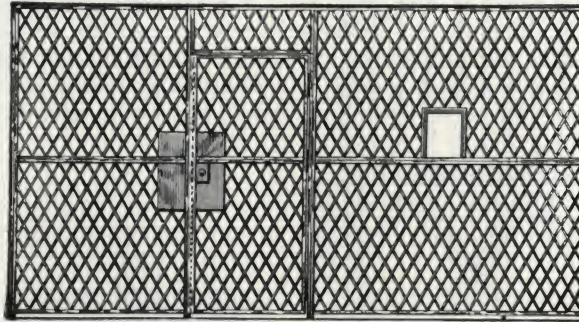
FENCES (Wire and Iron) for all purposes: FOLDING, SLIDING and SWING GATES; WIRE PARTITIONS:

IRON PORCH RAILINGS: WIRE and IRON WINDOW GUARDS.

Also Waste Paper Consumers.

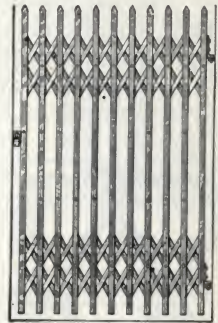


No. 31 Wrought Iron Bar Gate



No. 40 Wire Factory Partition

Made of round steel wire crimped and interwoven (varies from 1 to 2 in.) diamond mesh with channel iron frame. Black finish



No. 50 Wrought Iron Folding Gate

Made of flat iron usually $\frac{5}{8}$ in. x $\frac{1}{2}$ in.

No. 10 Wire Guard with Round Frame

No. 10 guard is particularly suitable for school windows or for basement and bulkhead windows. It is usually secured to wood frame with staples and to steel sash with "J" bolts



No. 12 Wire Guard with Channel Frame

No. 12 guard is particularly suited for installation where heavy construction is desired, such as store and factory windows. It is secured to wood frame with wood screws, and to brick jamb with expansion bolts

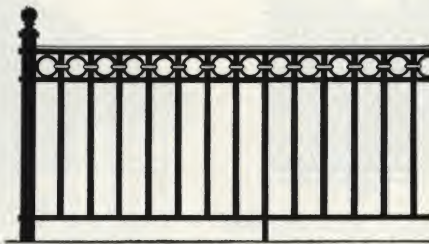


No. 30 Wrought Iron Guard

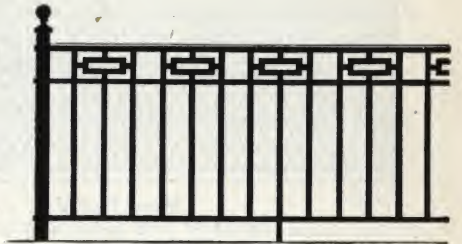
No. 30 is particularly applicable where maximum protection is desired, such as in bank, store or factory windows. It is usually anchored in masonry when building is under construction. It is generally secured to brick jamb with expansion bolts. No. 30 is usually made of $\frac{5}{8}$ -in. round upright iron bars spaced $3\frac{1}{2}$ in. apart



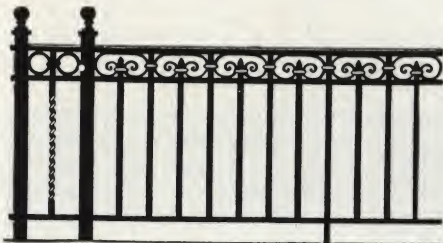
No. 24 Iron Porch Rail



No. 2 Iron Porch Rail



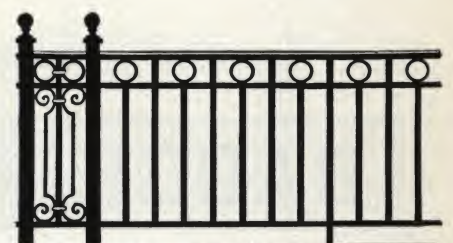
No. 5 Iron Porch Rail



No. 19 Iron Porch Rail



No. 20 Iron Porch Rail



No. 21 Iron Porch Rail

Barnes Iron Porch Railings

These railings are usually made of $\frac{1}{2}$ -in. square bars spaced 4 in. apart with channel iron rails and half oval cover bar. Height, 26 in. Other designs offered upon application

BADGER WIRE & IRON WORKS

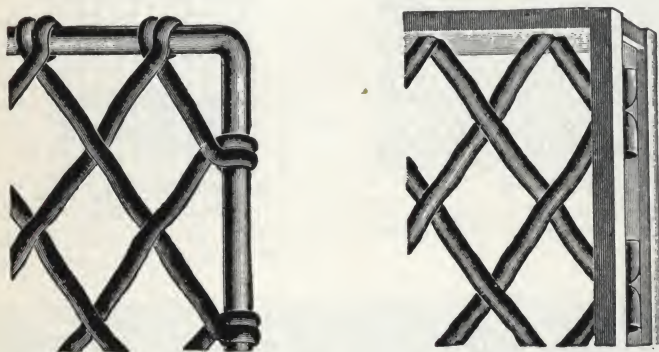
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MILWAUKEE, WIS.

Products

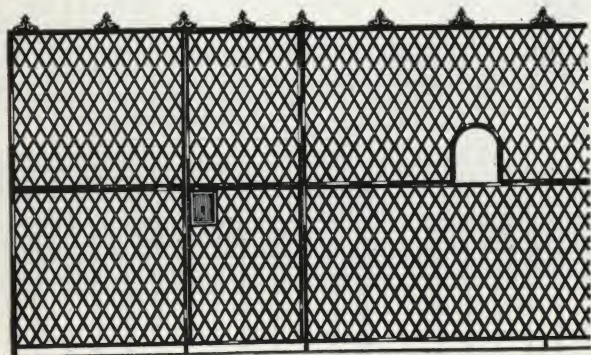
ORNAMENTAL IRON AND WIRE WORK:

Window Guards, Wire Partitions, Railings, Tool Room Enclosures, Fences, Grilles, Panels, Wire Signs, Skylight Guards, Iron Gratings, Folding Gates, Balcony Railings, Sidewalk Doors, Marquises, Fire Escapes, Iron Stairs, Elevator Enclosures, Fireproof Stairway Enclosures, Entrance Gates, Flagpoles and Lawn Furniture.



Wire Window Guards

A particular specialty is made of the manufacture of wire window guards and these can be furnished at minimum prices. Inquiries should specify quantities and sizes, as well as gauge of wire, size of mesh and style of frame



Wire Partition

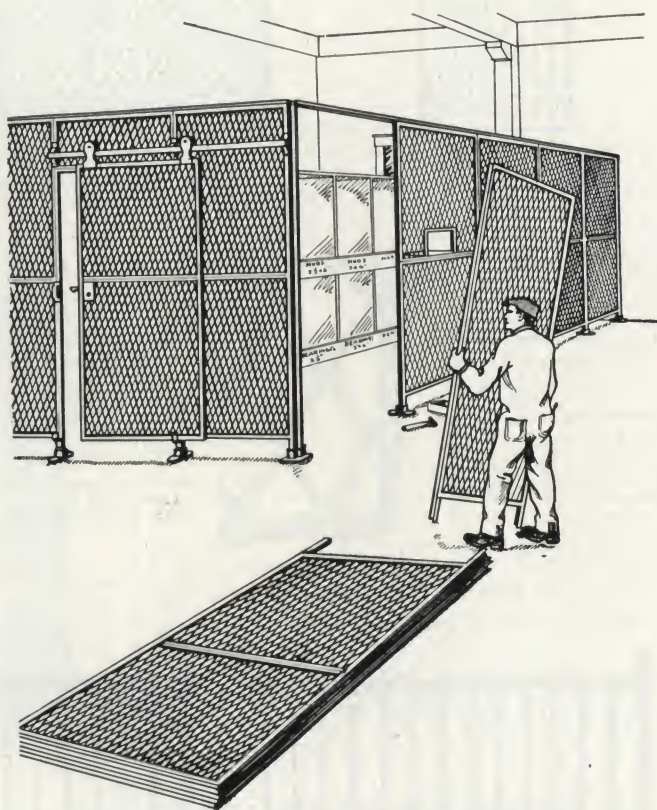
Used extensively where it is desirable to enclose a space effectively without obstructing the light.

Generally made of No. 10 wire, 1½-in. diamond mesh, 1x½x½-in. channel frames; cover bar and cast pickets at top as shown

Service

Ornamental iron and wire work according to design to be submitted, or this Company will furnish details of their standard construction. Inquiries will be given prompt and careful attention.

BADGER WIRE & IRON WORKS own and operate a new plant, where, with ample space and facilities, they will be able to give prompt and satisfactory service.



Standard Sectional Wire Partitions

Principally for tool and stock room enclosures. Interchangeable, so that re-arrangement is possible without drilling or fitting. Standard partitions are made 4x7, 5x7, 4x8, and 5x8 ft. They are made of No. 10 wire, 1½-in. diamond mesh, 1x½x½-in. channel frames, horizontal bar through center, 1½-in. channel cover bar at top; swinging or sliding doors; also service windows, equipped with necessary hardware

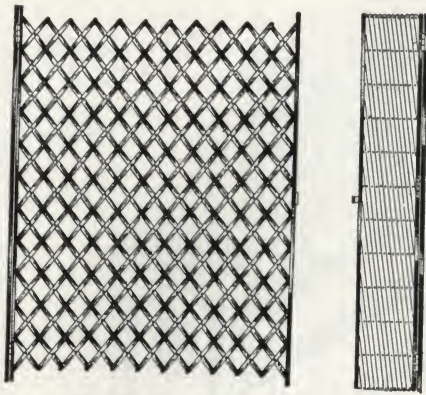
BADGER WIRE & IRON WORKS

Wire Sign

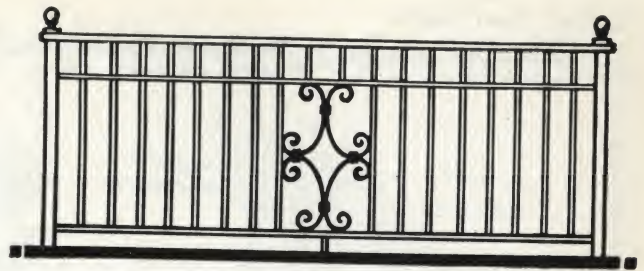
A specialty is made of the manufacture of wire signs and BADGER WIRE & IRON WORKS have furnished some of the largest in use. In writing for price state length, height and lettering wanted, also the position of the sign so that the proper bracing may be figured. Complete specifications will be submitted in quoting

Folding Gates

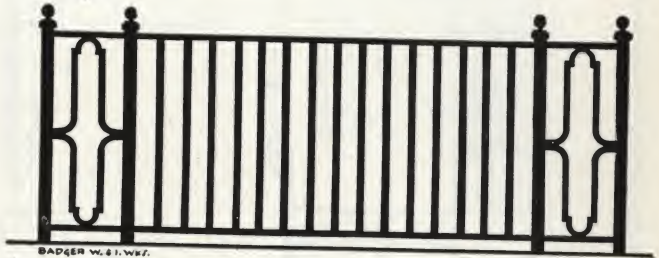
Below are shown three styles of our folding gates.



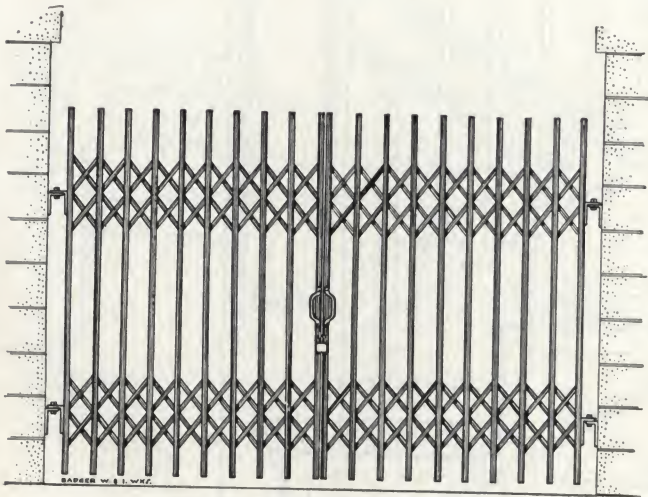
No. 25 Single Folding Gate



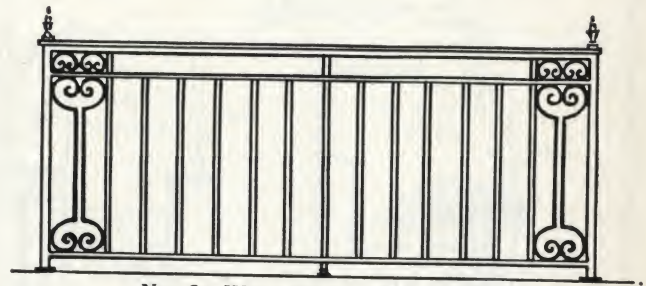
No. 65 Wrought Iron Balcony Rail



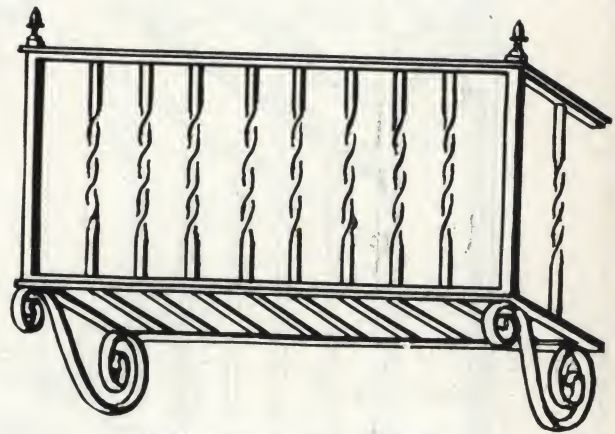
No. 66 Wrought Iron Balcony Rail with Cast Ornaments



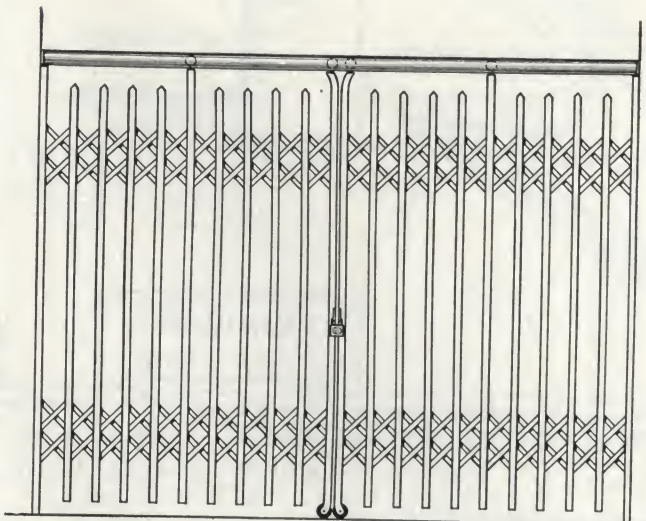
No. 27 Double Folding Gate



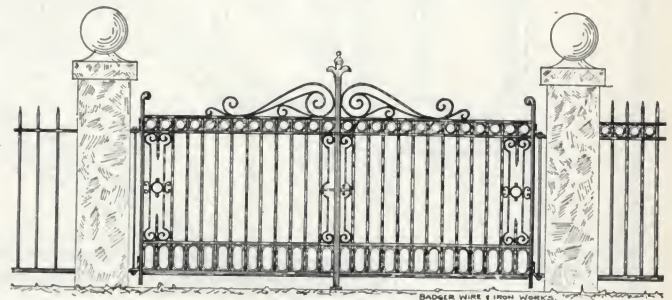
No. 67 Wrought Iron Balcony Rail



No. 68 Balcony and Railing



No. 28 Double Folding Gate with Overhead Track



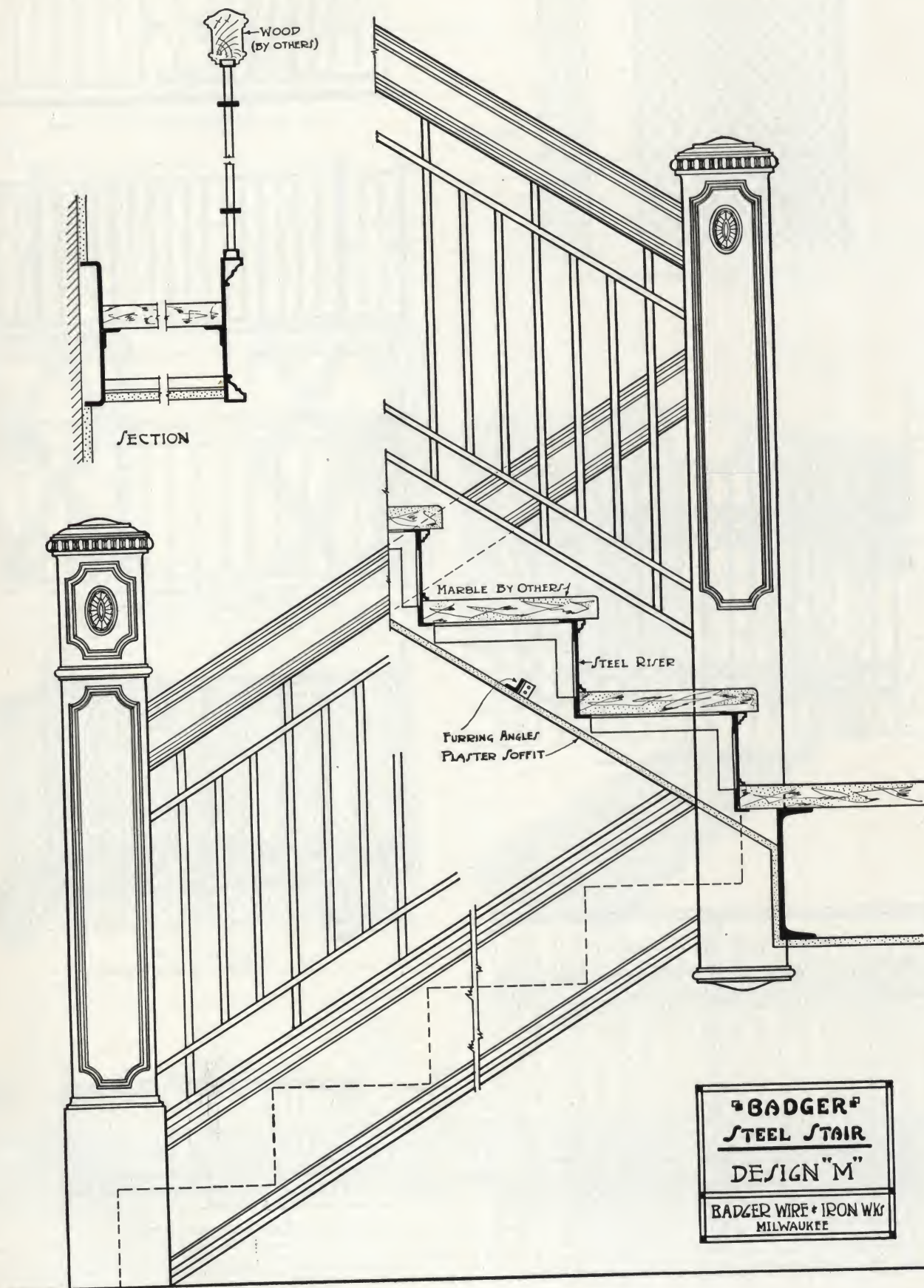
Iron Gate and Fence

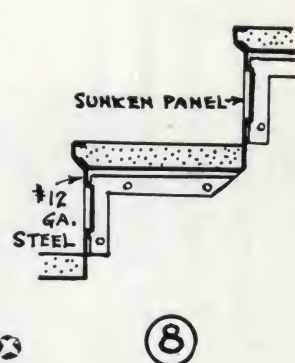
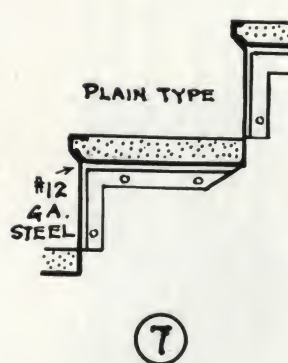
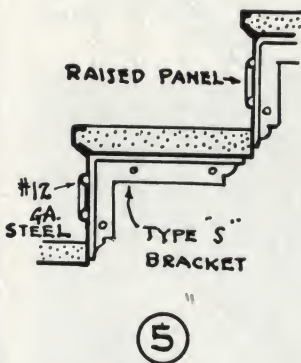
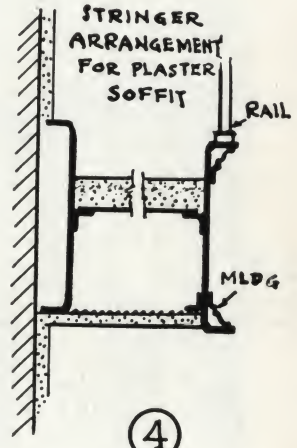
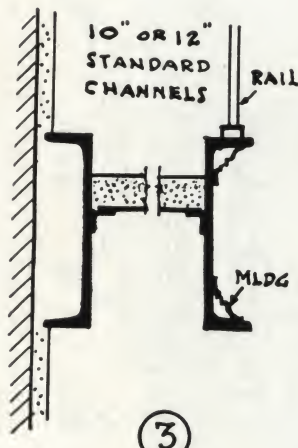
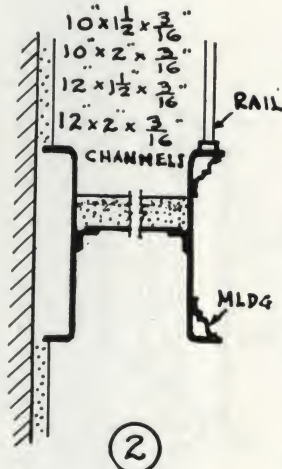
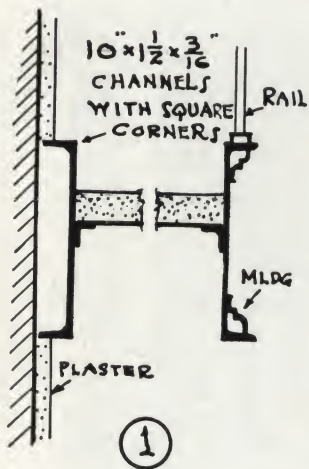
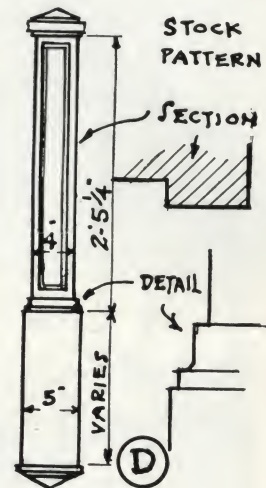
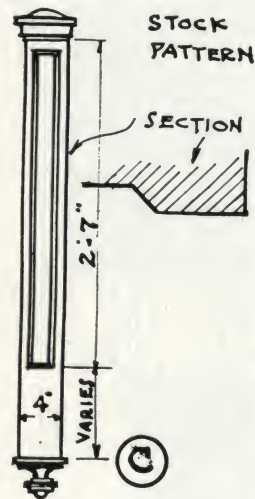
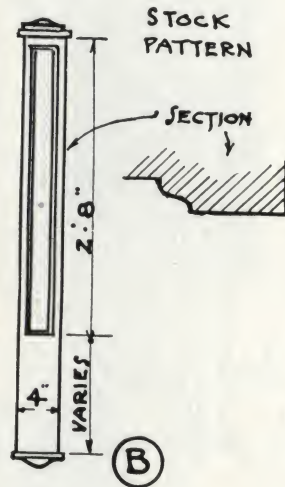
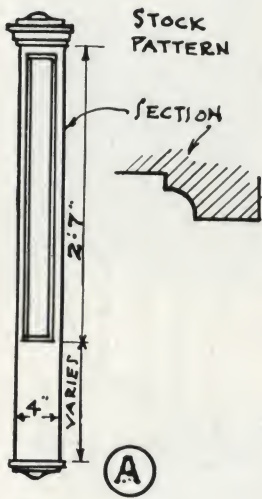
In this department exceptionally good service is given, and low prices consistent with the quality of the product are quoted.
Catalogue showing a number of styles will be sent on application.
Special designs furnished

Badger Steel Stairs

Design "M" is one of the recent installations by the BADGER WIRE & IRON WORKS. A great variety of

other types have been fabricated. Details of any will be furnished on request.

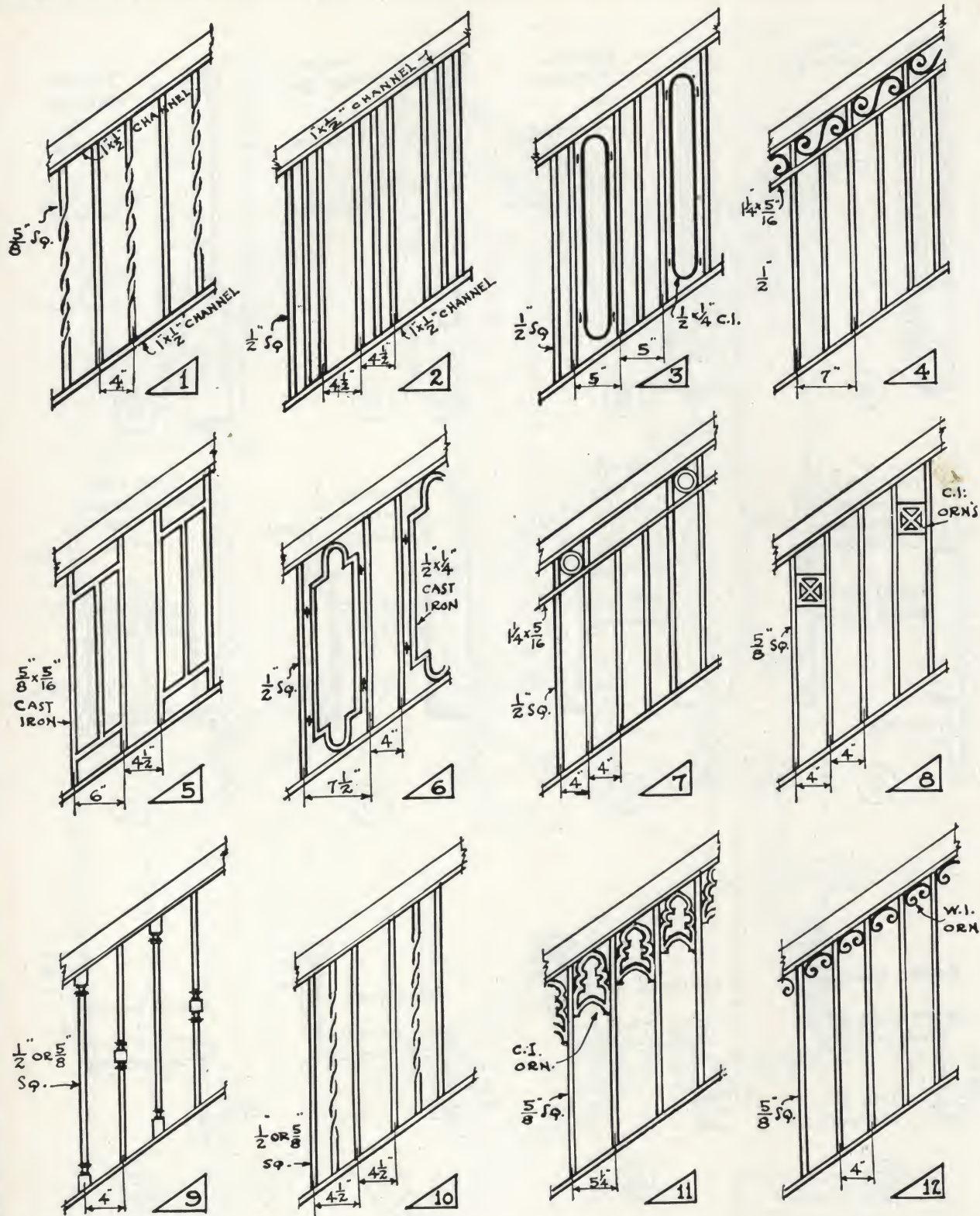




BADGER
WIRE & IRON
WORKS

NEWELS • STRINGERS & RISERS

MILWAUKEE
WIS.



'BADGER
WIRE & IRON
WORKS'

~ RAILING · DESIGNS ~

MILWAUKEE
WIS.



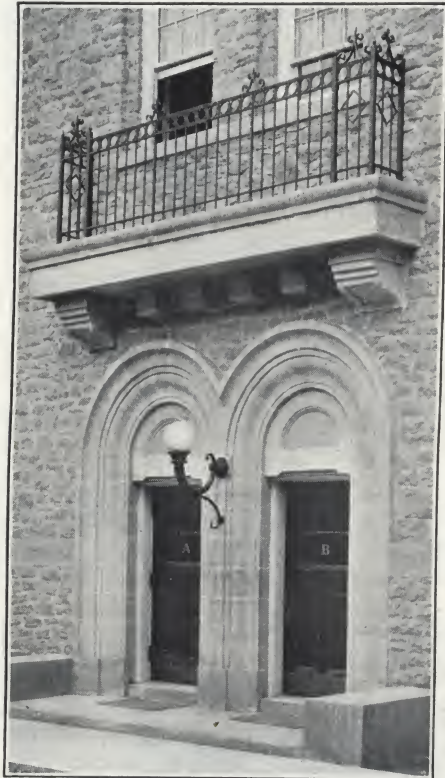
Window Guards, Coakley Bros. Warehouse, Milwaukee, Wis.
GEO. S. KINGSLEY, Architect



Interior, Berger Furniture Co., Milwaukee, Wis.
KIRCHHOFF & ROSE, Architects



Door Grille, Coakley Bros. Warehouse, Milwaukee, Wis.
GEO. S. KINGSLEY, Architect



Balcony Rail, University of Wisconsin, Madison, Wis.
ARTHUR PEABODY, State Architect



Stairway to Apartments, Piper Building, Madison, Wis.
BALCH & LIPPERT, Architects



Balustrade Railings, Gordon Osborne Residence, Sheboygan, Wis.
W. C. WEEKS, Architect

Examples of Ornamental Wrought Iron Installations

ESTABLISHED 1883

THE COLUMBUS WIRE & IRON WORKS CO.

Ornamental and Architectural Wire and Iron Work

MAIN OFFICE AND PLANT
Poplar and Michigan Avenues
COLUMBUS, OHIO

Products

ORNAMENTAL and MISCELLANEOUS IRON and WIRE WORK: including Stair, Balcony and Porch Railings; Grilles; Wire and Iron Window Guards; Entrance Doors and Gates; Steel Folding Gates; Bank Screens; Spiral Stairs; Fire Escapes; Pipe Railings; Area Gratings; Columbus Standard Wire Partitions; Wire Signs; Skylight Guards; Cold Air Screens; Flagpoles, Flag Stands; and many other Light Steel and Wire Products.

We are craftsmen in wrought iron.

Facilities

We will gladly submit designs and specifications for special work. We also furnish estimates on architects' plans and specifications, giving complete estimate on all work required for entire building as covered by ornamental iron specifications.

Our plant covers 22,000 sq. ft. of floor space and is equipped with best of modern metal working machinery. We employ mechanics of long experience.

Wrought Iron Railings from Stock

Send for circular showing railings, panels and posts which we can furnish from stock at prices more reasonable than many designs in wood.

Specify iron rails for porches on residences and apartments. They are neat and durable, and easy to erect.

Additional Plates of Stock Designs

For additional plates of our stock designs, refer to your files under "Ornamental Iron and Wire Work," A.I.A.-15d.



STOCK DESIGNS~RAILINGS	
<p>R-2000</p>	<p>SPECIFICATIONS. POST-1" x 1" SQUARE #3 TOP RAIL-1" x 1/2" CHANNEL CAPPING-1/4" x 1/2" FLAT BARS-3/8" x 1/2" SQUARE 4" O.C. BOTTOM-1" x 1/2" CHANNEL</p>
<p>R-2001</p>	<p>SPECIFICATIONS. POST-1/2" x 1/2" SQUARE #1 TOP RAIL-1" x 1/2" FLAT BARS-3/8" x 1/2" SQUARE 7" O.C. BOTTOM-1" x 1/2" FLAT</p>
<p>R-2002</p>	<p>SPECIFICATIONS. POST-1" x 1" SQUARE #3 TOP RAIL-1" x 1/2" CHANNEL CAPPING-1/4" x 1/2" FLAT INTERMEDIATE RAIL-1" x 1/2" FLAT BARS-3/8" x 1/2" SQUARE 4" O.C. BOTTOM RAIL-1" x 1/2" CHANNEL</p>
<p>PLATE</p>	<p>MANUFACTURED BY THE COLUMBUS WIRE & IRON WORKS CO. COLUMBUS OHIO</p> <p>403</p>

STOCK DESIGNS~RAILING PANELS	
<p>PANEL-A-SHOWN IN RAIL</p>	
<p>PANEL-B-</p>	<p>PANEL-C</p>
<p>PANEL-D-</p>	<p>PANEL-E-</p>
<p>PANEL-F-</p>	<p>PANEL-G-</p>
<p>PLATE</p>	<p>MANUFACTURED BY THE COLUMBUS WIRE & IRON WORKS CO. COLUMBUS OHIO</p> <p>402</p>

ESTABLISHED OVER 25 YEARS

L. E. JONES, Prop.

L. E. JONES WIRE & IRON WORKS

321 North Calvert Street
PLANT 318-322 DAVIS STREET
BALTIMORE, MD.

Products

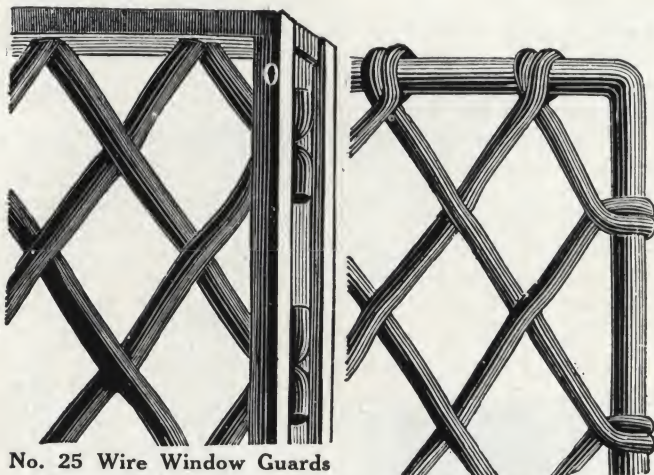
ORNAMENTAL IRON and WIRE WORK: including Window Guards, Elevator Enclosures, Grilles, Folding Gates, Elevator Cars, Sieves, Sand and Coal Screens, Machine Guards, Wire Partitions, Railings, Iron Gratings, Sidewalk Doors, Fire Escapes, Railings and Entrance Gates.

Also Fine Mesh Wire Cloth, Diamond Mesh Fabric, Galvanized Wire Mesh Cloth and Steel Stack Netting.

Facilities and Service

Our plant is fully equipped with facilities to handle any type of ornamental iron work. Our service is prompt and satisfactory.

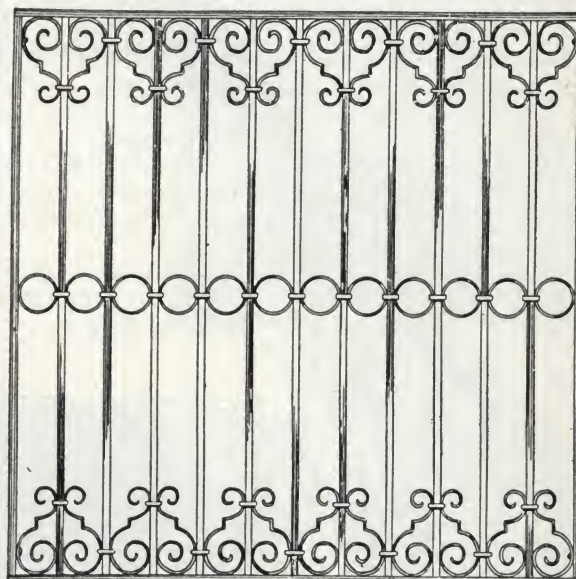
We are prepared to work up any special designs submitted to us or will be glad to offer our own suggestions when desired. Inquiries are given prompt and careful attention. We have a number of special catalogues covering the various types of work which will be sent on request.

**No. 25 Wire Window Guards**

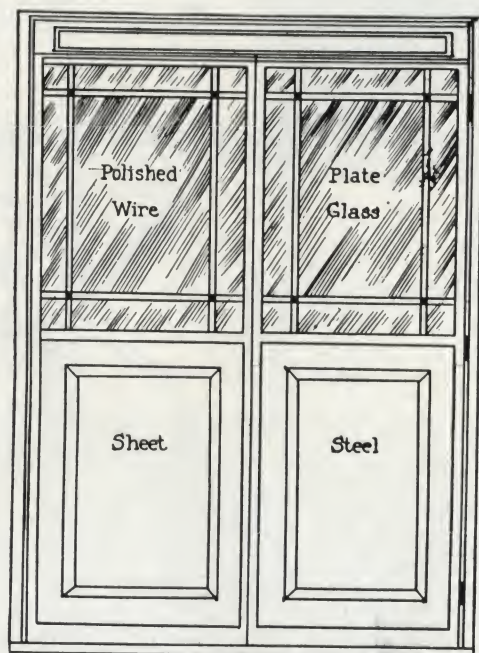
These guards are made with channel iron frames. They are strong and substantial, and made to screw in the window jamb, but can also be made to fasten to the outside of frame if so desired.

No. 26 Wire Window Guards

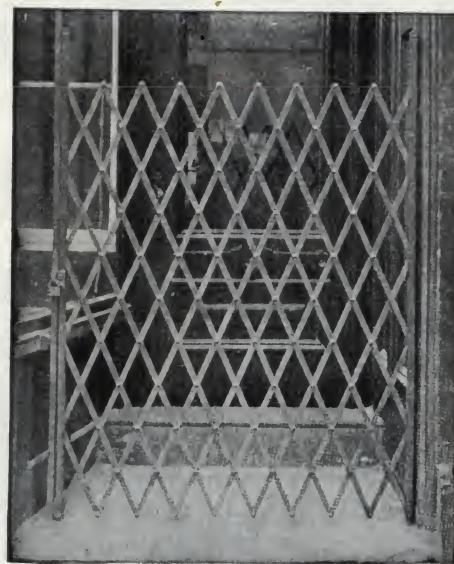
This type of inexpensive guard is usually fastened with staples, but they can be furnished with lugs for screw attachment if required.

**Bank and Office Grilles**

Made of iron, steel, brass, bronze and oxidized copper and in any finish. Plain flat grilles, with or without frames for sundry purposes to the more elaborate ornamental types for office, banks, etc. Made to designs submitted to us or specially designed to harmonize with other fixtures.

**Elevator Enclosures**

We make a specialty of all types of elevator enclosures and have equipped some of the largest office buildings in this field. Your inquiries for this class of work are solicited. A special catalogue will be sent on request.

**Folding Gates**

All types and sizes of folding gates. Can be made to fit any opening. For store, factory, elevators, passageways and office entrances, as well as for other miscellaneous uses.

TAYLOR & DEAN

PITTSBURGH IRON AND WIRE WORKS
(ESTABLISHED 1842)

Ornamental Iron and Bronze Work, Builders Iron Work, Bridge Railing

2418-2428 Penn Avenue at 25th Street

PITTSBURGH, PA.

Products

ORNAMENTAL IRON and BRONZE WORK, including Ornamental Grilles, Railings, Entrance Doors and Gates, Fencing, Stairs, Elevator Enclosures, Bank Screens; Spiral Stairs, Fire Escapes, Pipe Railings, Folding Gates; Iron and Bronze Lamps; Fire-proof Porches.

Also Wire Fencing, Partitions, Tennis Court Enclosures, Tool Room Enclosures, Window Guards, Machinery Guards, Gear Wheel Guards, etc.

Fire Escapes

TAYLOR & DEAN fabricate and erect approved fire escapes of all types.

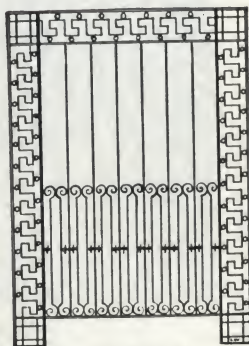
All work is guaranteed to meet the requirements of the law.



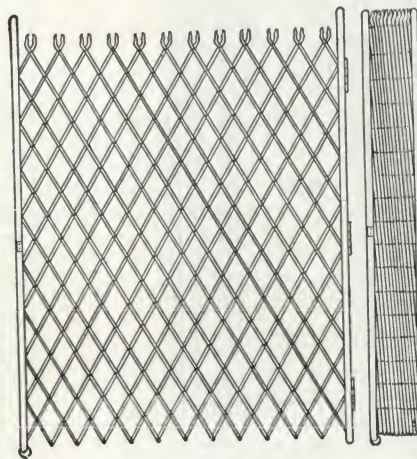
Fire Escape.



Ornamental Iron Gate and Lamps



Grille No. 43



Folding Gate

Other designs upon application

Spiral Stairways

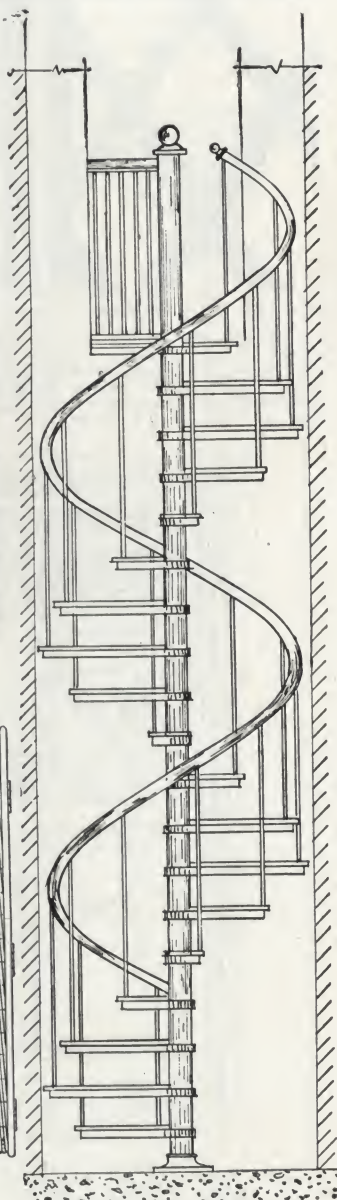
TAYLOR & DEAN spiral stairways are recommended for durability and economy of space and cost.

Experience and Facilities

TAYLOR & DEAN are extensive manufacturers, distributors and erectors of the above mentioned products. Eighty years' experience makes them well qualified to handle, in an expert manner, any work of this character.

Co-operative Service

An engineering department is maintained, which is at the service of the architect or owner for supplying complete information on design and uses of any TAYLOR & DEAN products. Estimates and information are freely given.



Spiral Stairway

VULCAN RAIL & CONSTRUCTION COMPANY

Manufacturers of Pipe Railings

MAIN OFFICE AND WORKS

Grand Street and Garrison Avenue, MASPETH, N. Y.

BRANCH OFFICE AND SHOPS: 39th Street and A. V. R. R., PITTSBURGH, PA.

Products

PIPE, STAIR, BRIDGE and BOARD-WALK RAILINGS; ANGLE RAILING FITTINGS; LAMP BRACKETS.

Also manufacturers of Picket Fencing, Steel Gratings, Walkways, Ladders and Stairs for boiler houses, etc., Special Pipe Bends, Racks for Fur Storage, Trunk Racks and Rug Racks, and anything special constructed with Pipe.

For Underwriters' Steel Fire Doors, see page A876.



TRADE-MARK



Standard Pipe Stair Rail

Facilities

Our main plant at Maspeth and branch shop at Pittsburgh are both fully equipped to manufacture our products, having railroad sidings and a trained force of skilled and experienced workmen, which assures prompt and efficient execution and shipment of all orders.

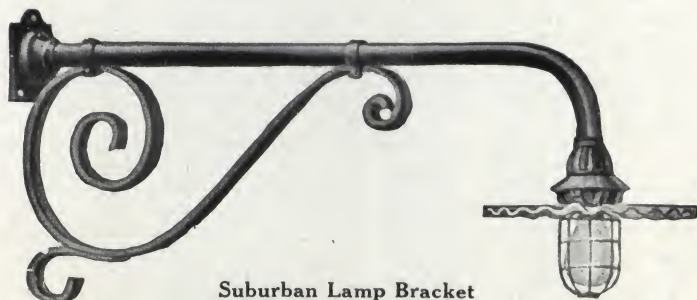
Service

We carry a large and complete stock of pipe rail fittings at both Maspeth and Pittsburgh. In addition to all of the regular rail fittings, we stock special angle malleable iron fittings for 1, 1¼, 1½ and 2-in. pipe for stairs, ramps and inclines.

Our pattern shops are modern and equipped to make up patterns for special fittings on short notice.

Specific Information

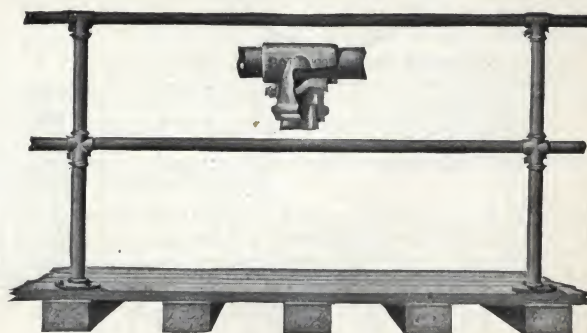
Complete information, including estimates and preliminary designs for any of the products illustrated below or listed under Products, will be promptly supplied on request. Catalogue sent on application.



Suburban Lamp Bracket



Angle Railing Fittings



Elevated Railroad Railing with "Vulcan" Malleable Iron Anti-rattle Fittings



Boardwalk Railing with Lamp Posts



Typical Bridge Railing

POTTER MANUFACTURING CORPORATION

Manufacturers of the Potter Tubular Fire Escape

107 West Washington Street
CHICAGO, ILL.

Product

The POTTER TUBULAR SLIDING TYPE FIRE ESCAPE—inspected by the Underwriters Laboratories, Inc. and listed as standard.

Description

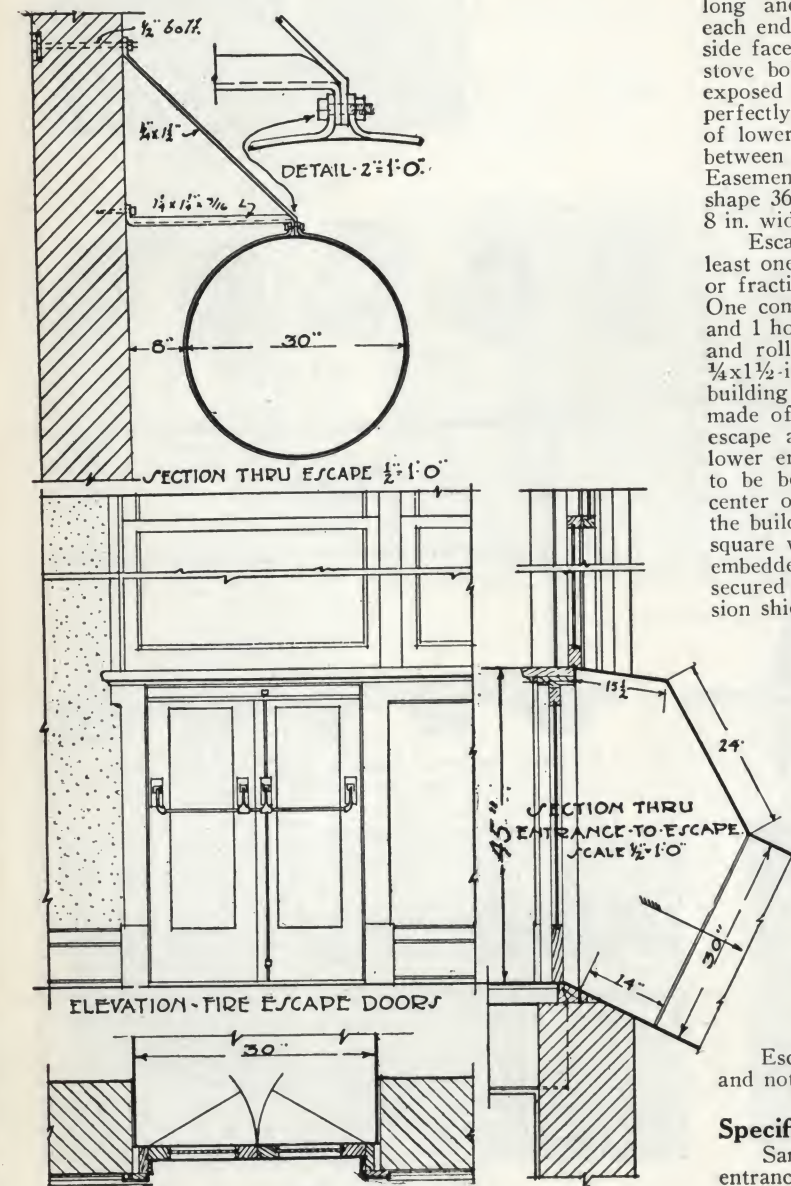
The Potter Tubular Fire Escape is designed especially for schools and hospitals. It consists of a copper-bearing galvanized sheet steel straight tube inclined about 30° to horizontal, with entrance from room through doors equipped with panic-bolt hardware and exit from horizontal section at ground level. Supporting brackets every three sections.

Advantages

It is safe, rapid, strong, durable and economical.

It can be entered direct from the schoolroom, thus permitting quicker exit.

There is no possibility of any one who uses it getting hurt. Slipping, falling, stumbling, pushing and confusion are all eliminated. Being enclosed, the occupants are fully protected from falling obstacles, flame, smoke, ice and snow.



Sizes

Made in two sizes—30 and 36 in. in diameter. The large size is recommended for hospitals as it will accommodate a patient on a mattress.

Specification School Type Size 30-inch Diameter

Construct all parts of fire escape out of 20-gauge copper-bearing G I metal. Entrance to escape to be 30 in. wide and 42 in. high, securely built into wall. Elbows to be 30-in. diameter with 8-in. sweep, except where elbow is placed more than 5 ft. from entrance in which case they shall have sweep of 18 in. All joints shall be double seamed. Sections shall be 30 in. in diameter, not more than 36 in. long and have an $1\frac{1}{4} \times \frac{1}{8}$ -in. angle iron band riveted to each end. Sections shall be joined together by bolting the outside faces of the angle iron bands together with fifteen $\frac{1}{4} \times 1$ -in. stove bolts. All rivets to have countersunk heads, and those exposed to the sliding surface to be soldered over and scraped perfectly smooth. Sheets of upper section to lap over sheet of lower section so that occupants slide with the lap. Joints between the sections to be filled with asbestos roofing cement. Easement or lower end to flare from 30-in. diameter to oval shape 36 high by 30 in. wide and rest on a concrete base 2 ft. 8 in. wide, 3 ft. 2 in. long and 16 in. high.

Escape shall be secured to the building with brackets. At least one set of brackets shall be used for every four sections or fraction thereof, exclusive of entrance, elbow and easement. One complete bracket shall consist of 1 band, 1 hanger brace, and 1 horizontal brace. Band to be made of $\frac{1}{4} \times 1\frac{1}{2}$ -in. flat bar, and rolled to 30-in. diameter. Hanger brace to be made of $\frac{1}{4} \times 1\frac{1}{2}$ -in. flat bar and extend from center of escape at top to building at an angle of about 45°. Horizontal brace to be made of $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$ -in. angle iron and extend from center of escape at top to building horizontally. Both ends of band, lower end of hanger brace and outer end of horizontal brace to be bolted together with $\frac{1}{2} \times 3$ -in. machine bolt at top and center of escape. Upper end of hanger brace to be secured to the building with a $\frac{1}{2}$ -in. bolt through the wall held by a 3-in. square washer on the inside. Head of bolt and washer to be embedded in the plaster. Inner end of horizontal brace to be secured to the building with a $\frac{3}{8} \times 3\frac{1}{2}$ -in. lag screw and expansion shield.

Entrance on inside of building to be closed with double doors 15 ft. wide, 42 ft. high, equipped with panic bolt and lock operated with push bars on each door. Doors to swing into entrance of escape. All casing and woodwork to match other woodwork of room in which entrance is located as to kind of wood, design and finish.

Finish shall include stain and one coat of varnish. A horizontal swing bar shall be placed near top of entrance just outside the doors for occupants to grasp with hands when entering escape. Swing bar to be made of $\frac{3}{4}$ -in. pipe and be securely fastened to entrance.

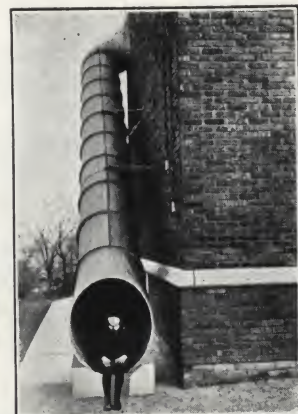
Escapes shall be painted one coat in factory and when installation has been completed they shall be painted a second coat. Color to match that of building.

All materials used in the manufacture and installation of fire escape shall be of the best grade and all work shall be done in a thorough and workmanlike manner, by skilled mechanics.

Escape shall be hung with a slope of not less than 26° and not over 40°.

Specification Hospital Type Size 36-Inch Diameter

Same as above except for diameter of tube and width of entrance.



ENTERPRISE IRON & WIRE FENCE CO.

Manufacturers of Fencing and Ornamental Iron

Yandes and 24th Streets
INDIANAPOLIS, IND.

Products

ENTERPRISE "EVER STRAIGHT" WROUGHT IRON FENCES.

HAND WROUGHT ORNAMENTAL ENTRANCE GATES.

WROUGHT IRON ENTRANCE DOORS and GRILLES.

WROUGHT IRON BALCONIES.

WINDOW GUARDS.

WROUGHT IRON STAIR RAILS and AREA GRATINGS.

Factory

The factory of this company is equipped with their patented "caulking machines" which permit the quick fabrication of standard and special designed fences. The workmen are experienced craftsmen in wrought iron work, also in fancy and intricate design.

Experience

Enterprise fences and gates have been in satisfactory use for over 45 years.



Construction

Wrought iron is used exclusively in the manufacture of Enterprise fences and gates. All fittings are the best grade cast and malleable iron. The gates and balconies are hand wrought and all joints are mortised and tenoned. The fence pickets are permanently locked in place by a patented pneumatic caulking machine.

All work is given a coat of black preservative paint before shipping and a second coat after erection.

Quotations and Estimates

Will be sent without charge. Please send a simple diagram showing size of plot, lengths of fence, location and widths of gates, also a profile sketch, if there is a grade greater than 5 per cent.

Erection and Installation

Can be made by this company or by one of its agents, or the fence and gates can be shipped with full instructions for erecting, with sufficient paint for the finish coat.

Blue Prints and Specifications

This company maintains its own *layout* and *design* department for the assistance of architects, and will be glad to co-operate in making unusual plans and designs.

AMERICAN FENCE CONSTRUCTION CO.

Iron Picket Fences—Chain Link Fences

TELEPHONE

CIRCLE 9847-8-9

221-225 West 57th Street

NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

Fences and Gates of Standard and Special Design

This company offers a wide and complete choice of designs in standardized fences and gates both of iron picket and chain link wire types. In addition, it is prepared to execute special-design fences and ornamental iron work from architect's designs. Some of our work of this kind is pictured here.

Iron picket fences, because of the infinite possibilities of ornamental design work, are standardized only in respect to the general use of certain "plain" picket fences of the designs detailed on the following page. Ornamental work, special gates, etc., are executed in infinite variety.



TRADE-MARK

Other Products

Tennis court enclosures, poultry and kennel runs, arbors and trellises, window guards, interior wire partitions and industrial property chain link fences.

Estimates and Service

Estimates on either fence materials or fences plus erection will be given, either by this office or local representatives throughout the Eastern, Central and Southern States. The fullest measure of co-operation is available. Information regarding standard practice in the size of members, dimensions of concrete footings and other such practical data is made available to any who will find it helpful.

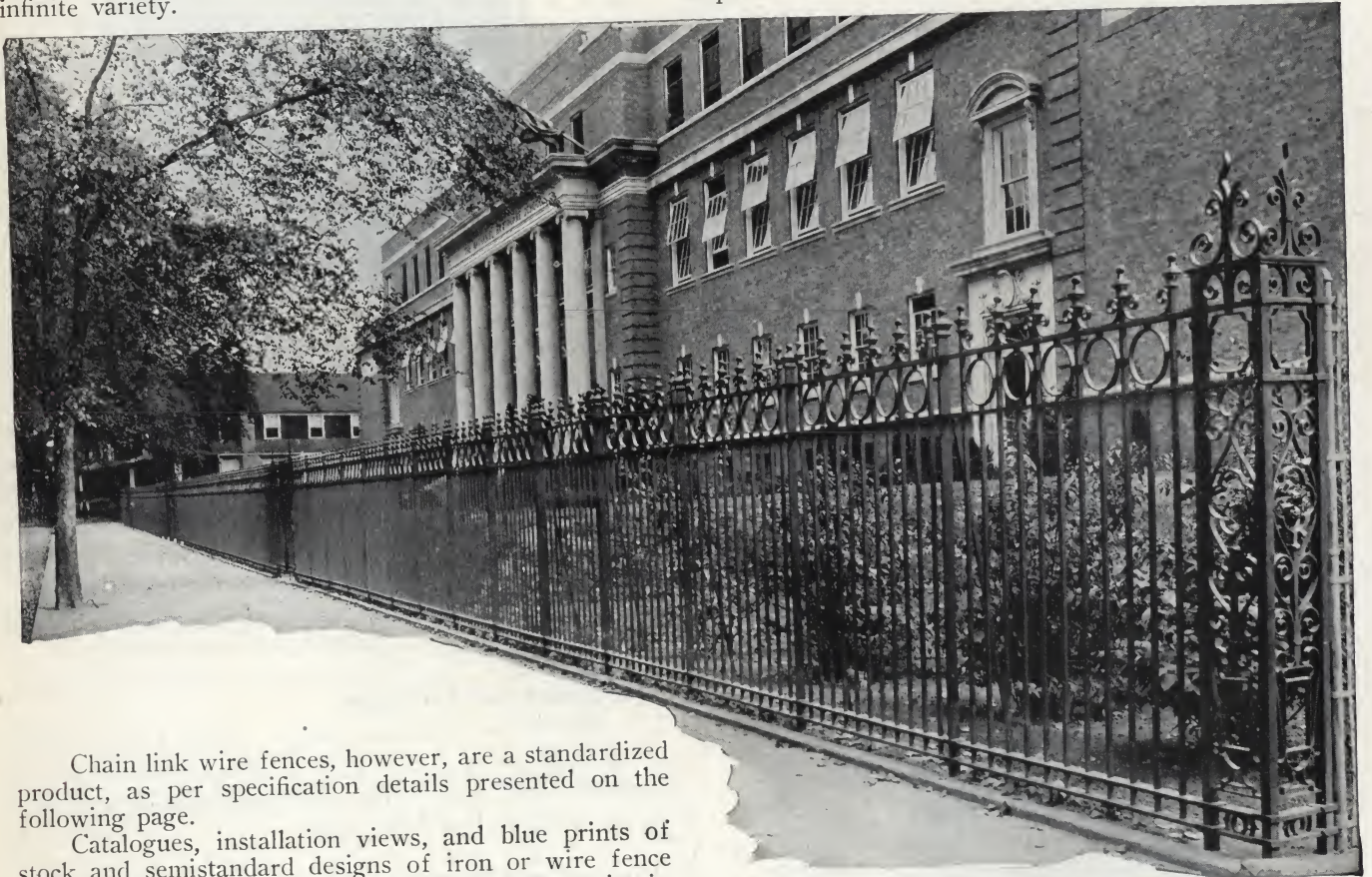


Fig. 1. Ornamental Iron Fence at the Nathaniel Hawthorne School, Yonkers, N. Y.
6 ft. high, with 3/4-in. pickets
G. HOWARD CHAMBERLINE, Architect



Fig. 2, Afco No. 54A Gate at Private Estate Entrance
Matches fence in detail Fig. 10



Fig. 3, Afco Chain Link Fence
7 ft. high, guarding a city reservoir



Fig. 4, Special Design Gate and 4-rail Iron Picket Fence
Note ornamental iron gate posts



Fig. 5, Ornamental Fence
6 ft. high, 1 in. sq. pickets.
An adaptation of the simple
design in detail of Fig. 8.
Special newel posts

Iron Picket Fences and Gates

The standard iron fences are built in varied sizes of pickets, proportionate to specified heights and the duty intended.

Standard designs can be given simple ornamentation to harmonize with the fence's architectural background, such as the row of rings in detail Fig. 10.

Special design work originates with the architect, often with the co-operation of our organization in so far as the specification is prepared to enable the utilization of members in sizes readily available.

Detail Fig. 8	Detail Fig. 9	Detail Fig. 10	Size pickets, in. square	Channel rail size, in.	Height, ft.
No. 150A	No. 107A	No. 154A	5/8	1 1/2 x 1/2	3, 3 1/2, 4, 4 1/2, 5,
151A	108A	155A	3/4	2 x 5/8	3, 3 1/2, 4, 4 1/2, 5, 6
152A	109A	.....	7/8	2 x 3/4	3, 3 1/2, 4, 4 1/2, 5, 6

Pickets spaced on 5-in. centers.

Afco Chain Link Fences

Standardized fences in heights from 3 1/2 to 10 ft., for the varied requirements of homes, estates, institutions, schools and playgrounds, etc. All are built with Afco Chain Link Fabric of rust-resisting copper-bearing steel wire, galvanized after weaving by a special hot dip process.

Guardian Fence—A medium weight structure for general use either without or with (as Style 913) barb-wire overhang.

Specification—End, corner and gate posts 2 1/2 in.; line posts 2 in.; top rail 1 1/8 in.; all outside diameter measurement, standard weight galvanized pipe. Fabric 2-in. mesh chain link of No. 6 or 9 copper-bearing steel wire. Heights, 4, 5 and 6 ft.



Fig. 7, Afco No. 107A Fence and Matching Double Walk Gates



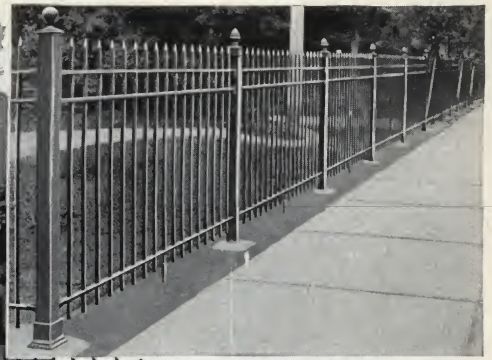
**Fig. 8, Detail of
No. 151A Fence**
3-in. I-beam post,
pineapple top



**Fig. 9, Detail No.
107A Fence**
1-in. square posts
with back brace and
ornamental top



**Fig. 10, Detail No.
153A Fence**
No. 16B posts,
2-in. square. Ball top



5 1/2 ft. high
**Fig. 6, Afco 151A Fence
Surrounding a Church
Property**
See table for specifications

Set with drive anchors, or in concrete post footings.

Style 913—Same as above but with 3 strands thickset barb-wire on post arms.

Bulwark Fence—A heavy weight standard for schools, institutions or extra high fences.

Specification—End, corner and gate posts 3 in.; line posts 2 1/2 in.; top rail 1 1/8 in.; all outside diameter standard weight galvanized pipe. Fabric 2-in. mesh chain link of No. 6 or 9 copper-bearing steel wire. Heights 5 to 10 ft. Set in concrete footings 36 in. deep.

Single and Double Gates

Are of rigid frame construction, being built of tubular members welded at all joints. Standard sizes for either fence, to meet all normal conditions.

Tennis Fence

Two specifications, for private and for club and professional courts. Either complete enclosure, backstop or backstop and wings, of standard 10-ft. height or to order.

Specifications—Private Courts—End, corner and gate posts 2 1/2 in.; line posts 2 in. spaced 8 ft. apart; top rail 1 1/8 in.; all outside diameter measurement standard weight galvanized pipe. Fabric 1 1/4-in. mesh chain link of No. 11 wire. Set in concrete footings 36 in. deep.

Professional Courts—Same as above, except end, corner and gate posts 3 in., line posts 2 1/2 in. outside diameter spaced 10 ft. apart, top rail 1 1/8 in.

Afco Chain Link Factory Fence

The heaviest chain link fence, used as a non-climbable barrier where absolute protection is essential. Built on steel angle posts, with integral overhanging arm carrying 3 strands of heavy barbed wire. Set in concrete. Described fully in SWEET'S ENGINEERING CATALOGUE, or printed specification sheets can be had on request.



**Fig. 11, Afco Bulwark Fence at School
Grounds**
5 ft. high, 2-in. mesh chain link fabric

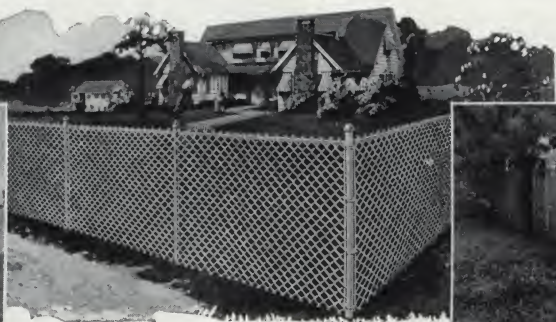


Fig. 12, Afco Guardian Lawn Fence
4 ft. high
See specification above for details



**Fig. 13, Afco 913 Fence, Non-Climbable
Chain Link Type**

ANCHOR POST FENCE COMPANY

FORMERLY ANCHOR POST IRON WORKS

Manufacturers of Wire Fences, Iron Railings and Entrance Gates

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Products

ORNAMENTAL IRON ENTRANCE GATES;
WELDED RAILINGS and FENCES.

WIRE and IRON FENCES of all kinds and in several heights, for country places, residences, parks, playgrounds, institutions, factories, mills, railroads, reservoirs, etc.

TENNIS COURT and ATHLETIC GROUND ENCLOSURES; KENNEL, POULTRY and STOCK PADDOCK FENCES; expert designing and construction of special ENCLOSURES for game, birds, etc.; IRON and WIRE ARBORS, ARCHES and TRELLISES.

Nation-wide Sales and Erecting Service

A chain of Anchor offices located in principal cities in all parts of the United States insures immediate attention to the requirements of architects. We maintain trained crews of erectors who erect fences under the supervision of our main office and branches, thus insuring good workmanship and an economical job. If



TRADE-MARK

desired, we will make surveys for grades and measurements and take entire charge of the work. When a customer prefers to do the erecting, tools and necessary instructions are furnished.

Estimates and Catalogues

Estimates given for products delivered and set complete in any part of the country. In requesting estimates, send, if possible, a diagram giving dimensions, location of gates, ends and corners.

For the convenience of architects and their specification writers we have prepared a special folder according to specifications for A.I.A. filing system. It contains a complete set of catalogues, specification sheets with scale drawings, details and dimensions on Anchor Fences, Railways and Gates.

The nearest Anchor office will gladly send you one of these handy folders. Just write for folder "A.I.A. File 14-K."



Ornamental Iron Entrance Gate on the Estate of Asa G. Candler, Jr., Atlanta, Ga.
This installation also includes 5700 ft. of Anchor Chain Link Fence, Type DOA-1, 7 ft. high



Anchor Garden Gate on Private Estate



Anchor-Weld Railing, Type RA-1

Surrounding residence of H. C. McCrady, Pittsburgh, Pa.

Iron Railings and Entrance Gates

Long experience enables this company to manufacture railings and ornamental gates properly proportioned and designed, and correctly made in all details. Special or stock designs furnished.

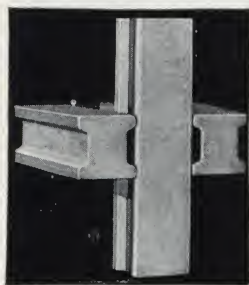
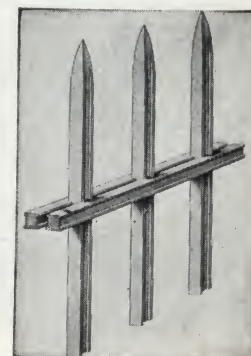
Anchor-Weld Railings and Gates

The ANCHOR POST FENCE COMPANY has secured the right to manufacture railings and gates by the *electric-weld process*. As shown in the illustrations, we use grooved square bars: $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. square. The rails consist of these bars in horizontal pairs the length of a panel. Welded between these pairs, and at right angles to them, are the pickets. All welding is done on the flange sides of rails and pickets.

The strength of this type of construction is enormous. Not only does it permit the making of panels as long as 10 ft., but the center support—so necessary with ordinary railings—is dispensed with entirely.

Even when supporting an additional weight of several hundred pounds at the center, the rails show little or no deflection. Neither can the pickets become loose and fall. Gates, made in the same manner as the railing, require no disfiguring diagonal braces to maintain rigidity.

Elaboration is possible: circles, scrolls, ellipses, and other special features may be introduced, double top or bottom rails may be used, and highly ornamental iron posts or brick, stone, concrete, or cast iron columns may be employed.

Grooved Square Rods
of Open Hearth
SteelElectrically Welded
Under Tons of
PressureForming One Solid
Piece at Each
IntersectionPerfect Union of
Pickets and
Rails

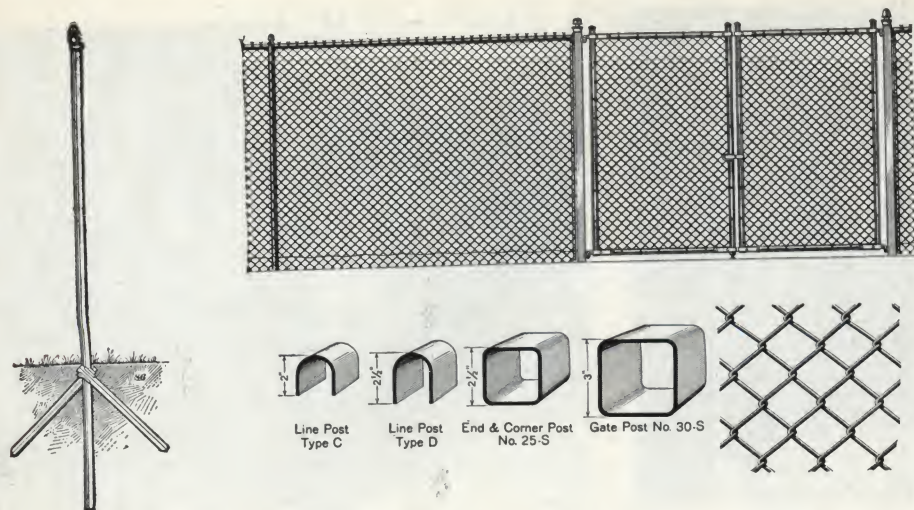
Anchor-Weld Railing, Type RA-3

And single walk gate at St. Mary's School, Elizabeth, N. J.



Anchor-Weld Double Gate

At the factory of The Duratex Co., Newark, N. J.



Chain Link Steel Fence

Fabric.....Copper-bearing steel wire, galvanized *after* weaving
 Line posts..High carbon steel, type C or D, U-bar, spaced about 10 ft.
 End, corner and single gate posts.....No. 20-S or 25-S
 Double gate posts.....No. 25-S

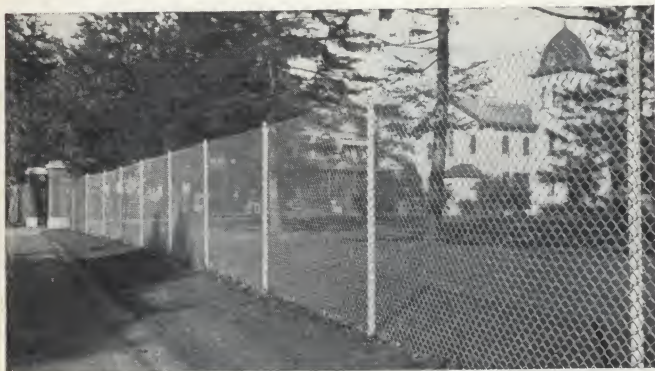
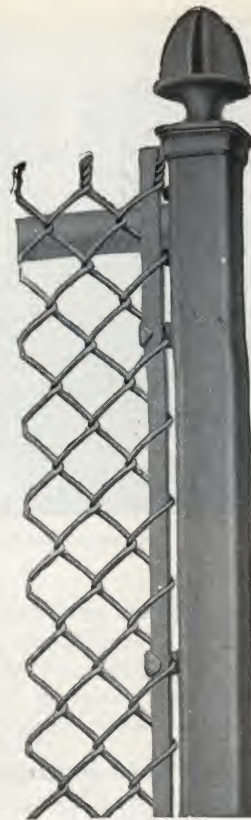
Chain Link Steel Fences

Anchor Chain Link Fabric is of best quality copper-bearing steel wire *galvanized after weaving*. Made of No. 9 and No. 6 gauge wire. Heights up to 10 ft. The small mesh affords no foothold for climbers. This fence can be furnished with or without top rail of galvanized pipe and with or without barbed wire topping. All parts are heavily galvanized by the hot-dip spelter process.

Anchor Square Terminal Post

An exclusive Anchor feature recently introduced by this company.

Stronger—because of its square shape; Unclimbable—no bands or footholds for trespassers to use as a step-ladder; More protection—fabric can not be detached from post from outside; Better-looking—has no disfiguring fabric-holding bands



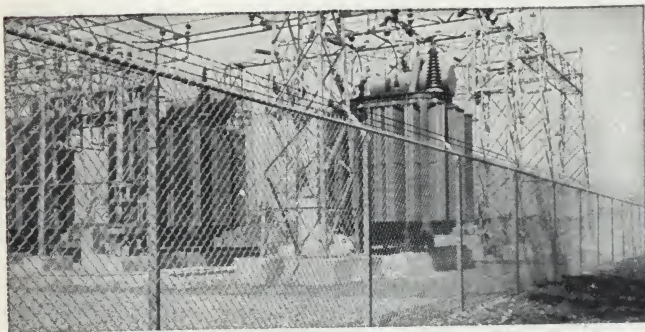
Anchor Chain Link Fence, Type DO-1

Part of an installation of 2980 ft. at the Soldiers' Home, Noront, Conn.



Anchor Chain Link Fence, Type DOA-1

Surrounding the estate of John D. Rockefeller, Sr., Lakewood, N. J.



Anchor Chain Link Fence, Type DTA-1

Surrounding transformer station of the Cleveland Electric Illuminating Co., Avon, Ohio



Anchor Chain Link Fence and Entrance Gate

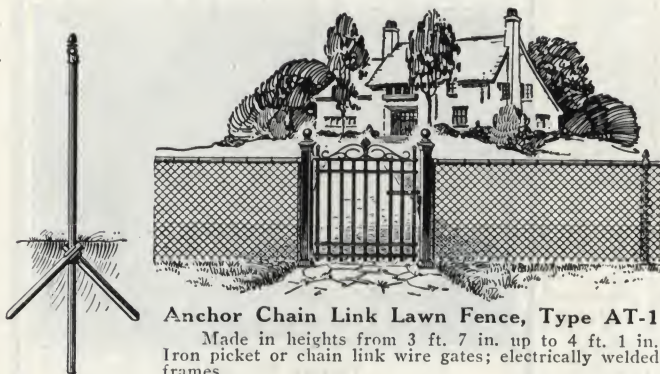
Part of an installation at Willamette Iron & Steel Co., Portland, Ore.



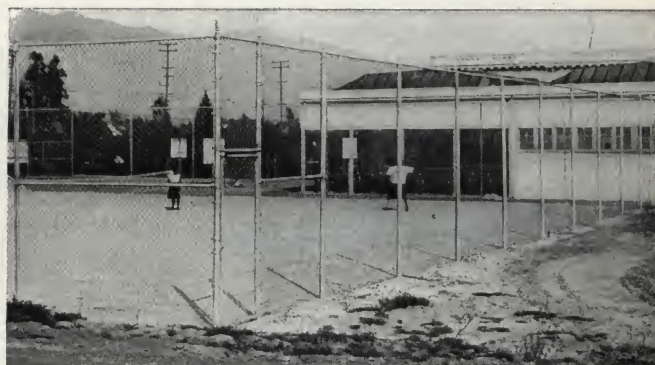
Anchor Chain Link Lawn Fence, Type AT-1
On the property of Miss E. A. Bogue, Montclair, N. J.



Woven Picket Lawn Fence, Type AT-2
3 ft. 7 in. to 7 ft. 1 in. high. Can be furnished with arms and barbed wire 5 ft. and higher



Anchor Chain Link Lawn Fence, Type AT-1
Made in heights from 3 ft. 7 in. up to 4 ft. 1 in. Iron picket or chain link wire gates; electrically welded frames



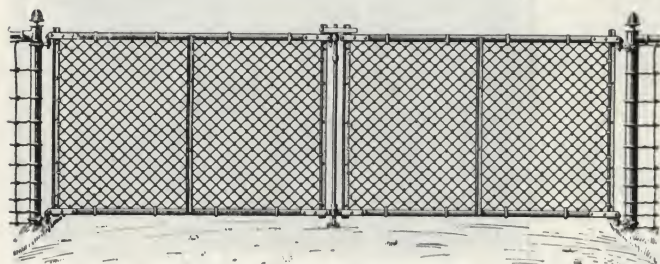
Anchor Chain Link Tennis Enclosure, Type DT-1
Installed on grounds of high school, Pasadena, Cal. Built up to 12 ft. high, with adequate bracing of corners and firm anchorage. Narrow entrance gates comprised in enclosure proper



Square Mesh Farm and Pasture Fence, Type CO-5
Similar to the high fence used to enclose cattle pastures. Made in 3 ft. 6 in., 4 ft. 0 in., and 4 ft. 10 in. heights, without arms or barbed wire

Anchor Electric-Weld Farm Gates

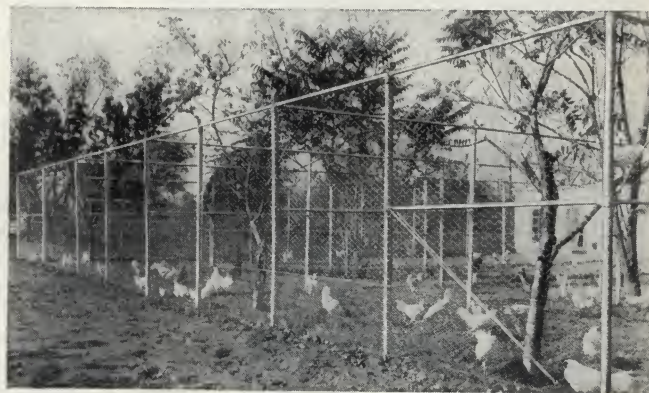
Great strength is secured for Anchor welded farm gates by joining the top and bottom rails to double uprights of steel channel, by means of channel corner plates electrically welded to the uprights.



Double Farm Gate, Type "J"
Made in the following widths: 12 ft. 1 in., 13 ft. 10½ in., 15 ft. 10½ in. Other types to suit any width opening



Chain Link Kennel Enclosure, Type DT-1
This kennel enclosure offers a clean runway, ample room for exercise and absolutely guards the dogs against escape, injury or theft. Can be furnished with or without covered top



Chicken Run Enclosure, Type CT-4
These poultry fences are not only better looking, but will last two or three times as long as those built with wood framework. Ratproofing the outside of the enclosure is always advisable. A fine wire cloth is buried in the ground in such a way that rats can not burrow under it; a slight charge is made for this addition.
Specification for any size enclosure can be furnished on application

CINCINNATI IRON FENCE COMPANY

Manufacturers of Ornamental Iron and Wire Work

3330 Spring Grove Avenue
CINCINNATI, OHIO

Products

ORNAMENTAL and PLAIN IRON and WIRE WORK of every description and for every purpose.

Steel and Iron Fence suitable for residences, cemeteries, school grounds, parks, etc.; Entrance Gates, Folding Gates, Door and Window Guards, Sidewalk Doors, Grilles, Gratings, Iron Shutters, Wire Window Guards and Partitions, etc.

Estimates

Blue prints on request. Estimates cheerfully given.

Design and Construction

The dominant features of Cincinnati Iron Fencing are its rugged strength, coupled with attractive design.

Rails—Made of channel, angle or flat sections.

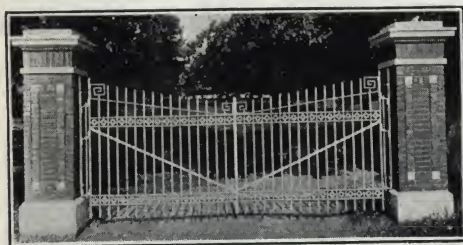
Pickets—Square, round, flat or angle, suitable thickness according to height required, pointed or tipped with malleable iron heads.

Posts—Made in large variety of sizes and styles to harmonize with the architectural surroundings.

ORNAMENTAL IRON GATES



Special Design "A"



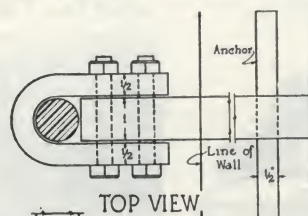
Design No. 326



Design No. 326 (Special)



Special Design "B"



TOP VIEW



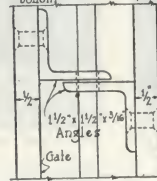
FRONT VIEW

Heavy Duty Hinge



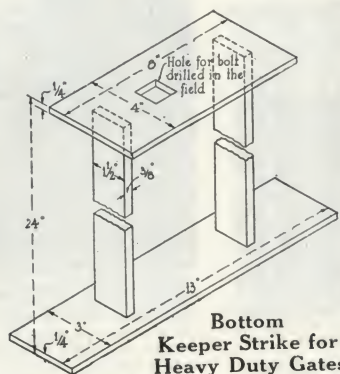
TOP VIEW

Continuous $\frac{1}{2}$ " x 1" bar turned into wall 4 in at top & bottom



Light Duty Hinge

FRONT VIEW



Bottom Keeper Strike for Heavy Duty Gates

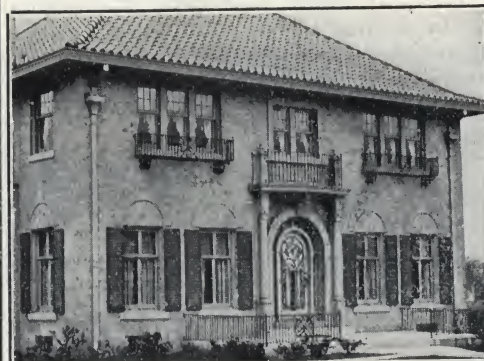
INTERIOR AND EXTERIOR ORNAMENTAL IRON WORK IN STOCK DESIGNS



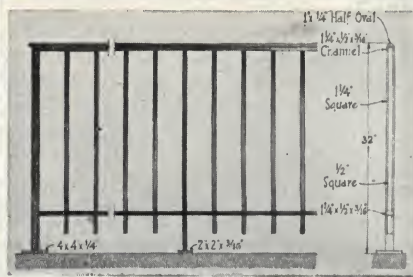
Design No. 681



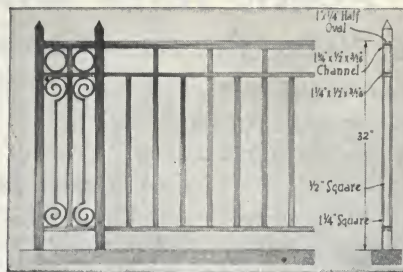
Design No. 682



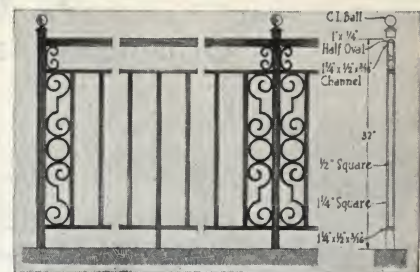
Design No. 680-G Door Grille and 680 Railings



NO 450

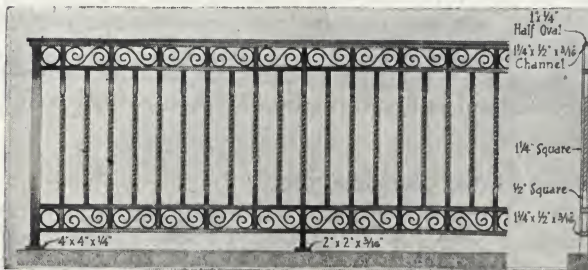


NO. 453



NO. 523

RAILINGS AND FENCE

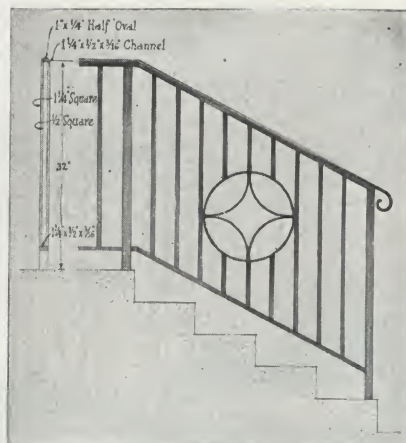


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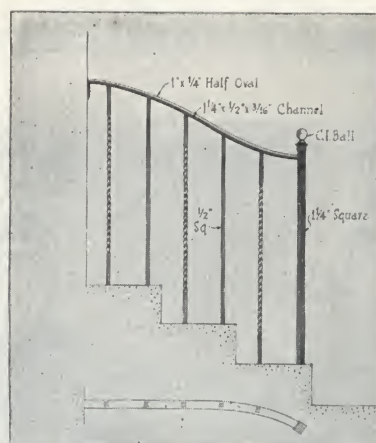


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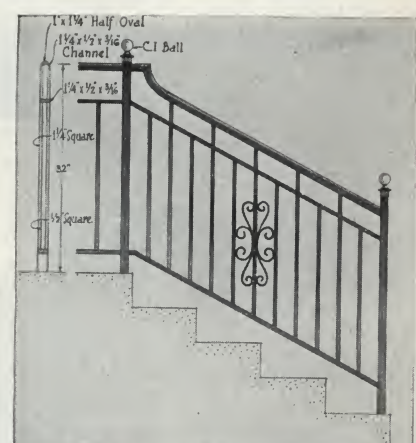
RAILINGS AND FENCE



NO. 459



NO 460



NO. 461

EXTERIOR RAILINGS

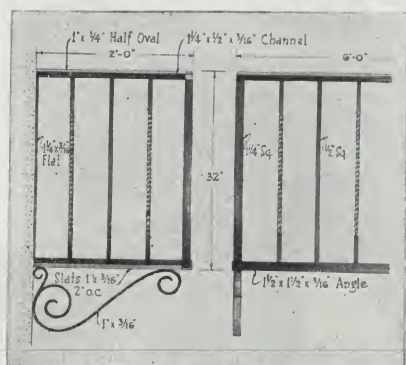
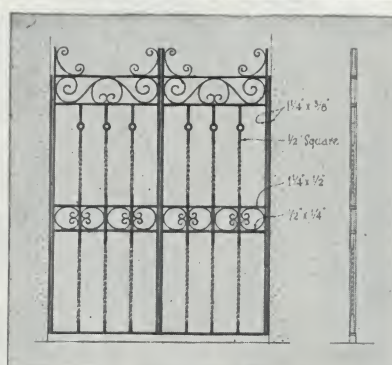
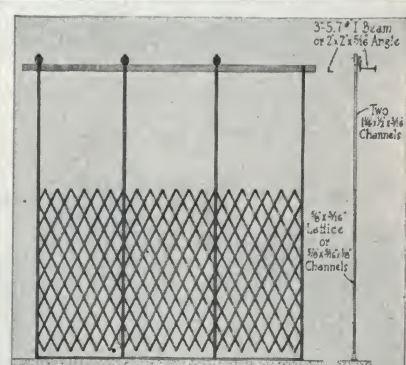
NO 480
BALCONYNO. 682
INTERIOR GRILLENO. 599
FOLDING GATECINCINNATI
IRON FENCE
COMPANYIRON RAILING, FENCE, BALCONY, GRILLE &
GATE CONSTRUCTION & DESIGN.

PLATE 1

ESTABLISHED 1858

J. W. FISKE IRON WORKS

Ornamental Iron, Brass, Bronze, Wire and Zinc Work

69-71 Park Place
NEW YORK, N. Y.

Products

ORNAMENTAL METAL WORK and FENCING as follows: Ornamental Entrance Doors, Window Guards, Lamps and Lamp Standards; Metal Stairs; Memorial Tablets; Fountains; Iron Railings and Entrance Gates; Woven Wire and Climbproof Chain Link Fencing; Sanitary Stable and Barn Equipment.

Also, Brass and Bronze Railings; Andirons and Fire Sets; Fire Escapes; Flagpole Bases; Balls and Trucks; Folding Gates; Leader Shoes; Marquises; Garden and Park Furniture; Sundials; Tree Guards; Wire Partitions.

Fiske Quality

The quality of Fiske products is best evidenced by installations for the United States Government, states, cities and leading commercial organizations, and upon many of America's largest private estates.

Co-operative Service

The J. W. FISKE IRON WORKS will submit estimates for products either delivered or erected complete. A well organized engineering staff is maintained, and contracts for designing and erection complete are made when desired. Co-operation with the architect, contractor or owner in executing unusual specifications is a specialty.

Where material is delivered only, instructions and drawings will be furnished to enable local mechanics to erect the work. Sketches and designs will be furnished on request, and full information as to sizes and weights will be given.

Entrance Gates, Fencing, etc.

This company will carry out any design in ornamental entrance gates, iron fencing, window guards, metal stairs and similar work, or will prepare and submit designs for such work.



Illustrations of Work Finished and Installed by J. W. Fiske Iron Works

No. 1—Entrance Gate, South Kortright, N. Y.
No. 2—Entrance Gate, Oakdale, L. I., ERNEST FLAGG, Architect
No. 3—Entrance Gate, Montclair, N. J.

No. 4—Chain Link Fence, Paterson Parchment Paper Co., Passaic, N. J.
No. 5—Bronze Memorial Tablet
No. 6—Interior Stable, WM ZEIGLER, JR., Noroton, Conn., H. P. KNOWLES, Architect

"Set-in-concrete" Posts

All Fiske fence posts are set in concrete footings and this construction is strongly recommended by this company. This method keeps the posts from being thrown out of alignment by frost, and prevents them from rusting off at the ground line.

Chain Link Fencing

All Fiske chain link woven wire fencing is extra heavy galvanized by the hot dip spelter process. This is the heaviest and most durable type of wire fence made. Fiske woven steel wire fabric is made in widths from 60 to 96 in. and when erected in connection with Fiske standard "set-in-concrete" posts, provides a fence from

5 ft. 2 in. to 8 ft. 2 in. high. This height can be increased to 10 ft. with diagonal arms and 3 strands of barbed wire.

Foundry Work

This company is prepared to undertake any ornamental casting in iron, brass or bronze according to submitted designs or models, or from designs originated by its own organization.

Sanitary Stable and Barn Fittings

The J. W. FISKE IRON WORKS make a specialty of complete sanitary fittings for stables, cow barns, etc., and are pleased to co-operate with architects in writing specifications.

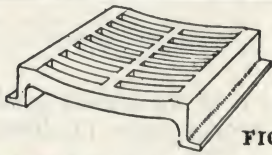


FIG. 159A K

HIGHWAY CATCH BASIN FRAME & GRATING
(Very Heavy)

24" long, 22½" wide, 5½" deep.
Grating only, 20" x 20", 2½" thick in center



FIG. 196E K

LIGHT GUTTER BASIN & GRATE

For lawns & carriage drives, not for street use.
18" wide x 24" long x 5" deep
Grating only, 16" x 22"

HEAVY GUTTER BASIN & GRATE

For roadways, streets, parks, cemeteries, etc.
No. 2- 18" wide x 24" long x 5" deep
Grating only, 16" x 22"
No. 1- 3" x 15" x 3" for use in draining small areas. The outlet is so designed that it can be used on 4", 6", 8", or 10" pipe.

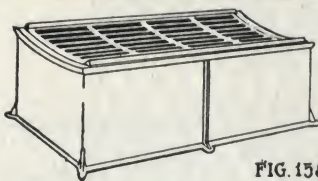


FIG. 158 K

ROAD BOX

For public or private roadways, etc.
No. 1- Top: 25" long, 14½" wide, 10" deep
Grating only 23" long, 13½" wide
No. 1A- Top: 25" long, 14½" wide, 4" deep
No. 2- Top: 32" long, 14½" wide, 4" deep

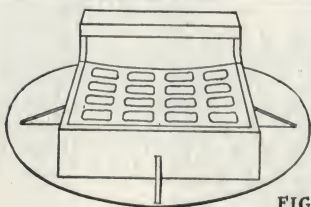
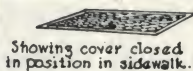


FIG. 162A K

CATCH BASIN INLET

Top 23" x 32", bottom flange 42" diameter. Grating is concave at rear



Showing cover closed in position in sidewalk.

FIG. 196F K

SAFETY COAL HOLE COVER & FRAME

	Cover	Frame
No. 1-	18" x 18"	23" x 23"
No. 2-	22" x 22"	27" x 27"
No. 3-	30" x 30"	35" x 34"

**SPIRAL STAIRS**

Furnished for all floor heights with following diameters: 4'-0", 4'-6", 5'-0", 5'-6", 6'-0", 7'-0"



FIG. 201C K

CAST IRON GRATING

For concrete or iron gutter Width: 5 3/4"



FIG. 201D K

	Wide	Thick	Wide	Thick
GUTTER COVER	3 1/2"	3/8"	7"	1/2"
For concrete gutter	4"	3/8"	8"	1/2"
	5"	1/2"	9"	1/2"
	6"	1/2"	13"	3/8"

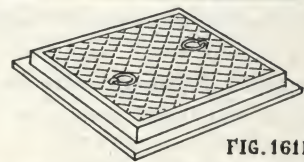


FIG. 161B K

MANHOLE FRAME & COVER, FOR CONCRETE.

	Top of frame	Depth	Cover
No. 1	12" x 12"	3"	10 1/2" x 10 1/2"
No. 2	18" x 18"	3"	16 1/2" x 16 1/2"
No. 3	26" x 26"	3"	24 1/2" x 24 1/2"
No. 4	32" x 26"	3"	30 1/2" x 24 1/2"

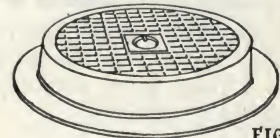


FIG. 173A K

MANHOLE FRAME & COVER

	Opening	Depth	Diam. on bottom	Cover
20" (light pattern)	4"	2 1/2"	20 1/2"	20 1/2"
20" (deep pattern)	6 1/2"	2 1/2"	20 1/2"	20 1/2"
20" (heavy pattern)	4 3/4"	2 7/8"	20 1/2"	20 1/2"
24" (light pattern)	6"	3 1/2"	24 1/2"	24 1/2"
24" (heavy pattern)	6"	3 1/2"	24 1/2"	24 1/2"



FIG. 163 K

MANHOLE FRAME & COVER

Diam. of top-25"; Diam. of bottom flange-36"; Diam. of cover, 22 1/2"

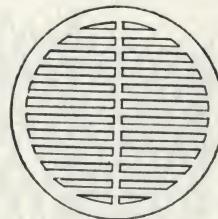


FIG. 173B K

GRATING

To fit in bell ends of soil pipe

Size of pipe	Grating	Size of pipe	Grating
8"	10"	18"	20 1/2"
10"	12"	20"	23 3/4"
12"	14 3/4"	24"	27 3/4"
15"	17 3/4"		



A FEW OF J. W. FISKE IRON WORKS SPECIALTIES

AUG
1922

WILLIAM R. PITT COMPOSITE IRON WORKS

TELEPHONE

CHICKERING 6560-6561

548 West 27th Street

NEW YORK, N. Y.

Products

Manufacturers of FOLDING GATES and GUARDS for every purpose:

- "Pitt-Bostwick" Folding Gates
- "Pitt" Lazy Tong Folding Gates
- "Pitt" Composite Folding Gates
- "Pitt" Driveway and Entrance Gates
- "Pitt" Car Gates
- "Pitt" Folding Window Guards

Pitt-Bostwick Folding Gates to Protect

- Banks and trust companies
- Homes and apartments
- Public school corridors
- Storehouses and warehouses
- Department stores
- Safe deposit companies
- Show windows and entrances

Folding Gates and Guards a Specialty

This company is the original manufacturer of the "Bostwick" gate, and the originator of most of the standard folding gates, developing their uses through specialization.

This department is therefore, by training, experience and facilities, prepared to meet the demands of architects, builders and the iron trade.

"Pitt" gates are internationally famous for their quality, and are found in every state and many foreign countries.

The initial cost is not high. They are strong, durable and easy working and take up very little space when not in use.

Quality of Work

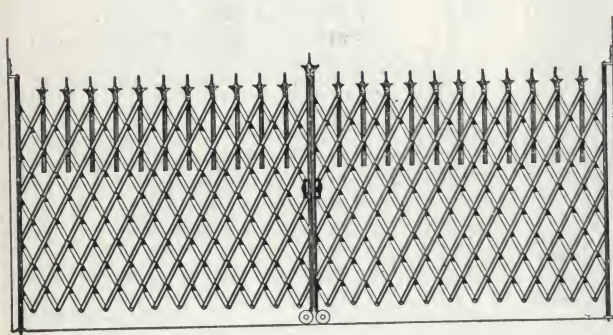
Every "Pitt" product is of the highest grade workmanship and materials, economically produced under modern conditions.

Specifications

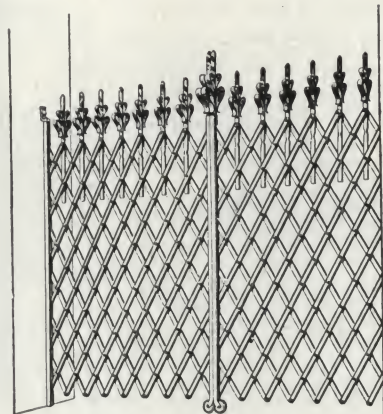
Copy the *number* and *description* of gate desired from the illustrations on this and the page following, or submit requirements for our advice and special blue prints or designs.

Estimates

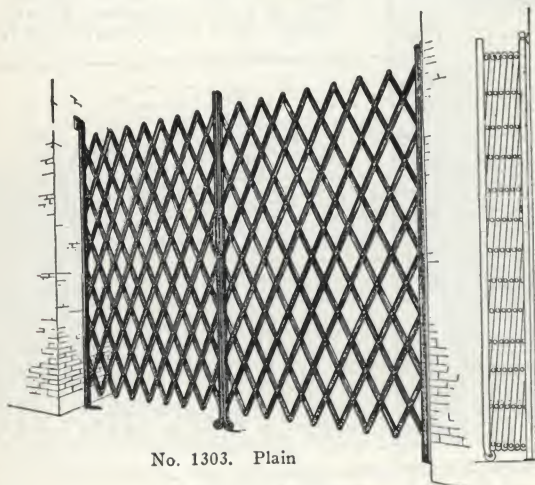
Folding Gates—Send *plans* and *specifications*, or a *sketch* showing *width* and *height*, and *where* gate is to *set*. State *purpose* for which gate is intended.



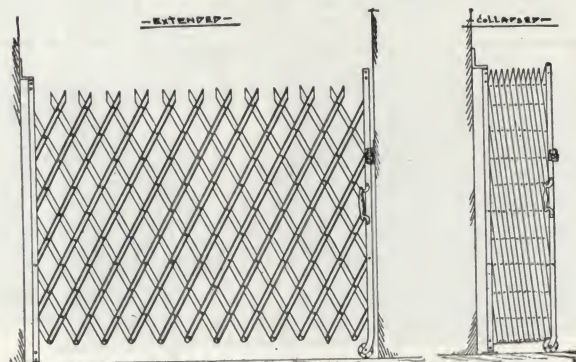
No. 1254-A. With Wrought Pickets



No. 1246. With Ornamental Pickets and Ball Rivets

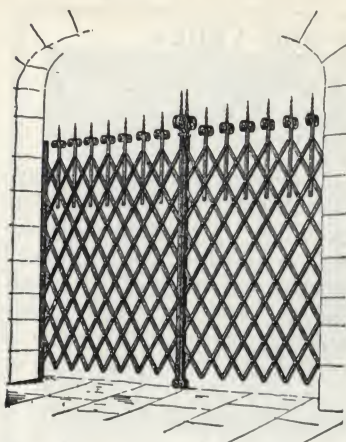


No. 1303. Plain

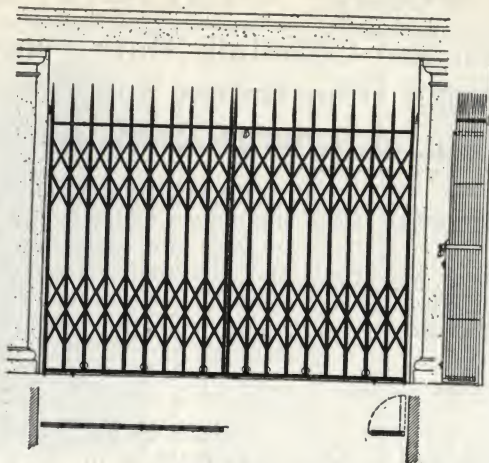


No. 1303-A. With Pointed Scissors Top

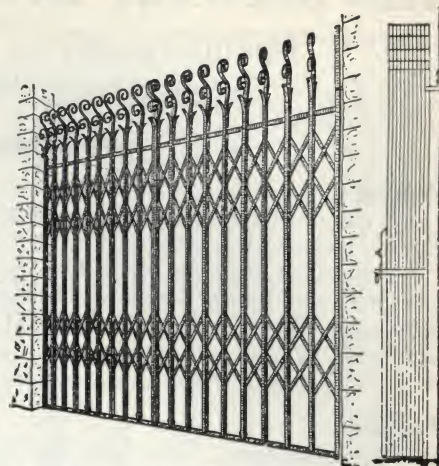
"Pitt" Lazy Tong Folding Gates for Entrances, etc.



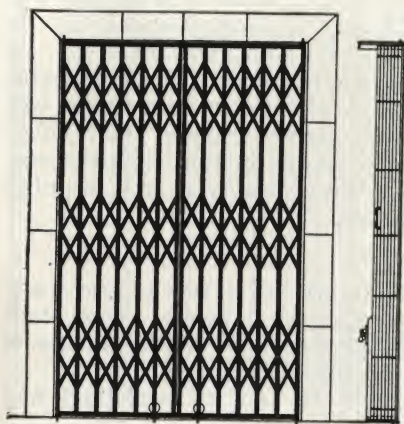
No. 1254. "Pitt" Gate, with Ornamental Wrought Pickets



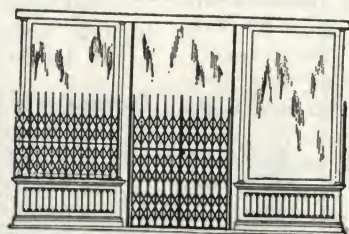
No. 1262-A. "Pitt-Bostwick" Gate with Cast Spear Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



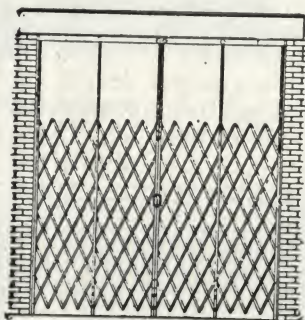
No. 1260. "Pitt-Bostwick" Gate with Ornamental Wrought Pickets, Hinged Stiffening Bars and Hinged Lifting Bottom Tracks



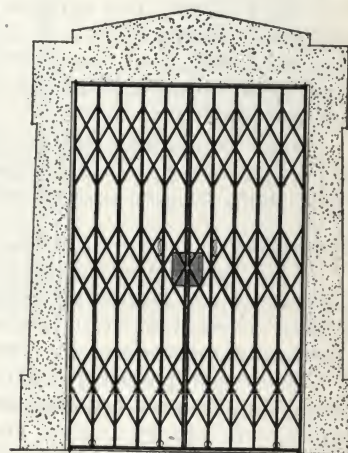
No. 1284. "Pitt-Bostwick" Vestibule or Window Gate with Stationary Top and Hinged Lifting Bottom Tracks



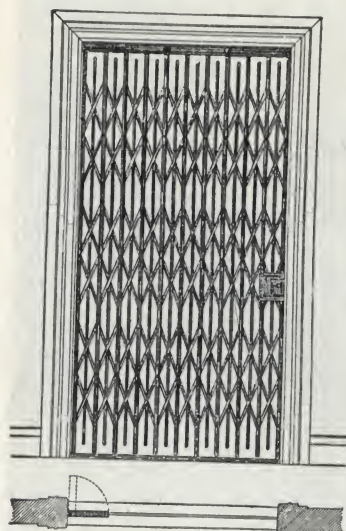
No. 1273. "Pitt-Bostwick" Gate and Window Guard for Store Front



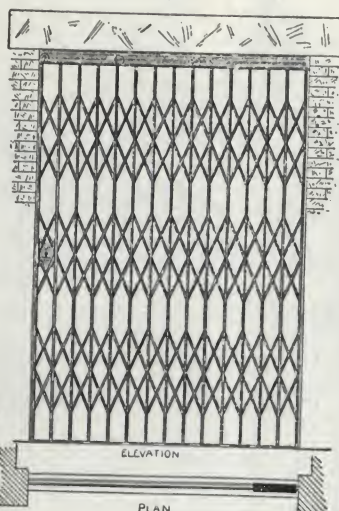
No. 1302. "Pitt" Lazy Tong Gate for Driveway Entrances



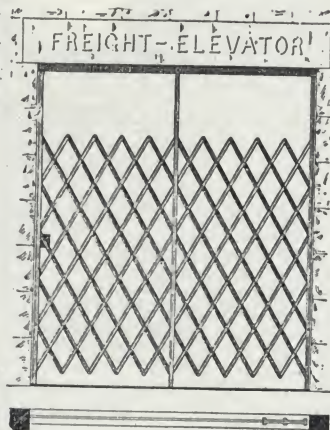
No. 1267-A. "Pitt-Bostwick" Guard for Window with Stationary Tracks Top and Bottom



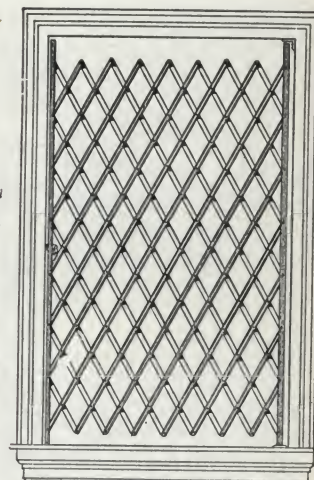
No. 1245. Close Mesh "Pitt-Bostwick" Elevator Gate for Shaft Openings



No. 1261. "Pitt-Bostwick" Folding Elevator Gate



No. 1300. "Pitt" Lazy Tong Folding Elevator Gate



No. 1316. "Pitt" Lazy Tong Guard for Windows. No Tracks

Standard Types of Folding Gates

Special designs submitted on request

THE STEWART IRON WORKS COMPANY, INCORPORATED

Manufacturers of Iron and Chainlink Wire Fences and Gates
Architectural Wrought Iron, Bronze and Brass Products

780 Stewart Block, CINCINNATI, OHIO

Products

PLAIN and ORNAMENTAL IRON GATEWAYS and FENCES; CHAINLINK WIRE FENCE.

Also Iron Railings, Iron Grilles, Bronze and Iron Lanterns and Lamp Standards, Lawn Furniture, Folding Gates, Window Guards, General Ornamental Iron and Wire Work.

For Jail and Prison Construction, see page C3412.

Facilities

This company, "The World's Greatest Iron Fence Builders," with its unsurpassed facilities for the manufacture of iron fences and gates, has a factory containing 350,000 sq. ft. of floor space and covering an area of 8 acres; the equipment of the most modern machinery; an experience of more than 40 years; a complete organization of specialists in engineering and landscape architecture, and a large force of skilled mechanics and draughtsmen.

This equipment insures the highest standard of work and enables THE STEWART IRON WORKS COMPANY, INC., to give prompt service at proper prices.

Specialties

This company specializes in the building of highgrade ornamental iron fences and entrance gates, either from the designs of its own draughtsmen or from drawings and specifications submitted by customers or their architects.

They give particular study to the correct designing, proportioning and construction of enclosures and entrances of country houses and estates, as well as the simpler or more pretentious town house.

Special attention has also been given to designing simple and artistic enclosures for yards in the rear of city and suburban dwellings, providing security and eliminating the feeling of confinement produced by solid fences; with the added advantages of maximum sunlight, elimination of dark corners which conceal rubbish; and making the many small plots of green into a community garden for the enjoyment of all.

From its experience, this firm is qualified to advise as to the type of fence best adapted to particular conditions, and to aid in the most satisfactory and economical solution of fencing problems.

All types of plain and ornamental fences and gates, light or heavy, in iron or chainlink wire, for factories, public institutions, etc.

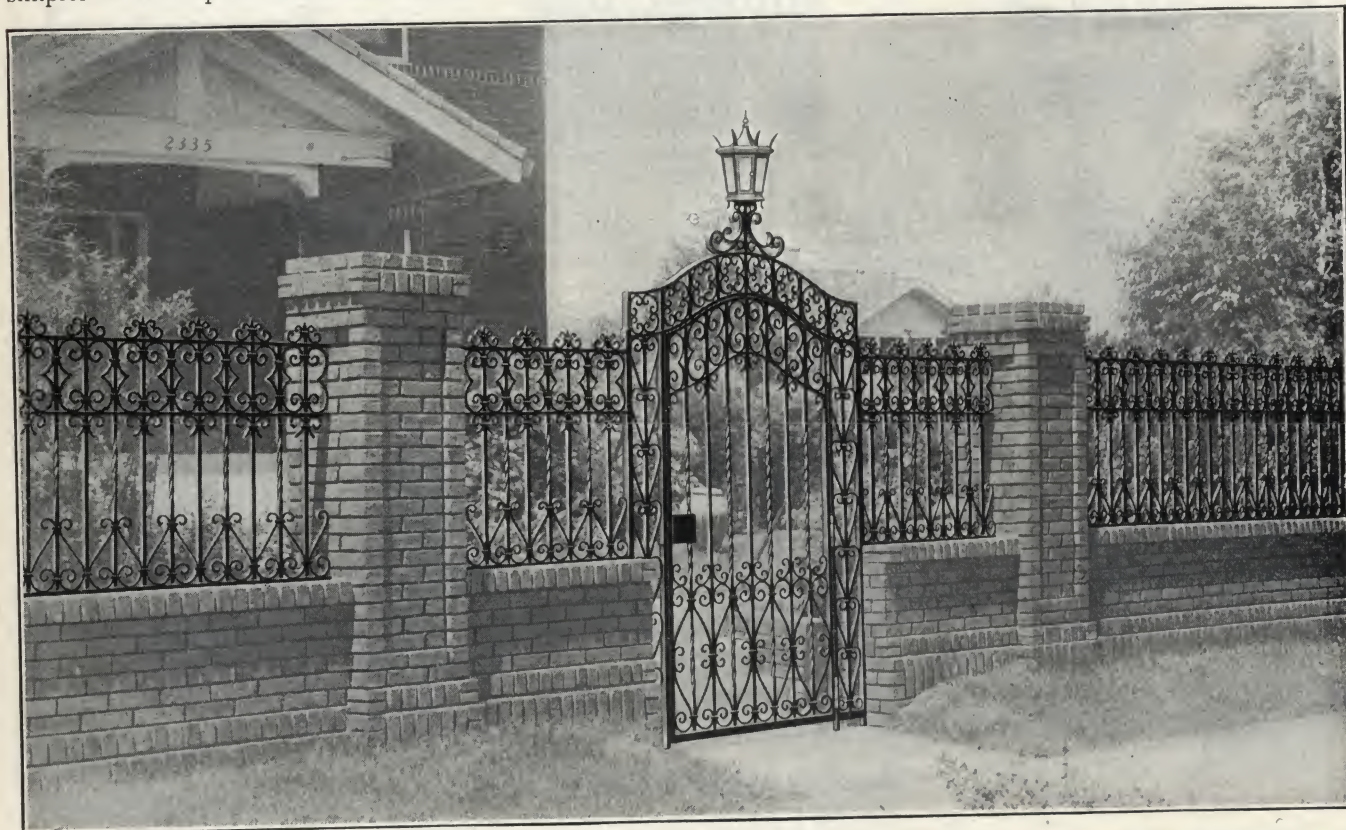
Decorative Iron Work

At innumerable points in the modern home the architect and builder find the use of interior stair railing, balconies, solarium grilles, terrace railing and other decorative iron work as developed by this Company necessary to give the final touch of beauty as well as utility to the interior and exterior.

Designs

The illustrations here are but a few of the many designs shown in this company's catalogues. Plain stock designs are featured in their Catalogue No. 50-A; special ornamental designs in "Book of Designs C."

These catalogues will be sent to architects and prospective purchasers on request.



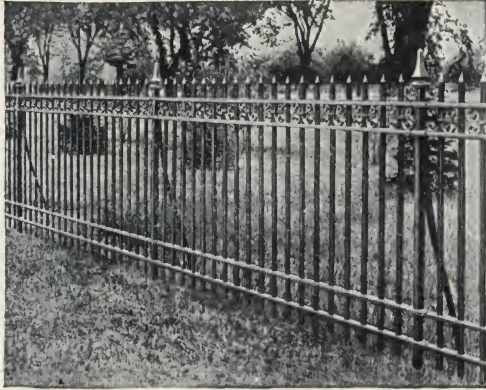


PLATE NO. 8495
ORNAMENTAL IRON FENCE

DETAIL FROM
PLATE NO. 8495

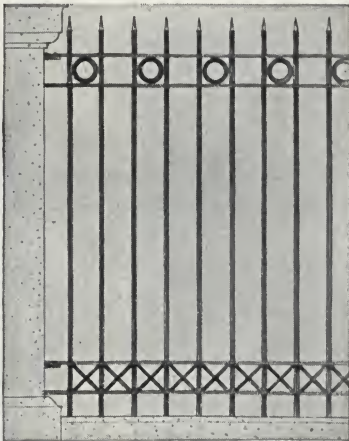
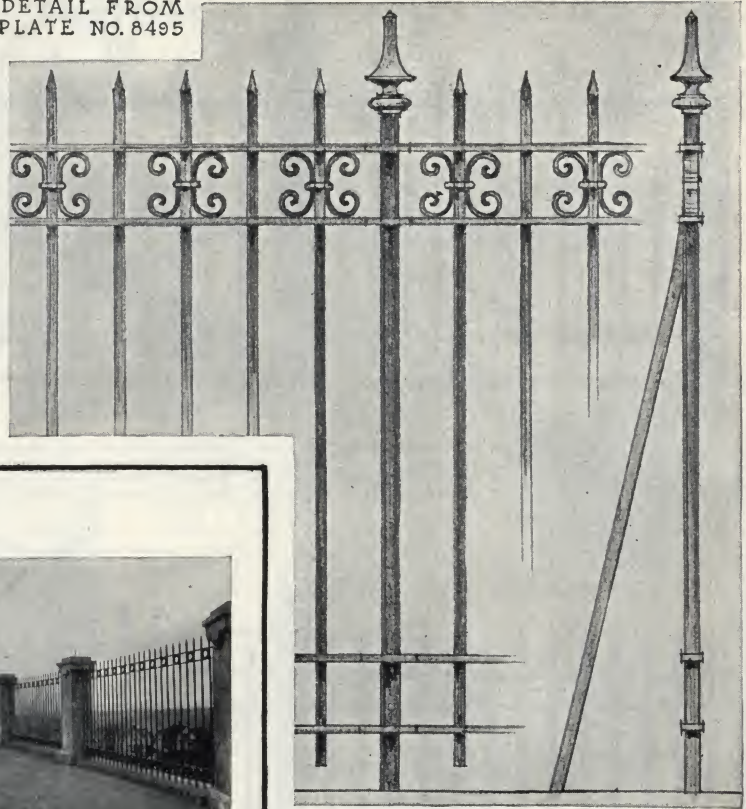
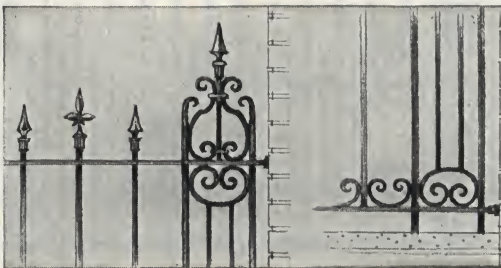
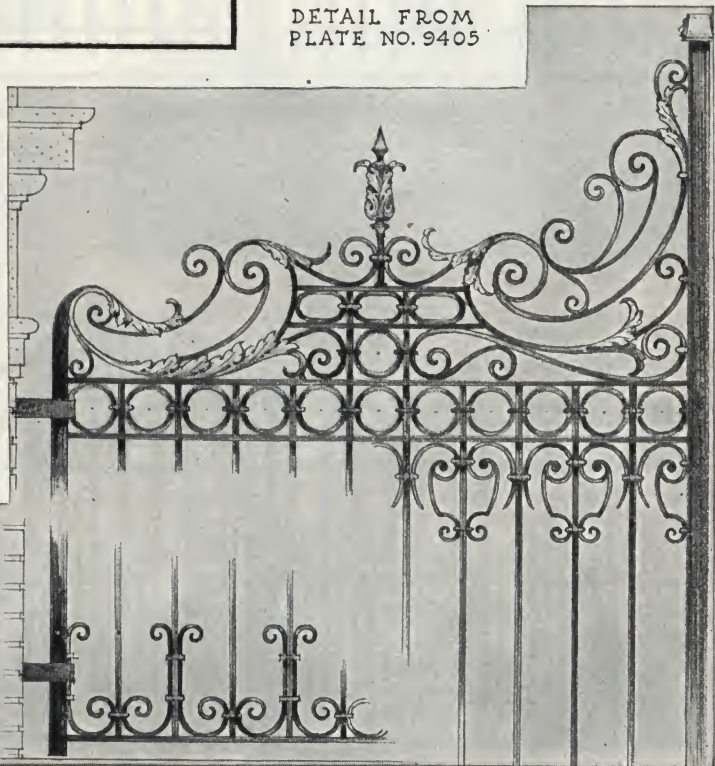


PLATE NO. 8985
ORNAMENTAL IRON FENCE

DETAIL FROM
PLATE NO. 9405



PLATE NO. 9405
ORNAMENTAL IRON ENTRANCE GATE



ORNAMENTAL IRON FENCE AND ENTRANCE GATES.



POST No. 6-A

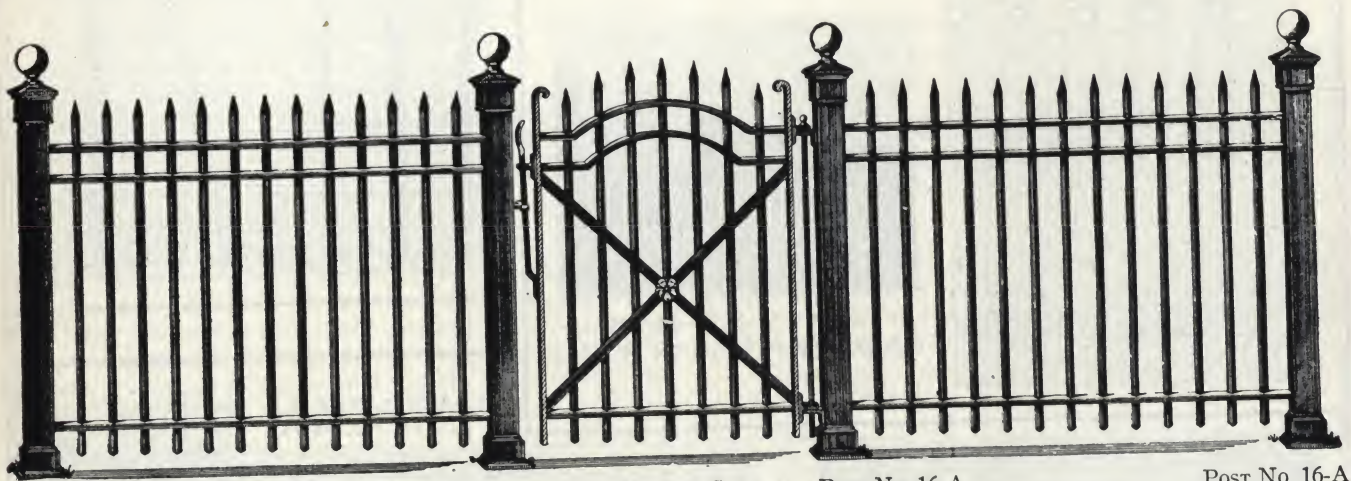
POST No. 6-A

GATE No. 2-A

POST No. 6-A

POST No. 6-A

No. 71-A— $\frac{3}{8}$ -in. round pickets, 4 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.
 No. 72-A— $\frac{1}{2}$ -in. round pickets, 4 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.
 No. 73-A— $\frac{5}{8}$ -in. round pickets, 5 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42, 48, 54 and 60 in.
 No. 74-A— $\frac{3}{4}$ -in. round pickets, 5 in. on centers; $1\frac{1}{2} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42, 48, 54, 60 and 72 in.



POST No. 16-A

POST No. 16-A

GATE No. 5-A SPECIAL

POST No. 16-A

POST No. 16-A

No. 148-A— $\frac{3}{8}$ -in. square pickets, 4 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.
 No. 149-A— $\frac{1}{2}$ -in. square pickets, 4 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.
 No. 150-A— $\frac{5}{8}$ -in. square pickets, 5 in. on centers; $1\frac{1}{2} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42, 48, 54 and 60 in.
 No. 151-A— $\frac{3}{4}$ -in. square pickets, 5 in. on centers; $2 \times \frac{5}{8}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42, 48, 54, 60 and 72 in.
 No. 152-A— $\frac{7}{8}$ -in. square pickets, 5 in. on centers; $2 \times \frac{5}{8}$ -in. Stewart patent 4-rib channel rail; height from ground, set, 37, 42, 48, 54, 60 and 72 in.



POST No. 3-A

POST No. 3-A

GATE No. 2-A

POST No. 3-A

POST No. 3-A

No. 33-A— $\frac{3}{8}$ -in. round pickets, 2 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.
 No. 34-A— $\frac{1}{2}$ -in. round pickets, 2 in. on centers; $1\frac{1}{4} \times \frac{1}{2}$ -in. Stewart patent 3-rib channel rail; height from ground, set, 37, 42 and 48 in.

Iron Fence and Entrance Gates

Stewart's Chainlink Wire Fence and Gates

Our product is the result of proven principles of construction which produce a quality unexcelled. Our organization of factory salesmen and erecting representatives, located at advantageous points, affords quick and efficient co-operation to those who place their orders with us.

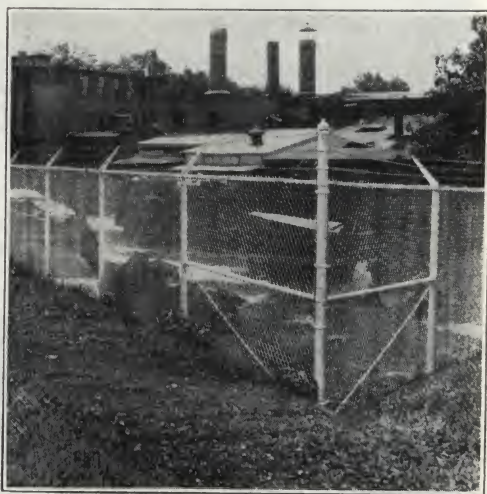
Chainlink Fabric—Woven of No. 6, 9 or 11 gauge copper-bearing steel wire, possessing great rust-resisting qualities.

Galvanizing—All framework and fittings, barbed wire and fabric are extra heavily galvanized by the hot dip process and not wick-wiped. The fabric and barbed wire are galvanized after weaving, the fabric carrying a guaranteed coating which actually weighs 8 to 9 per cent of the finished product. Bolts and nuts are also hot-dipped galvanized.

Standard Type 3-T Fence—Very generally used for maximum property protection. Usually 7 or 8 ft. high over all, including either 3 or 5 strands of barbed wire



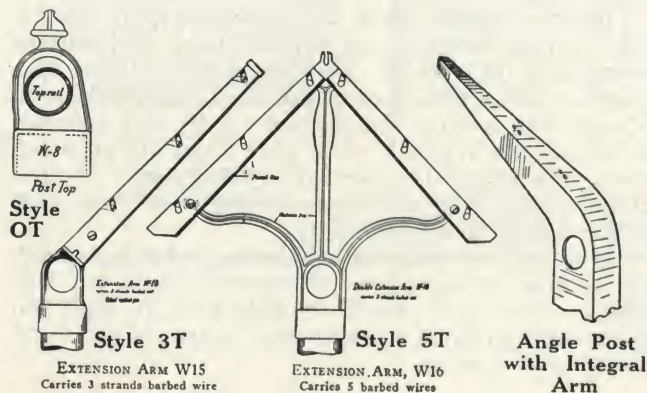
Integral Arm,
Angle Line
Post



Standard Type Wire Fence, 3T

above the fabric. Fabric is either No. 9 or No. 6 gauge wire, 2-in. mesh, with barbed selvages at top and bottom. Intermediate posts are angle section, $2\frac{1}{4} \times 2\frac{1}{4}$ in. (weight, 3.8 lb. per ft.), for setting in concrete 10 ft. apart; 2 ft. 6 in. below grade line. Top rail $1\frac{1}{8}$ -in. outside diameter, connected by expansion sleeve couplings. Fabric attached to top rail with zinc bands and to posts with staples. Bottom of fabric reinforced with No. 6 gauge coil spring wire. Tubular intermediate posts, $2\frac{1}{2}$ -in. outside diameter, with W-15 barbed wire extension arm, are furnished instead of the angle post, if desired.

This fence is also furnished without barbed wires (style OT), in which case we use No. W-8 ornamental post tops. For economy, the top rail is sometimes omitted and, in this case, we use a coiled spring wire of No. 6 gauge at both top and bottom of fabric for additional reinforcement.



Stewart's Chainlink Tennis Court Fence

Furnished in two specifications:

Heavy Construction—Chainlink Fabric of 2-in. mesh No. 9 gauge or $1\frac{1}{4}$ -in. mesh No. 11 gauge copper-bearing steel wire. Intermediate posts, $2\frac{1}{2}$ -in. outside diameter tubular steel (weight, 3.65 lb. per ft.) spaced 10 ft. apart, for setting 2 ft. 6 in. deep in concrete. Top rail, $1\frac{1}{8}$ in. outside diameter (weight, 2.27 lb. per ft.); reinforcement wire at bottom of fence and about 4 ft. above grade, No. 6 gauge galvanized coiled wire; end, corner and gate posts 3-in. outside diameter (weight, 5.73 lb. per ft.), for setting 3 ft. deep.

Light Construction—Chainlink Fabric $1\frac{1}{4}$ -in. mesh No. 11 gauge copper-bearing steel wire. Intermediate posts 2-in. outside diameter tubular steel (weight, 2.72 lb. per ft.), spaced 8 ft. apart. Top rail, $1\frac{1}{8}$ -in. outside diameter (weight, 1.66 lb. per ft.); end, corner and gate posts $2\frac{1}{2}$ -in. outside diameter. Specifications otherwise same as for heavy construction.

Stewart's Chainlink Lawn Fence

Far superior to ordinary types of lawn fence. Stocked in 36, 42 and 48-in. heights, in the 2-in. mesh, No. 9 gauge fabric. Intermediate posts, 2-in. outside diameter; spaced 10 ft. apart, for setting 2 ft. 6 in. deep in concrete. End, corner and gate posts are $2\frac{1}{2}$ -in. outside diameter, for setting 3 ft. deep.

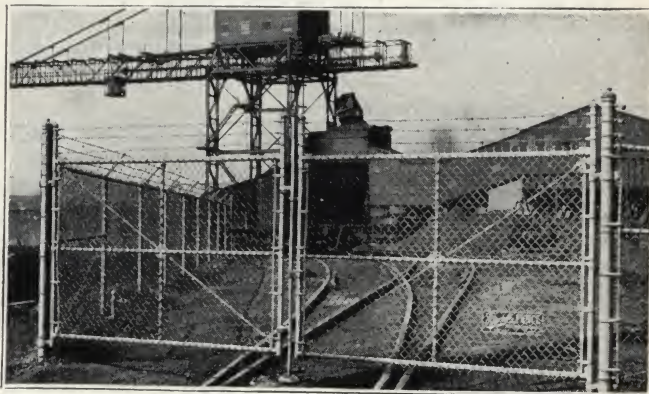
Note: Often excellent, artistic and practical results are obtained around residences by using Chainlink Lawn Fence in combination with wrought iron entrance gates.



Chainlink Lawn Fence

"Heavy Duty" Gates

Furnished in any width. We also furnish sliding gates. These have 1.9-in. outside diameter steel tubular frames, joined with pressed steel corners; a horizontal cross member and $\frac{1}{2}$ -in. solid round steel brace rods. We guarantee them to be sagless. Hinges are forged steel, located below bottom rail and above top rail, thus rendering maximum efficiency.



"Heavy Duty" Gates

Double Gate Latch Device—Very simple and effective. Permits opening left-hand gate independently of the right. Locks by means of a padlock which can be operated from either side of gate.

Gate Equipment—Includes center stop for setting in concrete and automatic back stops to hold gates in open position.

Stewart's Road Guard Fence

For dangerous embankments, curves and bridge approaches. Woven of No. 6 gauge, copper-bearing steel wire into 2-in. mesh fabric, 24 in. high, with knuckled selvages at both top and bottom, and galvanized after weaving. Furnished painted white if desired.



Roadguard Fence

ACME WIRE & IRON WORKS

Manufacturers of Standard Wire Mesh Partition Panels and Window Guards

TELEPHONE
HOGARTH 4616

12340 Cloverdale Avenue
DETROIT, MICH.

Products

Manufacturers of STANDARD RED RIBBON WIRE MESH PARTITIONS, ENCLOSURE PANELS and SQUARE MESH WIRE WINDOW GUARDS.

WIRE MESH ENCLOSURES for Cashiers and Clerks.

Also Wire Mesh Guards for Skylights; Steel, Brass and Bronze Grilles and Wickets; other products in Wire Mesh and Light Ornamental Iron Work and manufacturers of Brass, bronze or Nickel Tubular Railing.

Red Ribbon Products

Red Ribbon partition and enclosure panels are carried in stock in sufficiently large quantities to permit a good sized order being shipped in twenty-four hours. They are designed to meet varying conditions and being in standard sections they are 100% salvageable. They can be added to, from time to time, with the assurance that the new parts may be mingled with the old, with no field work to make parts match.

Being manufactured in quantities, all economies in the way of labor and the machine method of construction can be used, keeping costs to a minimum.

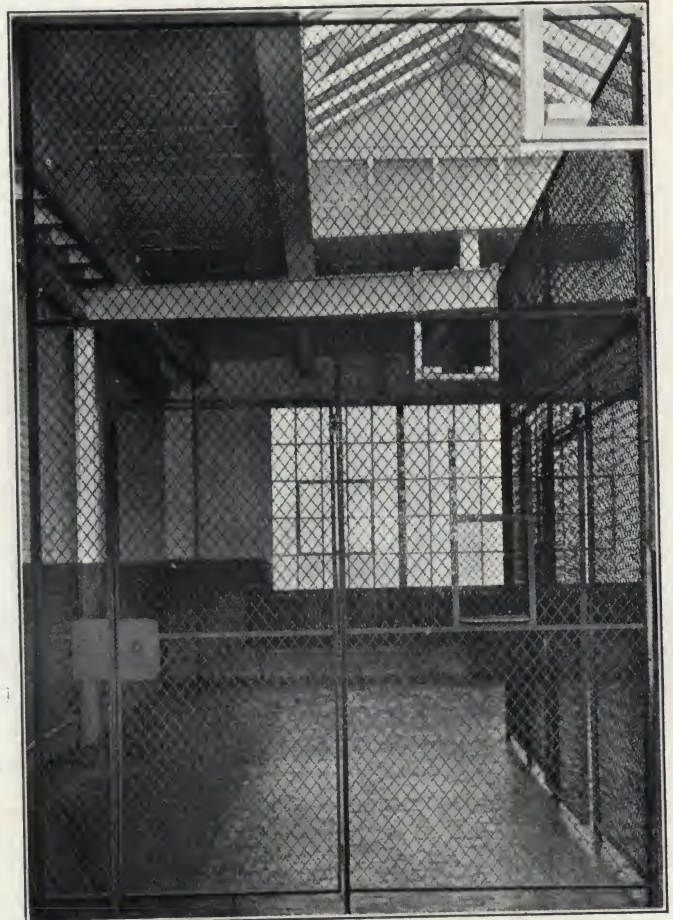
It will be noticed that the multiplicity of parts has been avoided, enabling erection in the field by inexperienced help.

Construction Specifications

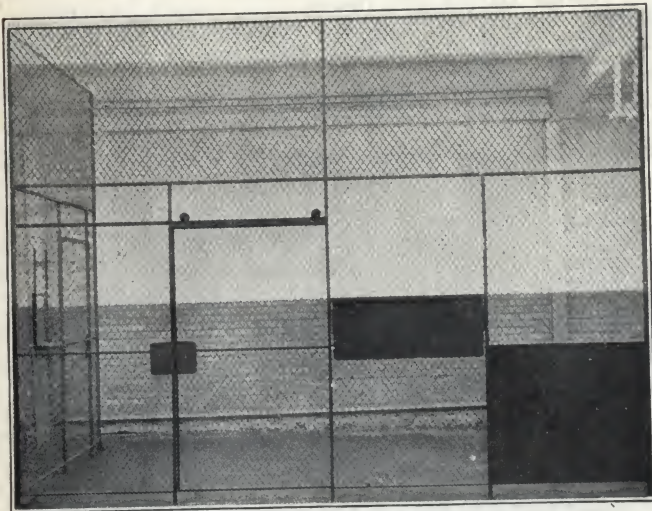
General Specification—Wire is No. 10 W&M gauge, crimped and interwoven to 1½-in. diamond opening mesh, measured parallel with the wire. Mesh is securely clinched into 1½x1½x1/8-in. steel channel frame. Crossbars are composed of two 1x3/8x1/8-in. channels, riveted together through the mesh; 3-in. sweeping space is provided at the floor.

Standard partition panels with mesh full height are designated as Type "M."

Type "S" panels have No. 16 gauge sheet metal base. Base is bolted to the channel framing surround-



Various Red Ribbon Panels Assembled in Enclosure



Various Red Ribbon Panels Assembled in Enclosure

ing it. All sheet metal base panels are flanged pan-shaped so that no rivets or bolt heads show from the face of the partition.

All standard panels measure 4 ft. wide and 8 ft. high, excepting at the ends of partition, where a special panel can be provided to fill in the balance of the space.

If height greater than 8 ft. is required, top panels designated as Type "T" are provided, which panels are to span two of the standard partition panels.

Doors—Sliding doors are equipped with special roller bearing hangers and flat bar track and will fit between any two panels. They have stops, guides, lock protecting plates and receiver for locks. Doors come in 4, 6 and 8-ft. widths. All doors are 7-ft. high opening, and have transom panel. 4-ft. wide doors are arranged to lock with a special bronze flat key claw lock. Because of the width, 8-ft. doors are arranged to lock with padlock (padlock not included).

Hinged doors lock with a Yale No. 042 R night latch with lock-protecting plate. Three steel tight pin butt hinges. Stock doors are 3 ft. wide by 7 ft. high and have a transom panel and side panel arranged to fit into a 4-ft. wide opening.

Windows—Type "SD-MD" is a drop shelf window panel 4 ft. wide, 8 ft. high and will also fit any other panels. The shelf which folds up, closes and locks the opening, is No. 10 gauge steel and has folding arms to stiffen same when used as a shelf.

Type "SW-MW" is a sliding window for use in passing requisitions or other papers through; can also be used for small tool passing, can be locked open at various heights or locked shut.

Top Panels—Type "T" panels are in various heights and designed to cross two base panels acting as a stiffener to the entire partitions. These panels are to permit higher partitions to the ceiling. They will receive the bulk of the cutouts for sprinkler, steam and water pipes for cross beams, etc., eliminating cutting into the more expensive base panels, and when partitions are rearranged are the only panels that it may be impossible to use in a new location because of cuts, etc.

Cap Bars—Cap bars are $1\frac{1}{4} \times \frac{1}{4}$ in. and can be fitted to the top of any partition; they act as an excellent stiffener to any partition. No drilling is required to make them fit—they are started in the center of a panel and always end in the center of a panel.

Stiffener Braces—Two types are shown, one for a wooden ceiling, another for concrete. The one for the concrete ceiling recommends itself particularly because it lowers the entire erection cost. A $\frac{1}{2}$ or $\frac{5}{8}$ -in. hole is punched into the concrete, the bar pounded into the hole and tightened to the vertical member of the partition; no lag screws, bolts, shells or lead packing is used.

In some cases, a type "D" flat bar is desirable to stiffen panels. Where this is done $\frac{5}{16}$ in. must be added to the length for each bar so used.

Floor Shoes—Of cast iron, can be used on any floor; designed to keep partition from shifting. Are placed after entire partition is lined up. On concrete floors partition can also be anchored or cemented into the floor.

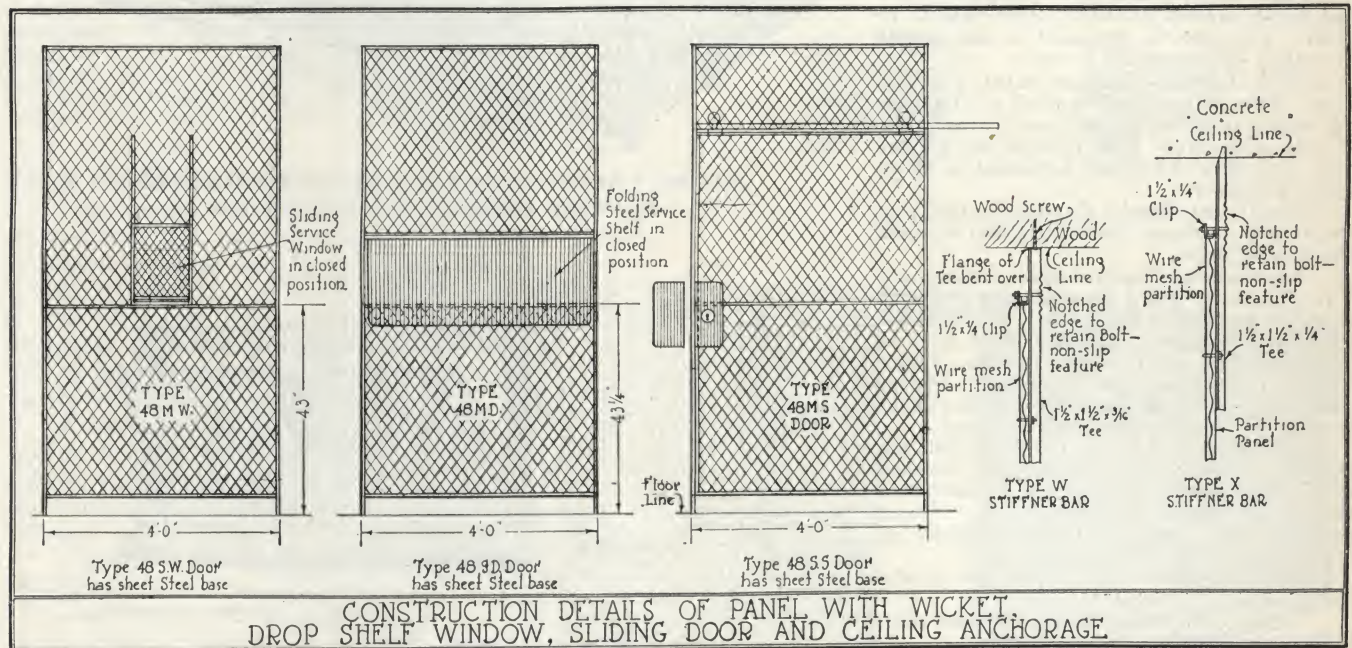
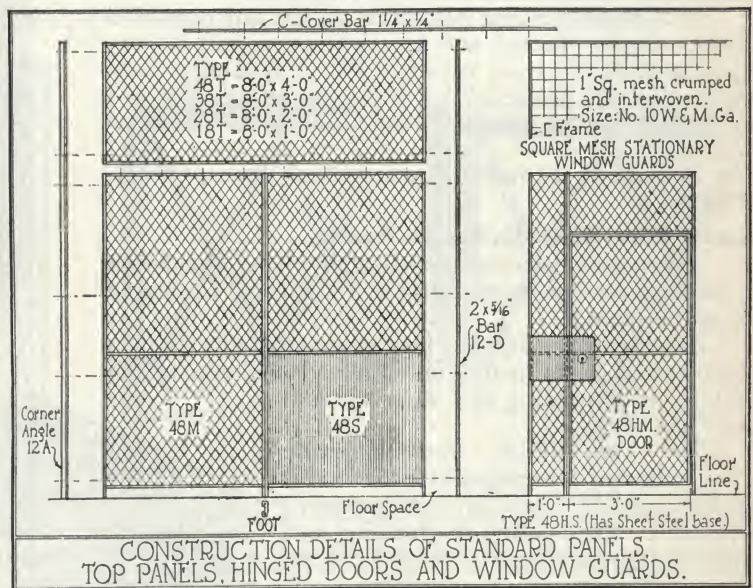
Paint—Standard paint is one dip coat of black asphaltum. Other finishes special.

Square Mesh Window Guards

Not carried in stock but due to the method of manufacture, orders can be shipped in 48 hours. This type cannot be made in diamond shape mesh. Diamond mesh guards require a greater length of time to make. Square mesh guards are not expensive, they are strong and desirable for window and burglar protection, bulk-head guards, etc.

Ornamental plates are provided for the corners of hinged guards to keep them from sagging. Padlocks or rim locks can be attached; no mortise locks can be used.

Specifications—1 in. square opening mesh No. 10 W&M gauge wire, $\frac{3}{4}$ -in. channel frames, painted 1 dip coat black asphaltum, or special color if desired.



ACORN WIRE AND IRON WORKS

Wire Mesh Enclosure Panels, Wire Cages and Wire Window Guards

TELEPHONE
NORMAL 1895

5906 Lowe Avenue
CHICAGO, ILL.

Products

Manufacturers of ACORN WIRE MESH ENCLOSURE PANELS; CAGES for Banks and Offices; DIAMOND MESH WINDOW GUARDS.

Also manufacturers of Skylight Guards, Machinery Guards; Elevator Enclosures, Wickets and Grilles; Railings for Stairs, Porches, Balconies and Windows; Area Gratings and Sidewalk Doors; Wire Signs and Collapsible Folding Gates.

Important Recommendation to Architects

It is suggested that architects secure our quotation direct. Copies thereof will be gladly furnished to contractors when this work is to be included in another contract. To be protected against inferior service and workmanship, the architect should include in his specifications:

"As made by the ACORN WIRE AND IRON WORKS, Chicago, or equal."

Acorn Wire Mesh Enclosure Panels

A fireproof partition which allows free circulation of air and unobstructed light is a requisite for every industrial plant.

Acorn enclosure panels give systematic effectiveness—the aim of every factory executive; they eliminate loss of tools and supplies, and do away with petty thievery.

They are 100% interchangeable. They can be rearranged, added to or moved quickly and by inexperienced workmen. They permit the forming of a corner at any intersection and the placing of doors between any two panels.

Material Specifications—Height—7, 8, 9 and 10 ft. carried in stock; other heights to order. Can also be increased to any height by adding special panels at top.

Width of Panels—Standard panels are 5 ft. wide. This extra width is used to eliminate the weakness caused by too many connections. It also saves from 15% to 20% installation cost. Special width panels furnished to fill in where necessary.

Cut-outs and Special Panels—Cut-outs, or special size or shape panels furnished to meet special conditions.

Door Sections—Standard door sections are 3 ft., 3 ft. 6 in., and 4 ft. wide, and of height to match partitions. Doors are 6 ft. 6 in. high with transom panel overhead. Door sections interchangeable with other sections. Either sliding or swinging types furnished. Sliding doors up to 4 ft. wide made self-closing without extra cost. Special sizes when necessary.

Locks—Made of brass, operated with pin tumbler cylinders from outside, and recessed knob from inside. Master-keyed locks furnished at slight additional cost. Doors equipped with hasp for padlock instead of regular lock with reduction in cost.

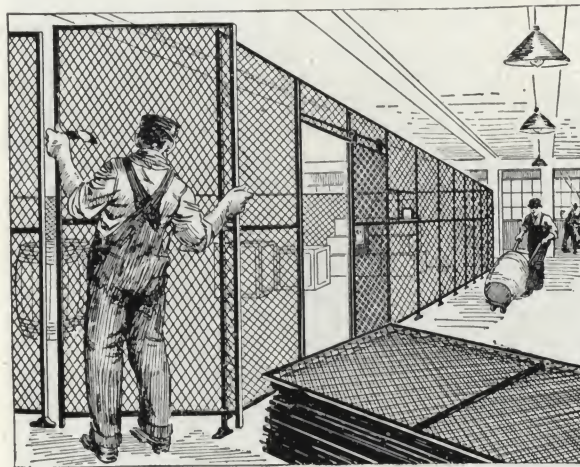
Service Windows—See illustrations of details.

Hangers—All sliding doors equipped with ball bearing hangers.

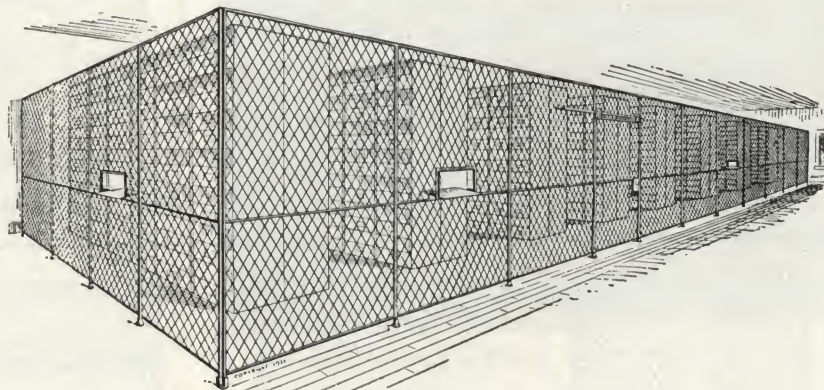
Wire, Web and Mesh—No. 10 ($\frac{1}{8}$ -in.) open hearth steel wire used. Entire web in one piece with wires passing through center stiffening bar, eliminating unnecessary joints. Mesh is $1\frac{1}{8}$ -in. diamond mesh.

Framing and Stiffening Bar—Framing, $1\frac{1}{2}$ -in. steel channel. Center stiffening bar, $1\frac{1}{8}$ -in. channel steel securely riveted to frame.

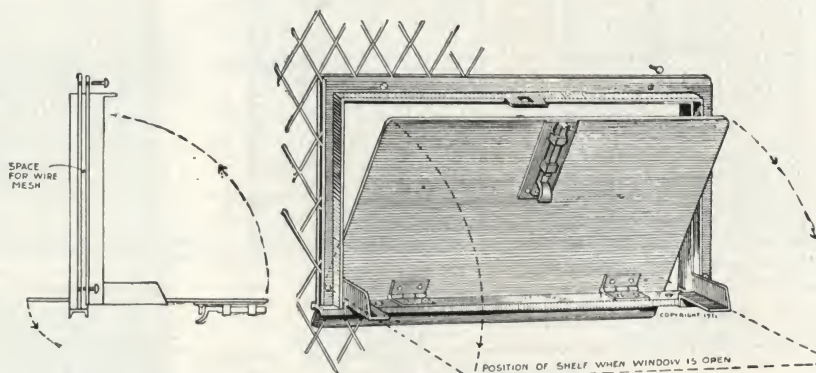
Capping Bar— $2\frac{1}{8}$ -in. steel channel extending from center of one panel to center of next, thereby breaking joints.



ACORN UNIT WIRE MESH ENCLOSURE PANELS



STANDARD INTERCHANGEABLE PANELS ADAPTABLE TO ANY USE
An excellent arrangement for tool or stock room



COMBINATION SERVICE WINDOW AND SHELF

Shelf swings up, closing opening, and is locked from inside with improved dead locking push bolt. After it is locked, a spring back of bolt lodges the hand into recess when it can not be opened until bolt is pressed against plate. Installed before shipment or after partition is in place. Special service windows furnished to suit requirements.

2 sizes; "A," 15 in. wide by 9 in. high, "B," 24 in. wide by 15 in. high. Each fitted with metal shelf extending about 2 in. on outside, and 9 in. and 15 in., respectively, on inside.

Bracing—While capping bars will carry a reasonably long partition, simple methods of bracing can be effected by use of wire strands from top of partition slantwise to ceiling.

Floor Sockets—2½ in. high to allow for adjustment where floors are uneven.

Corner Posts—1x1-in. steel angle with floor socket. This permits the making of corner at any intersection.

Connection Toggles—In addition to the regular bolts furnished for bolting panels together, 3 special toggles are furnished at each intersection to prevent channels from telescoping or overlapping, thereby overcoming the difficulty otherwise experienced in erection.

General Hardware—All hardware that is subject to strain is made of malleable iron or wrought steel to prevent breaking. The balance is made of soft grey iron.

Paint—Standard factory green unless otherwise specified. Special colors may be had at slight additional cost.

Erection—Many original and exclusive features make Acorn partitions extremely easy to erect. No experience or special skill is necessary. Diagram and complete setting instructions sent with each order.

Acorn Diamond Mesh Window Guards

They permit the opening of windows for ventilation without danger of burglary or damage to material or tools, and safeguard windows against accidental or intentional breaking.

Material Specifications—Made of three principal specifications: 1¼-in. mesh, No. 12 wire; 1½-in. mesh, No. 10 wire; 2-in. mesh, No. 8 wire. The 1½-in. mesh, No. 10 wire is most used, being the meeting point of burglary and glass protection. Guards can be furnished in any wire or mesh desired.

No. H-5 hinge and No. H-6 hasp, of malleable iron, are recommended. They afford an excellent means of fastening and are adaptable to any style window frame by reversing same where necessary. Hinges are fastened to window by lag screws making it difficult to remove from outside. Hasps are locked to a heavy screweye which can not be removed when padlock is in place.

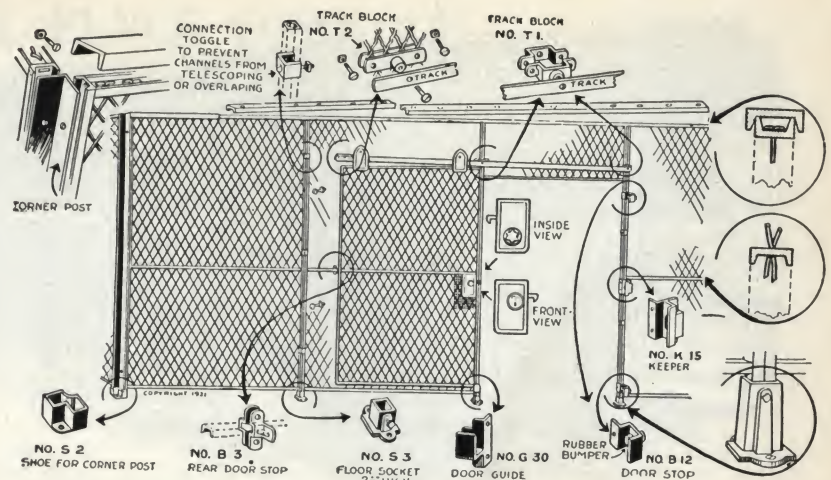
Cages for Banks, Offices, etc.

The ACORN WIRE AND IRON WORKS have developed and are using the press crimp type of construction in bank and office cages (see detail). This type of crimp adds much to the character and distinctiveness of the work. The old type double crimp can still be furnished when it is necessary to match old work.

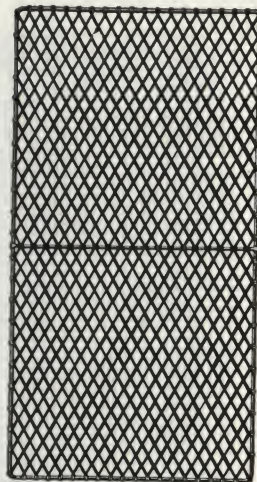
Press crimp can be furnished in either square or flat wire, but because of its greater utility and rigidity, square wire is recommended (see typical specification following).

Nos. 142 and 143 cages are commonly used in offices and small banks.

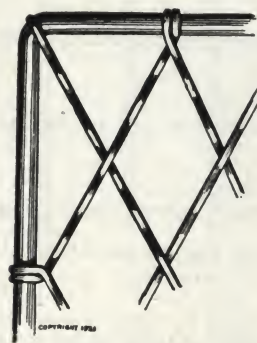
The upper part is made either of ⅛-in. square wire or ¼-in. flat wire, 1½-in. square mesh. The ⅛-in. square wire is preferable because of its greater strength. Wires are pressed at each intersection, making a neat and pleasing appearance. The lower part is made of round



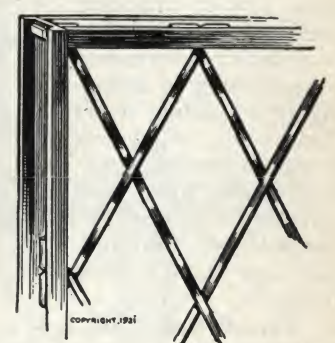
DETAILS OF ACORN UNIT SECTIONAL DIAMOND MESH PARTITIONS



No. 121 WINDOW GUARD



No. 121

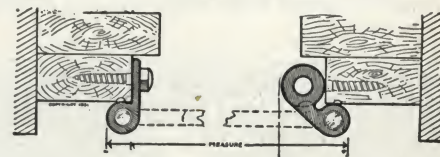


No. 122

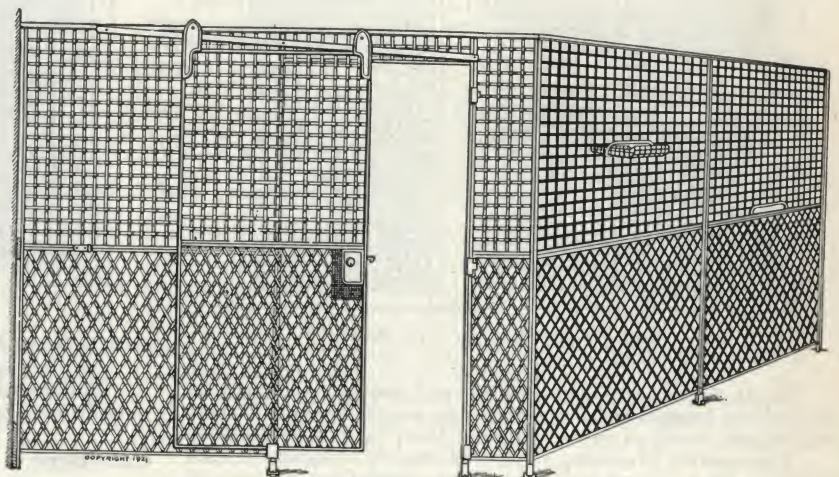
DETAILS SHOWING CONSTRUCTION OF SCREENS

No. 121 guard has round steel frame of ⅜ or ¾-in. diameter according to size of guard. Furnished in either stationary or hinged type. Hinged type permits washing windows.

No. 122 guard has channel frame varying from ¾ to 1 in. wide. These are satisfactory when designed to fit opening, but are not recommended when outer grooved edge is exposed to view.

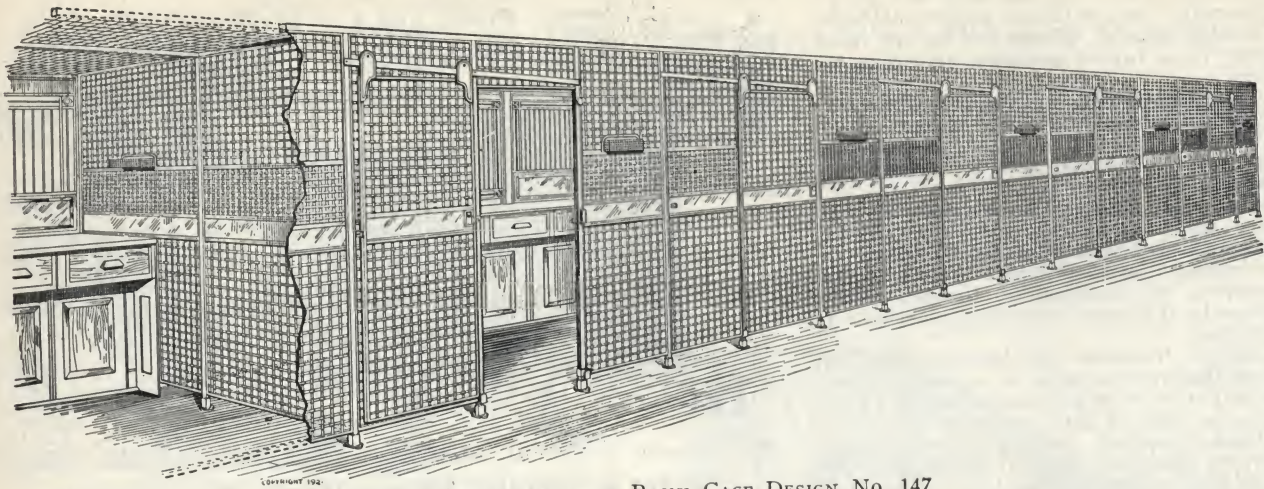


H-5 HINGE AND H-6 HASP



ACORN BANK OR OFFICE CAGE

No. 142, upper part square wire. No. 143, upper part flat wire

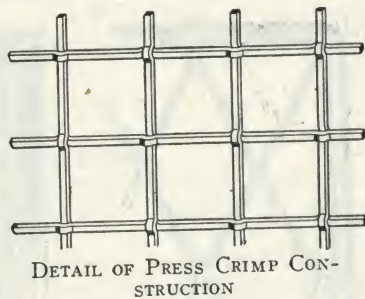


TYPICAL ARRANGEMENT OF BANK CAGE DESIGN No. 147

Same as Design No. 146 except that $\frac{3}{4}$ -in. square mesh panels 1 ft. high are fitted at top of solid panels

wire, $1\frac{1}{2}$ -in. diamond mesh.

Doors furnished either sliding or swinging type; sliding doors being made self-closing unless otherwise specified. Doors fitted with cylinder locks operating with key from outside and knob from inside.

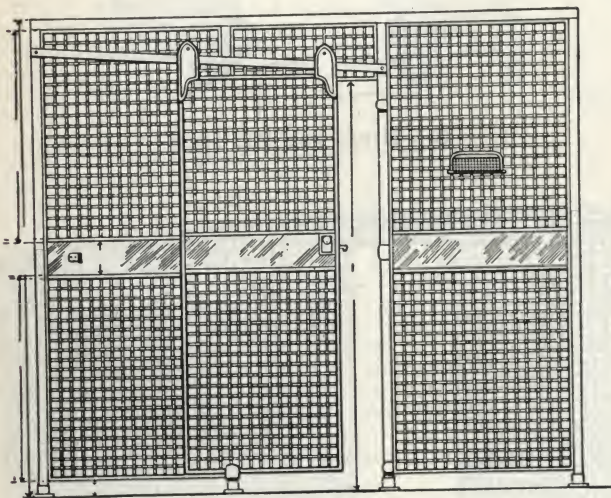


DETAIL OF PRESS CRIMP CONSTRUCTION

Typical Specifications—Cages shall be of a height to conform to front fixture and shall be made of $\frac{1}{8}$ -in. square wire, $1\frac{1}{2}$ -in. square mesh of press crimped type. Framing to be of $1\frac{1}{2}$ -in. channel, tenoned and riveted at corners. Posts at doors and at each intersection shall be of $1\frac{1}{4}$ -in. square Shelby tubing No. 14 gage in thickness. The same tubing shall be used to finish top of cages. (See Design No. 146, Catalogue 200, ACORN WIRE AND IRON WORKS, Chicago.)

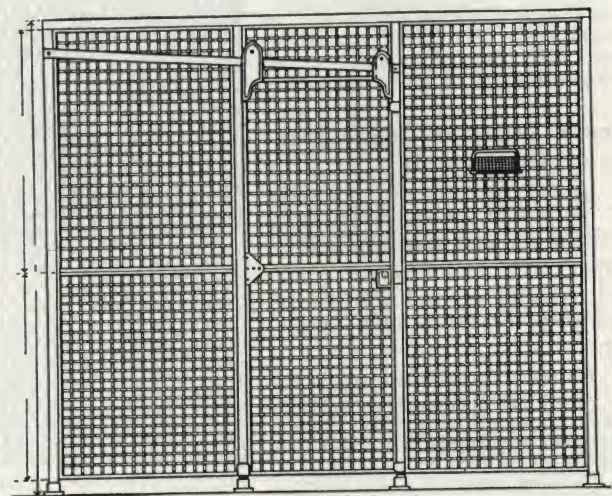
Note: If flat wire is specified, $\frac{1}{4} \times \frac{1}{8}$ -in. wire, $1\frac{1}{2}$ -in. square mesh is recommended.

Each section, including doors, to be fitted with metal panel 7 in. wide; bottom of panel to be flush with top of counter.



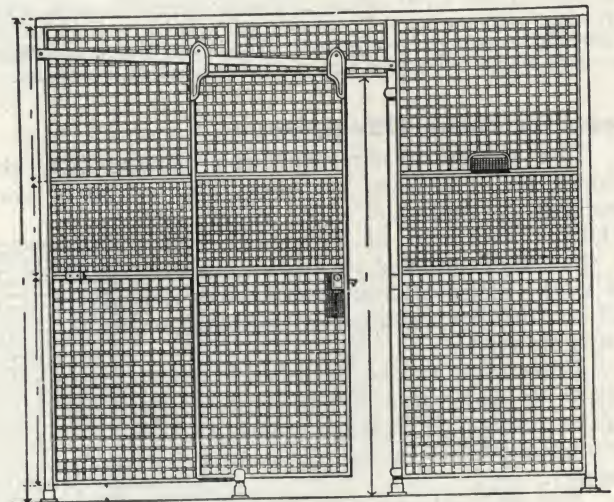
BANK CAGE DESIGN No. 146

Doors to be of sliding gravity, self-closing type hung on ball bearing hangers and fitted with Yale master-keyed cylinders; master keys to be of series different from balance of building. Pass baskets 8 in. wide, 10 in. long shall be included for each division. Pass baskets 8x8 in. shall be included for the rear of each cage. Basket to be fitted flush with outside of cage.



BANK CAGE DESIGN No. 144

Same as Design No. 146 except that solid metal panels are eliminated



BANK CAGE DESIGN No. 145

Same as Design No. 146 except that $\frac{3}{4}$ -in. square mesh panels 1 ft. 6 in. high are substituted for solid panels

Finish—Usually furnished in flat black, verde green, or natural bronze, but can be furnished in any finish desired.

Catalogue

Complete catalogue sent on request.

CYCLONE FENCE COMPANY

MAIN OFFICES
WAUKEGAN, ILL.

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PORTLAND and SEATTLE, NORTHWEST FENCE & WIRE WORKS

OAKLAND and LOS ANGELES, STANDARD FENCE COMPANY

Products

"GALV-AFTER" ALL COPPER-BEARING MATERIALS, CHAIN LINK FENCE for country estates, country clubs, golf grounds, suburban homes, city residences, public and private parks, schools, athletic fields, churches, cemeteries, city, county, state and national institutions.

WROUGHT IRON FENCE, ENTRANCE ARCHES and GATES, RAILINGS, etc.

FENCING for factories, industrial housing communities, power and pumping stations, transformer stations, reservoirs and filtration plants.

ENCLOSURES and BACK STOPS for tennis courts; also kennels, animal cages, and poultry yards.

ROAD-GUARD for the protection of motor traffic at dangerous curves, bridge approaches, grades, etc. Fabric is of heavy No. 6 gauge copper-bearing steel wire, 2-in. mesh, galvanized after weaving. Standard height, 24 in., for posts 36 in. high.

SWINGING, SLIDING and FOLDING GATES.

WIRE WORK of all kinds: Wire Partitions (built-in-sections) for factories, offices and stockrooms; Window and Sky-light Guards, Woven Wire Entrance and Display Signs.

Also manufacturers of Special Fencing and Entrance Gates in Wire and Iron for any purpose, and Snow Fence.

Complete Responsibility—Nation-Wide Fencing Service



The Mark of Dependable Property Protection

While building Property Protection Fence of outstanding superiority, the CYCLONE FENCE COMPANY has developed the most highly specialized service the fence industry has known. It is designed to relieve fence purchasers of every detail.

The CYCLONE FENCE COMPANY controls the quality of its products from the ore to the finished job.

Cyclone engineers design and specify fencing best suited to customers' requirements; then carry out the work of construction to the erection of the fence complete. No part of the work is subtle to others. In no other way could the CYCLONE FENCE COMPANY assume full responsibility and completely satisfy its customers.

Engineering Counsel—Cyclone engineers will make a complete study of your fence requirements and submit recommendations, layouts, and estimates of cost.

Cyclone Erection Crews—There are more than 100 erection crews constantly at work installing Cyclone Fence. One of these crews is available for your installation and will handle the work quickly, correctly and economically.

However, if you prefer to have your own workmen install the fence, a Cyclone erection superintendent will be furnished at nominal charge, to direct them.

Diagram, Prices, etc.—When writing for information, prices, etc., send simple diagram of proposed fencing. Give measurements of each stretch and total measurements. Indicate end, corner and gate posts thus, "O." State whether single or double swing, or sliding gates are wanted and give size of opening.

Copper-Bearing Steel

You do not need to test or investigate copper-bearing steel. That has been done for you by the American Society for Testing Materials, a body of eminent, impartial scientists and engineers who have been making scientific investigations and actual weather tests over a long period.

Their findings prove conclusively the superiority of copper-bearing steel and their test records are available for you.

The copper content of Cyclone Fabric and Cyclone Tubular Framework is 0.20%.

Cyclone Safeguard Chain Link Fence

Specifications—Standard height, 6 ft. Built in heights from 4 ft. up to and including 10 ft. Chain Link fabric is full height of fence.

Fabric—"Galv-After" Chain Link copper-bearing wire heavily zinc-coated (or hot-galvanized) by hot-dip process after weaving. No. 9 or No. 6 gauge wire woven in a 2-in. mesh. On heights 5 ft. and over, both edges of fabric have twisted and barbed finish. On heights 4 ft. and lower, one edge has twisted and barbed finish, the other has knuckled finish and it is recommended that the knuckled edge be placed at top of fence dressed below top rail with the barbed edge at the bottom.

Posts—Hot-dip galvanized. Of standard full weight tubular copper-bearing steel, made by the National scale-free process.

Line Posts—2½-in. outside diameter, weight 3.65 lb. per lin. ft. where fence is 6 ft. and over in height. Where fence is less than 6 ft. in height, 2-in. outside diameter, weight 2.72 lb. per lin. ft.

End, Corner, Angle and Pull Posts—3-in. outside diameter, weight 5.79 lb. per lin. ft. where fence is 6 ft. and over in height. Where fence is less than 6 ft. in height, these posts are 2½-in. outside diameter, weight 3.65 lb. per lin. ft.

Gate Posts—The size and strength of gate posts for swinging and sliding gates have been carefully determined by our Engineering Department. Details upon request.

Post Spacing—Posts are spaced in line of fence not farther apart than 10-ft. centers.

Depth of Posts—Line posts for fence 4 ft. or lower are set 24 in. in concrete base; terminal posts 30 in. In 5-ft. fence, line posts are set 30 in., terminal posts 36 in. In Cyclone Safeguard Fence 6 ft. in height and over, all posts are set 36 in.

Post Setting—Concrete post bases are of proper mixture, size and shape to furnish a foundation and support sufficient to withstand any ordinary strain or shock. A liberal factor of safety is provided.

Post Tops—Hot-dip galvanized. All posts fitted with heavy ornamental ball post tops of malleable iron. The base of these tops fits into the post and a flange carries over the outside to cap the post against moisture.

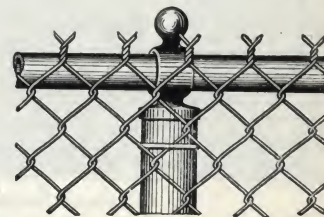
Top Rail—Made by the National scale-free process, hot-dip galvanized. Tubular copper-bearing steel 1½-in. outside diameter, weight 2.27 lb. per lin. ft. Expansion rail coupling. Top rail passes through post tops and forms a continuous brace from end to end of each stretch of fence. Top rail is securely fastened to end, gate and corner posts by malleable iron or pressed steel connections.

Braces—Made by the National scale-free process, hot-dip galvanized. End, gate and corner posts are braced by tubular copper-bearing steel braces 1½-in. outside diameter, weight 2.27 lb. per lin. ft. Braces are spaced midway between the top rail and ground and extend to the first line post, fastened by malleable iron or pressed steel connections, then trussed from line post back to end, gate or corner post.

Fittings—All copper-bearing materials, hot-dip galvanized. All fittings used in connection with Cyclone Safeguard fencing and gates are malleable, wrought iron, pressed steel or aluminum.

Fabric Bands—Aluminum. Fasten the fabric to line posts and top rail, spaced approximately 14 in. apart.

Finish—All materials entering into the fence construction, except aluminum bands, are heavily galvanized.



Top Finish of Safeguard Fence



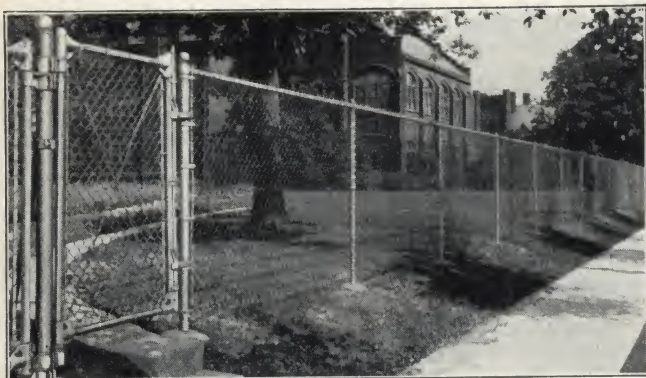
Cyclone Safeguard Fence

Standard for schools, playgrounds, parks, etc.; strong, durable; will stand rough usage



Cyclone Invincible Fence Enclosing Athletic Field

Built in heights up to and including 11 ft. "Galv-After" Chain Link Fabric and tubular framework made of copper-bearing steel. Pressed steel extension arms carry 3 rows of barbed wires along entire top of fence



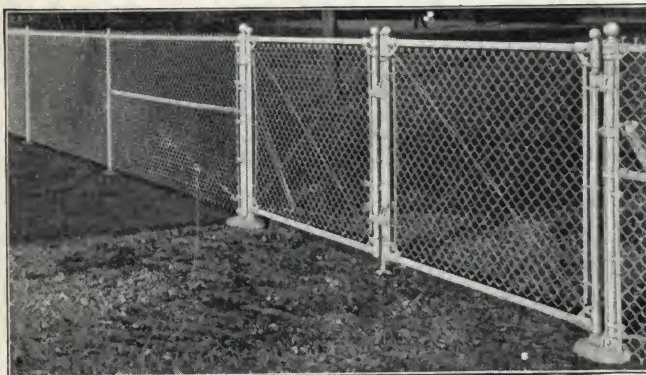
Cyclone Safeguard Fence

Extensively used for colleges, institutions, church property, public and private grounds of all kinds



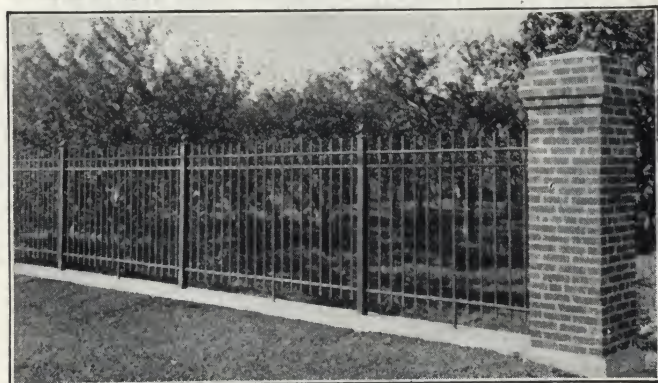
Cyclone Tennis Court Enclosures and Back Stops

Framework, tubular copper-bearing steel, hot-dipped galvanized. Fabric "Galv-After" Chain Link No. 11 gauge copper-bearing steel wire woven in a 1 3/4-in. mesh. Standard height, 10 ft.



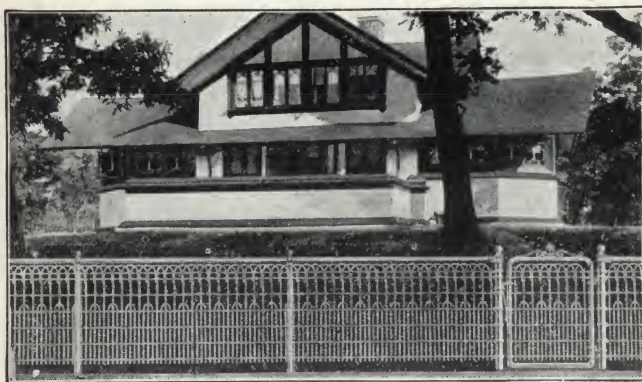
Cyclone Safeguard Fence

Beautiful and dignified property protection for country estates and homes—also golf grounds and clubs



Wrought Iron Fence, Pattern No. 508

One of the most popular patterns. Built in heights from 37 to 72 in. Square pickets. When desired, Cyclone Wrought Iron Fence will be built in special designs from architects' drawings



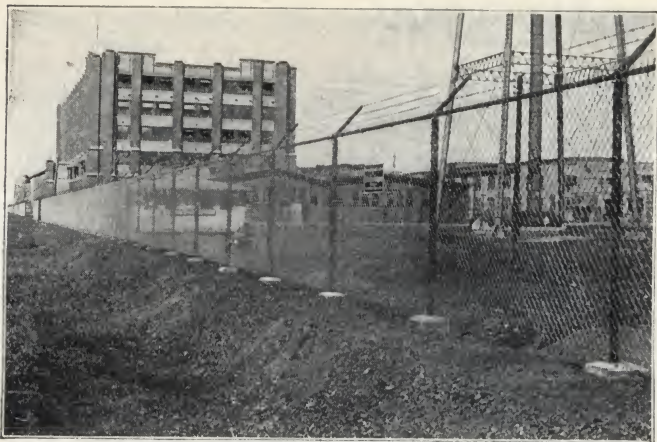
Cyclone Colonial "Complete Fence"

Standard heights: 36, 42, 48 and 54 in. Framework, tubular copper-bearing steel, hot-dipped galvanized. Fabric, style "F," copper bearing steel. Pickets spaced 3 in. apart at top, 1 3/4 in. apart at bottom



Wrought Iron Entrance Gate, Pattern No. 501

Cyclone Wrought Iron Fence and Entrance Gates are built in a variety of heights and handsome patterns from which fencing appropriate for any purpose may be selected



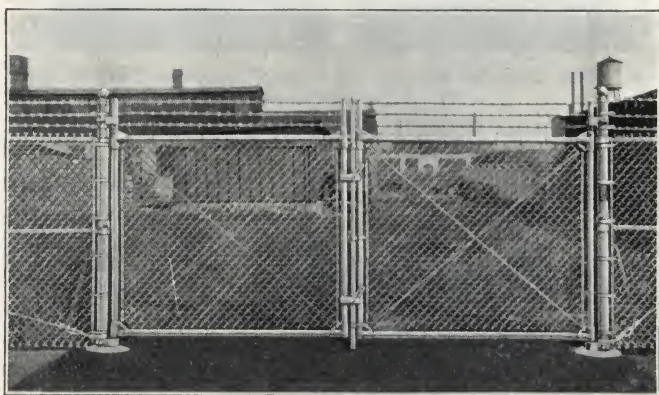
Cyclone Invincible Chain Link Fence

Standard height, 7 ft.. All copper-bearing materials. Built in heights up to and including 11 ft. Fabric, "Galv-After" Chain Link, heavily zinc-coated (or hot-galvanized) by hot-dipping process after weaving. No. 9 or No. 6 gauge wire woven in a 2-in. mesh. Extension arms carry 3 rows of 4-point barbed wires, 12 in. in or out from fence line. Posts and framework, full weight tubular steel, hot-dipped galvanized



Cyclone Non-climbable Chain Link Fence

Standard height, 7 ft. All copper-bearing materials. Built in heights up to, and including 11 ft. Fabric, "Galv-After" Chain Link, heavily zinc-coated (or hot-galvanized) by hot-dipping process after weaving. No. 9 or No. 6 gauge wire woven in a 2-in. mesh. Extension arms carry 5 rows of 4-point barbed wire 9½ in. in and out from fence line. Posts and framework, full weight tubular steel, hot-dip galvanized



Cyclone Swinging Gates

Either single or double, for Invincible, Non-climbable or Safe-guard Fence

Specifications, Cyclone Swinging Gates

Standard Sizes—Single swinging walk gates built standard for 4-ft. opening. Double swinging gates for driveways built standard for 14 and 18-ft. openings. The standard size for railroad entrance is 18 ft. Where conditions are such that standard sizes can not be used, gates are built to meet requirements.

Frames—Hot-dip galvanized, tubular copper-bearing steel; made by the National scale-free process. On fence having

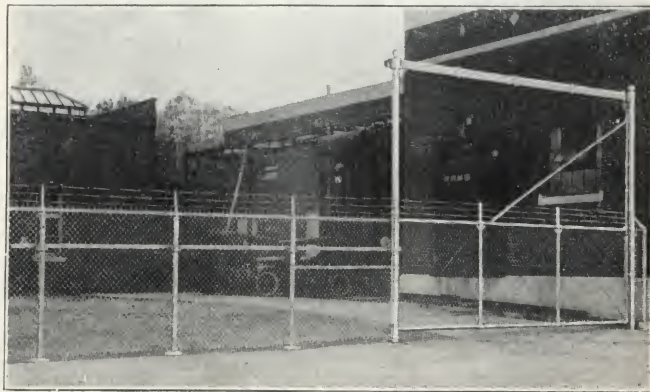
barbed wire top, the end members extend 1 ft. above top horizontal rails, and carry 3 strands of barbed wire.

Stays—Hot-dip galvanized, tubular copper-bearing steel. Made by the National scale-free process. Stays, together with ¾-in. adjustable truss rods, keep gate absolutely rigid; prevent sagging, buckling and side weave.

Fabric—Cyclone "Galv-After" Chain Link to match fabric used in fence furnished.

Hinges—Hot-dip galvanized. Made of malleable iron. Exceptionally large bearing surface for clamping hinge on gate post. Cyclone swinging gate hinge equipment will carry 100% overload. Bottom hinge is ball and socket pivot type.

Latch and Lock—Hot-dip galvanized. On swinging gates of all types, latch is of the plunger bar type, arranged for pad-lock locking. Railroad and drive gates are equipped with catch posts to hold gates in open position.



Cyclone Sliding Gates

Either single or double, for Invincible, Non-climbable or Safe-guard Fence

Specifications, Cyclone Sliding Gates

Standard Widths—14 to 20-ft. opening for driveway. Standard overhead clearance 14 ft.

Frames—Hot-dip galvanized, tubular copper-bearing steel. 2-in. outside diameter. Made by the National scale-free process. When used with fence having barbed wire top, 3 strands of barbed wire are carried above the top horizontal rail.

Stays—Hot-dip galvanized, tubular copper-bearing steel. Made by the National scale-free process. Gate stays, together with ¾-in. adjustable truss rods, keep gate absolutely rigid, prevent sagging, buckling and side weave.

Fabric—"Galv-After" Chain Link copper-bearing steel wire to match fabric used in fence furnished.

Overhead Track Support—5-in. channel, weight 6½ lb. per lin. ft. Fastened to gate posts by means of combination special ornamental ball post top cap and channel support.

Trolley—Double truck roller bearing type. Very easy to operate. Track completely enclosed.

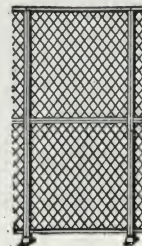
Wire Work of All Kinds

Partitions (Built-in-Sections)—Standard size sections 4 ft. wide by 8 ft. high. Frames are 1-in. channel iron. Fabric is No. 10 gauge wire woven in 1½-in. diamond mesh. Furnished with either swinging or sliding gates. Handholes or wickets provided where needed. Floor flanges furnished for either wood or concrete floors. Sections are interchangeable, movable; can be taken out and used elsewhere—no refitting—no loss. Quick changes in departments can be made at any time.

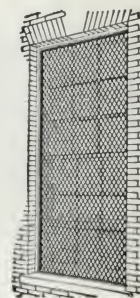
Send blue print or layout of partition work wanted.

Window and Skylight Guards—Frames are 1-in., ¾-in.

channel, or ¾-in. round iron. Fabric is usually No. 10 gauge wire woven in 1½-in. diamond mesh. Channel iron frames fit into openings. Round iron frames usually allow ¾ in. on all sides for lap. Special guards built with either channel or round iron frames, using size of wire and mesh desired.



Partition Section



Window Guard

PAGE FENCE ASSOCIATION

215 North Michigan Avenue

CHICAGO, ILL.

MEMBER COMPANIES

Distributing Chain Link Products of the Page Steel and Wire Company, Associate Company with the American Chain Company, Inc., Bridgeport, Conn.

ALABAMA: BIRMINGHAM—INGALLS IRON WORKS
 CALIFORNIA: LOS ANGELES—SOUTHERN CALIFORNIA FENCE CO.
 SAN FRANCISCO—MICHEL & PFEFFER IRON WORKS
 COLORADO: DENVER—STEARNS-ROGER MFG. CO.
 CONNECTICUT: NEW HAVEN—THE JOHN P. SMITH CO.
 GEORGIA: ATLANTA—J. R. WHITMAN
 SAVANNAH—SAVANNAH IRON AND WIRE WORKS
 ILLINOIS: CHICAGO—CHICAGO FENCE & WIRE CO.
 INDIANA: INDIANAPOLIS—THE HOOSIER FENCE CO.
 IOWA: DES MOINES—DES MOINES STEEL CO.
 KENTUCKY: LOUISVILLE—THE LOGAN CO.
 LOUISIANA: NEW ORLEANS—ORLEANS STEEL PRODUCTS CO.
 SHREVEPORT—THE MERIWETHER SUPPLY CO.
 MARYLAND: BALTIMORE—HORACE T. POTTS & CO.
 MASSACHUSETTS: BOSTON—C. A. GATES & CO.
 MICHIGAN: DETROIT—BARNES WIRE FENCE CO.
 MINNESOTA: MINNEAPOLIS—CROWN IRON WORKS CO.
 MISSOURI: KANSAS CITY—KANSAS CITY WIRE & IRON WORKS
 ST. LOUIS—SEARS AND PIOW
 NEBRASKA: OMAHA—GATE CITY IRON WORKS
 NEW YORK: BINGHAMTON—TITCHENER IRON WORKS, INC.
 BUFFALO—BUFFALO FENCE CONSTRUCTION CO.
 FORT EDWARD—NEWTON & HILL, INC.
 NEW YORK—BROOK IRON WORKS, INC.
 TROY—FRED K. BLANCHARD, INC.

NORTH CAROLINA: CHARLOTTE—GENERAL EQUIPMENT CO.
 OHIO: ASHVILLE—J. S. ROOF
 CINCINNATI—THE DAVIS & SIEHL CO.
 CLEVELAND—THE BETZ-PIERCE CO.
 WASHINGTON C. H.—W. W. WILSON & SON
 ZANESVILLE—THE F. WILKING & SONS CO.
 OKLAHOMA: TULSA—TULSA FENCE & POST CO.
 OREGON: MEDFORD—GADDIS & DIXON
 PORTLAND—GADDIS & DIXON
 PENNSYLVANIA: PHILADELPHIA—HORACE T. POTTS & CO.
 PITTSBURGH—STEWART-HOLLAND CO.
 SCRANTON—THE BITTENBENDER CO.
 TENNESSEE: CHATTANOOGA—JAMES SUPPLY CO.
 MEMPHIS—MILLER-COCHRAN CO.
 TEXAS: DALLAS—COLUMBIA FENCE & WIRE CO., INC.
 SAN ANTONIO—SOUTHERN PRISON CO.
 UTAH: WOODS CROSS—BURNHAM MANUFACTURING CO.
 VIRGINIA: DANVILLE—VASS-MOBLEY HARDWARE CO.
 RICHMOND—RICHMOND MACHINERY & SUPPLY CO.
 WASHINGTON: SEATTLE—GADDIS & DIXON
 SPOKANE—SPOKANE CULVERT & TANK CO.
 WEST VIRGINIA: PARKERSBURG—PARKERSBURG SUPPLY CO.
 WISCONSIN: MILWAUKEE—A. F. WAGNER ARCHITECTURAL IRON WORKS

CANADA

NIAGARA FALLS—DOMINION CHAIN CO., LIMITED
 OFFICES: WINNIPEG, MAN., ST. JOHNS, N. B., MONTREAL, QUE.

Products

CHAIN-LINK FENCING for protection and ornamental purposes of every description.

INDUSTRIAL FENCING for factories, mills, refineries, railroads, power stations, mines, yards, etc.

FENCING for city, state, and national institutions, including schools, parks, playgrounds, prisons, hospitals, etc.

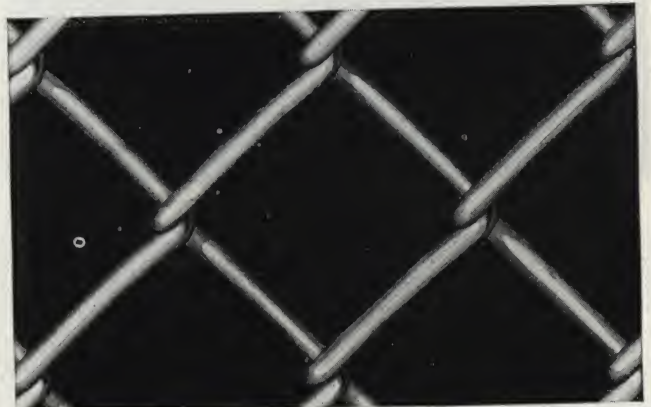
ENCLOSURES for athletic fields, tennis courts, baseball grounds, race tracks, fair grounds, amusement parks, aviation fields, automobile parking enclosures, etc.

Also manufacturers of Page Hi-Way Guard; Page Panel Partitions, made of Page Chain-Link fabric, for factories, offices, warehouses, stock rooms, etc.; Fencing and Entrance Gates of copper bearing steel for residences, estates, country clubs, etc.; Page Chain-Link Specialties: Window and Skylight Guards, Display Signs, etc.



TRADE-MARK

The first wire fence ever made was designed by J. Wallace Page in 1883. For 43 years Page fences have been standards of good fence design.



Half Size Illustration of Page Protection Fabric
 No. 6 Wire, 2-in. Mesh

This fabric is made in copper bearing steel.

The standard weave for fence purposes is a 2-in. mesh made from No. 6 or No. 9 wire or a 1 3/4-in. mesh No. 11 wire for tennis courts



"The Watchman That's Everywhere at Once"

Page Protection Fence

"The watchman that's everywhere at once" standing guard around the plant of a large manufacturing concern. Page is the most permanent and economical protection that is available

Only Page Drawn Wire Meets with Page Specifications

To assure the high standards for uniformity and strength set by Page engineers, every bit of wire used in Page products is rolled and drawn and galvanized in the Page mills.

The most rigid of inspection guarantees only perfect material being used.

Fabric Heavily Galvanized After Weaving

To guard against corrosion and rust, all Page fabric is heavily galvanized after weaving with a uniform coat of zinc—approximately five times heavier than ordinary galvanizing. This is applied by a hot dip process perfected by Page and assures uniformity. Page fabric galvanized in this manner has proven its claim for superiority by giving many years of satisfactory service under the most adverse conditions in all parts of the country.

Tests carried on both in the laboratory and in actual service prove that the heavier coat of zinc results in a more durable fence, especially when the base metal is uniform and of high quality.

There Is a Page Distributor Near You

In each district of the United States and Canada there is a responsible firm of fence engineers that carries complete stocks of Page products and specializes in fence construction. This assures expert performance of the work all the way through, and gives the advantage of consultation with men of long experience in the erection of fences.

Estimates gladly furnished on receipt of rough sketches of proposed work, or complete detailed designs will be drawn up, if desired, and estimates supplied.

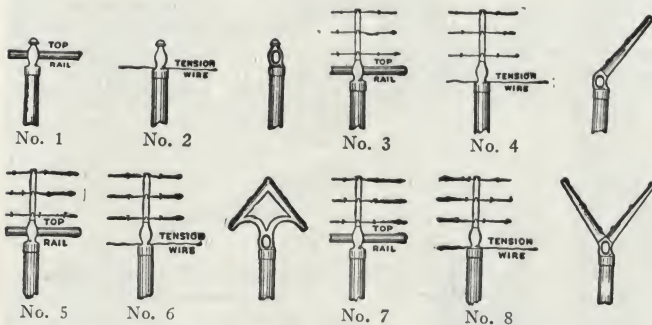
Get in touch with the distributor nearest you, as listed on the preceding page, or write direct to association headquarters for interesting literature.

Page Protection Fence for Industrial Buildings

Page factory fences are supplied in styles and sizes to cover every protection purpose.

Used to enclose yards and buildings, it keeps out malicious intrusion and reduces fire hazard. It helps maintain an accurate record of material entering and leaving the plant, and makes the yard a safe storage place for tools and fuel. In times of strike or other disturbances it protects buildings.

For detailed specifications see following page.



Eight Styles of Page Protection Fence from Which to Choose

- | | |
|-------------------|--|
| No. 1. Style 0-TR | No barbed wire—using top rail. |
| No. 2. Style 0-W | No barbed wire—using tension wire. |
| No. 3. Style 3-TR | Three strands of barbed wire—using top rail. |
| No. 4. Style 3-W | Three strands of barbed wire—using tension wire. |
| No. 5. Style 5-TR | Five strands of barbed wire—using top rail. |
| No. 6. Style 5-W | Five strands of barbed wire—using tension wire. |
| No. 7. Style 6-TR | Six strands of barbed wire—using top rail. |
| No. 8. Style 6-W | Six strands of barbed wire—using tension wire. |



Page Chain Link Fence Offers Permanent Protection for School and Institutional Property

Page Panel Partitions

For inside protection in warehouses, stores, garages and factories, Page panel partitions have no equal. They provide light, airy compartments for the storing of material, facilitating an accurate check on stock at all times.

Where an enclosure is desired for superintendent's office in shops, Page panels occupy little space and afford view of the entire floor or department.

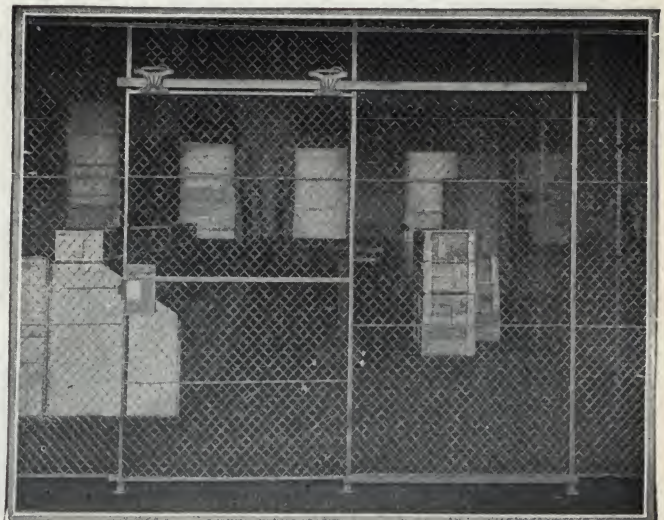
Page panels are constructed of the same strong square mesh as Page fence. Fabric is 1½-in. mesh, No. 10 gauge. Frames are of channel iron (½x1x1/8) braced crosswise with 3/8-in. diameter rods. Panels come to you complete with fittings, and painted black. Ready to install.

Units 4x8 ft., finishing 8 ft. 3 in. high. We also stock 3, 2 and 1 ft. wide.

Interchangeable standard panels permit removal and relocation of Page partitions with 100% salvage value.

Doors for Page panels are also interchangeable with regular panels. Both swinging and sliding types of doors can be hung on either side of partition to operate in either direction.

Sliding doors are built in two sizes, 4 ft. and 8 ft. wide.



This Stockroom Facilitates an Accurate Check on Supplies

Specifications for Page Chain Link Fence

Line of Fence

Chain Link Fence Fabric—Chain Link Fabric can be of copper bearing steel containing not less than .20% copper and galvanized after weaving. Usual specifications for factory fence are 2-in. mesh No. 6 or No. 9 gauge (W&M). Residential, 2-in. mesh No. 9 and 2-in. mesh No. 11 W&M gauge. Tennis courts construction, 1½-in. mesh No. 11 W&M gauge.

Line Posts—Are hot galvanized copper bearing steel pipe and furnished in the following sizes: 2-in. outside diameter, weight 2.717 lb. per ft. for fences under 6 ft. high, and 2½-in. outside diameter, weight 3.652 lb. per ft. for fences 7 ft. high and over. These posts are spaced approximately 10 ft. on centers and are set 3 ft. deep in bell shaped concrete footings crowned at the top to shed water and to prevent posts from rusting at the ground line.

Top Rail—Shall be 1½-in. outside diameter copper bearing steel pipe hot galvanized, weighing 2.272 lb. per ft. in random lengths, the average of which shall not be less than 15 ft.

Expansion Sleeve—(No. 1027 P. O. 1½.) This fitting is used in connecting the lengths of top rail and shall be made of pressed steel heavily galvanized and shall be extra long, providing a rigid connection and allowing for expansion and contraction in the top rail.

Intermediate Post Tops—(No. 15-24-25-30-45.) For all styles of Page protection fence shall be made of malleable iron heavily galvanized and so designed as to fit over the posts, thus excluding moisture from the inside. All tops are also constructed so as to be used with top rail or tension wire, as desired. Post tops for styles of fence calling for barbed wire shall be provided with stamped iron extensions.

Fabric Bands—(No. 1020.) For attaching fabric to line posts are made of rustless zinc alloy—the advantage of this band being that it can not be removed without a tool and that the post is free of drilling.

Tension Wire—All Page protection fence is provided at the bottom with a No. 6 gauge high carbon steel coiled wire. The purpose of this is to prevent the fabric from being forced in by external force between line posts.

All "W" styles of fences are provided with this same type of wire at the top to support the fabric instead of the top wire.

Terminal Posts

3-in. outside diameter—weight 5.79 lb. per ft.—end, gate and corner posts

4-in. outside diameter—weight 9.10 lb. per ft.—gate posts

6-in. outside diameter—weight 14.61 lb. per ft.—gate posts

All the above shall be hot galvanized copper bearing steel pipe and of sufficient length to set 3½ ft. in bell shaped concrete footings which are crowned at the top to shed water and to prevent posts from rusting at the ground line. End and gate posts for styles of fence provided with barbed wire shall also be long enough to extend 1 ft. above fabric—to provide a support for the barbed wire.

Gate, End and Corner Post Tops—(No. 11-26-31-46.) Shall be of malleable iron heavily galvanized so constructed as to fit over the posts, thus excluding moisture. Corner posts for styles of fence with barbed wire shall be supplied with an improved post top with stamped iron extension for barbed wire. This arm is also provided with a setscrew whereby the arm is held stationary on the post.

Brace and Tension Bands—(No. 1001-1002-1006-1007.) Shall be of unclimbable beveled edge steel type provided with

¾-in. diameter square shouldered carriage bolts which are easily installed and can not be removed from the outside. All bands and bolts are hot galvanized and are used in attaching fabric brace assembly and top rail to posts.

Brace Assembly—(Rail end No. 43 P 1¼ A, brace end 44 P 1¼, and brace rod No. 1030.) All end and gate posts shall be furnished with one complete brace assembly as follows: 1 piece 1½-in. outside diameter copper bearing steel pipe for brace, weighing 2.272 lb. per ft., which shall be used as a compression member, 1½-in. diameter steel brace rod with drop forged turnbuckle, to be used as a tension member, 1 malleable iron rail and brace with necessary brace bands, and bolts for attaching to post. Corner posts shall be furnished with 2 complete brace assemblies.

Tension Bars—(No. 1046.) This 1½x¾-in. flat bar is run through the first spiral picket in a roll of fabric and is secured to the post by means of tension bands. This method of terminating the fabric distributes the strain evenly over its entire length, thus avoiding the distortion of the fabric at the bolts.

Gates

Frames—Shall be of 2-in. outside diameter copper bearing steel pipe construction weighing 2.717 lb. per ft. with intermediate braces of 1½-in. outside diameter copper bearing steel pipe weighing 2.272 lb. per ft. All joints shall be welded making a rigid and watertight frame.

12-ft. single or 24-ft. double gates and over shall be provided with a ¾-in. diameter steel brace rod with drop forged turnbuckle for adjustment, which shall run diagonally across the frame from the top of the frame on the hinge side to the bottom of the frame on the latch side.

Gate Filler—Frames shall be filled with fabric to match that in the line of fence and shall be furnished with or without barbed wire—as specified. When barbed wire is specified, ratchets shall be furnished on the gate extension to provide a means of keeping the wire taut at all times.

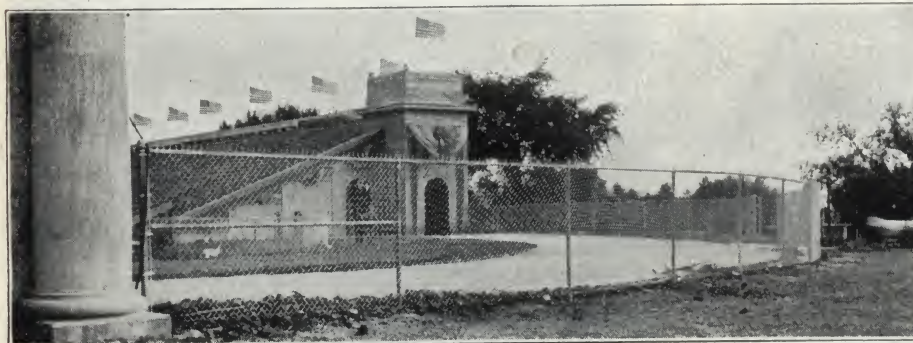
Hinges—(No. 115.) Shall be of the double clamping offset type allowing the gates to swing back parallel with the line of fence and shall be made of malleable iron and forgings heavily galvanized.

Latches—(No. 130 and No. 180.) The latches shall be of the eccentric double locking type which engages stops securely bolted to gate frame at both top and bottom. The lever handle is drop forged steel insuring the greatest strength possible without additional weight on the gate frames. The lock bars are of steel, the lower one being sufficiently long to extend down when locked, engaging an extra heavy malleable iron non-freezing gate stop for drive gates and a disappearing type of stop for railroad gates. Either one of these stops shall be securely fastened to a large concrete footing in the center of the opening.

Keeper—(No. 140.) With each gate frame there shall be furnished a keeper, the purpose of which is to automatically catch the gate when it is swung open and to hold it in this position.

Auxiliary Brace—(No. 1047.) With all gate posts for single gates 12 ft. wide or double 24 ft. wide and over, there shall be furnished a diagonal or strut brace of 2-in. outside diameter copper bearing steel pipe with necessary brace end and band for attaching to post. This brace shall be set inside and at right angles to the fence line to relieve the strain on the gate post when the gates are in an open position.

All gate fittings are heavily galvanized with the best grade of zinc.



**New Stadium at Haskell Institute,
Lawrence, Kan.**

Page Chain Link Fence encloses and permanently protects grounds. It assures more paid admissions and better control of crowds.

TUCKER & FICKEISEN, INC.

Manufacturers of Wire Mesh Cage Enclosures, Railings, Grilles and Wickets

34 Cliff Street
NEW YORK, N. Y.

Products, Facilities, Service

CAGES and GRILLE WORK for banks and offices.

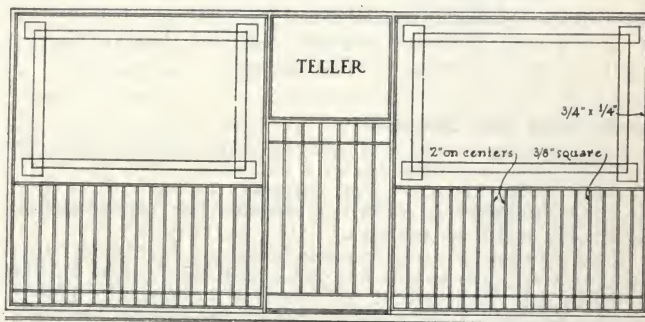
WIRE ENCLOSURES for stockrooms, toolrooms.

WIRE GUARDS for windows, doors, skylights.

BAR GRILLES, WICKETS, and RAILS—in bronze, brass, steel and silver.

Facilities—Our plant is completely equipped with modern machinery for the manufacture of the highest type product in our field.

Service—Accurate working drawings or design sketches prepared for any project. Samples of material or various finishes furnished. Architects' details accurately followed.



Recent Installations

Franklin Savings Bank, 8th Ave. and 42nd St., New York, N. Y.

U. S. Mortgage & Trust Co., 73rd St. and Broadway, New York, N. Y.

First National Bank, Altoona, Pa.

Ocean City Title & Trust Co., Ocean City, N. J.

Farmers National Bank, Reading, Pa.

Broad St. National Bank, Trenton, N. J.

Federal American National Bank, Washington, D. C.

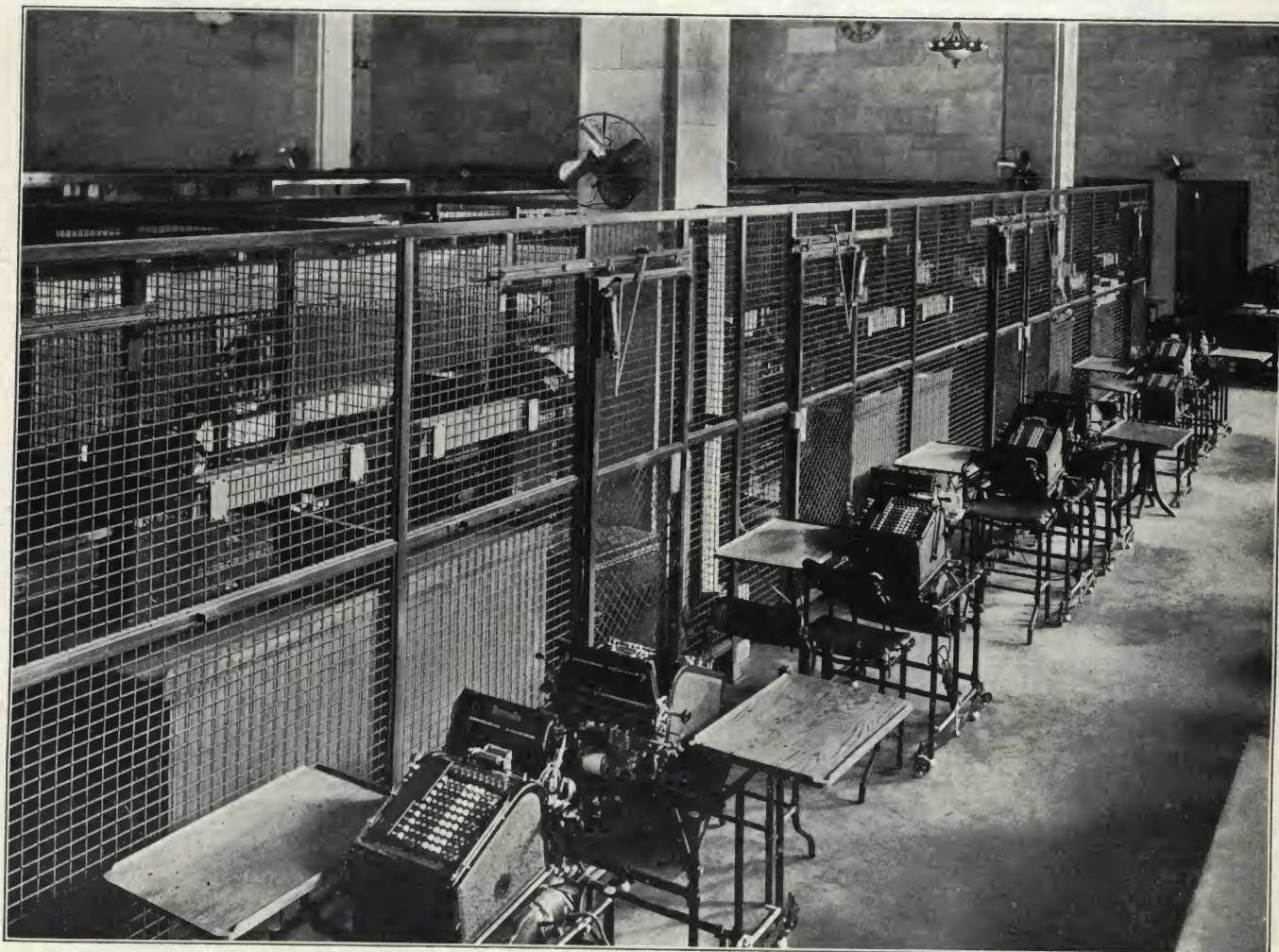
Excelsior Trust Co., Philadelphia, Pa.

International Motor Company, New York, N. Y.

Standard Oil Company, New York, N. Y.

Packard Motor Car Company, New York, N. Y.

Uppercu Cadillac Company, New York, N. Y.



H. V. BRIGHT

Manufacturer of Turnstile Equipment for Entrances and Exits

1104 Prospect Avenue
CLEVELAND, OHIO

Products

TURNSTILES, including Registering, Coin Controlled, Automatic and Non-registering Turnstiles; HARDWARE for Exit Turnstiles or Baffle Gates, consisting of top and bottom Castings, Ratchet, Dogs, etc.

TICKET CANCELING MACHINES.

Application and Service

Can furnish turnstiles for any purpose desired, such as swimming pools, museums, libraries, pay-toilet rooms, self-serve groceries, stadia, baseball parks, university or high school athletic fields, amusement parks, expositions, fair grounds, railroads, ferry and boat landings.

This concern has been manufacturing and furnishing turnstiles for more than twenty-five years, and has furnished them for use at many different places including the baseball clubs of both the American and National Leagues, the Sesqui-Centennial and Municipal Stadium at Philadelphia, the Woodland Hills Park Swimming Pool at Cleveland, Grandstand at Illinois State Fair and others.

Suggestions and advice given for arrangement and building of entrances and exits. Write us what you have in mind.

The "Bright" Printing Register

The "Bright" Printing Register for turnstiles furnishes a printed record of the opening and closing numbers of the turnstile register on a record slip, in a convenient form for filing or reference. It eliminates the chance for error in reading and writing down the figures from the register.



Automatic Registering Turnstile "C"

Can be used for either cash or ticket admissions. It embodies especially desirable features particularly in its automatic release—the patrons practically operating the Turnstile themselves as they go through—the attendant or gatekeeper's duty being to collect the tickets or money.

Can always be under control of gatekeeper as by releasing the foot lever the Turnstile cannot be operated. It is equipped with a shock absorber. This Turnstile can be used as a non-attendant type if desired.

The top broad arms are aluminum, black japanned—making for both lightness and strength. The base and center are of grey iron. Both center and arms are black japan finish.

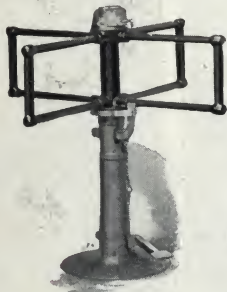


Ticket Chopper "K"

The above is suitable for many places where it is desired to cancel the tickets.

This Chopper punches clean holes in the tickets and leaves their surface smooth so that they can readily be counted if desired. Plate glass with heavy brass trimmings is used for the top.

The cabinet can be furnished in any finish desired such as oak, mahogany, white enamel, etc.



Registering Turnstile "A"

This machine is more generally used in connection with tickets and is suitable for many places where a lower-priced Turnstile is desired.

The base is of grey iron, levers of malleable iron, arms of steel tubing and iron castings.

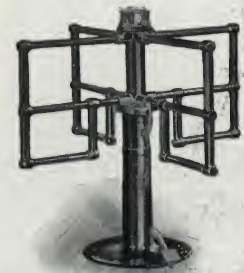
Turnstile "A" is successfully used at many places. It is under control of the gate-keeper or attendant by use of the foot lever. Furnished with either the printing or plain register.



Coin-Controlled Registering Turnstile

With this Machine, the coin must be dropped into the slot of the Coin Machine cabinet before the arms of the Turnstile will revolve passing the person through. Can be furnished to operate with 50¢, 25¢, 10¢ or 5¢ piece. It is positive in its operation—does not require electric power.

Used by many of the Fair Associations where the admission is a single coin. Being automatic, can be used at entrance to Toilet Rooms—eliminating locks on doors.



Registering Turnstile "B"

The above Turnstile is equipped with the Drop Arms, an added protection in that it makes it just that much harder for anyone to crawl under the arms of the Turnstile.

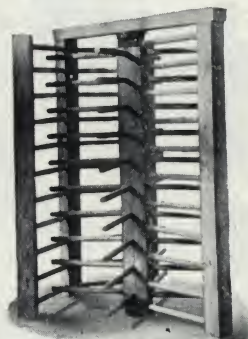
Is suitable for Libraries, Museums, Baseball Parks, Amusement Parks, Swimming Pools, Stadiums, etc.

Can be used for an inside Exit Turnstile if desired.



Turnstile "A" with Broad Arms

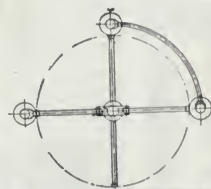
The above cut shows the Turnstile "A" equipped with the Broad Arms, the idea being to lessen the possibility of two people passing through the Turnstile on one registration.



Wood Exit Turnstile or Baffle Gate

The above operates one way only and no attendant is necessary. The Hardware only is furnished for the above Exit, this consisting of the top and bottom castings, ratchet plate, dogs, etc. A blue-print is also furnished giving the dimensions, etc.

of the principal wood parts used in the construction so that if desired the complete Exit Turnstile can be built in your own locality.



All Metal Exit Turnstile or Baffle Gate

Center post of Turnstile of 4½ in. O. D. iron pipe or tubing with arms of 1¼ in. O. D. iron pipe.

The outside posts carry the baffle and guard rails—Turnstile arms are strengthened by special iron fittings for inside of center post.

Will furnish complete shipped knock-down or will furnish Hardware only consisting of ratchet, dogs, top and bottom castings, etc.

PEREY MANUFACTURING COMPANY, INC.

Manufacturers of Turnstiles

101 Park Avenue
NEW YORK, N. Y.

Products

TURNSTILES, BAFFLE GATES, PASSIMETERS, and DEVICES for REGISTERING HUMAN BEINGS.

A Perey Turnstile for Every Purpose

For the past 15 years we have been solely engaged in manufacturing turnstiles and our organization is composed of specialists of wide experience.

We do not install our turnstiles, but furnish blue prints from which they can be readily installed.

We show below only a few standard models. Our line is complete and we can furnish turnstiles for every conceivable purpose.

Where Perey Turnstiles Can Be Used

Railroad, trolley and bus terminals, subway stations, amusement parks, bathing establishments, stadiums, athletic fields, ferries, or wherever a fare or an admission is charged and an accurate record of the number

of admissions is required (see standard and automatic models shown below). Also made in coin controlled type.

Libraries, museums, botanical gardens, zoos, recreation centers and the like where an accurate record of attendance is required without an attendant (see non-attendant model shown below).

Cafeterias, self-service stores, Y. M. C. A.'s, libraries and the like, where patrons are required to enter at a given place and to leave at another (see No. 11 wooden arm turnstile shown below).

Advantages of Installing Perey Turnstiles

- (1) Control crowds.
- (2) Save wages of ticket takers and attendants, and the cost of tickets.
- (3) Register accurately the number of persons admitted.
- (4) Assure many years of dependable operation at insignificant cost.
- (5) Save labor.
- (6) Prevent collusion.
- (7) Assure immunity from breakdown.



Standard Model

Suitable for railroads, ferries, amusement parks, baths or wherever a congested crowd is liable to collect and the collection of fares or admissions in a minimum space of time is desired.

Equipped with compression spring throw, shock absorber, unbeatable recording meter, hand and foot control, solid brass arms of the spread type and automatic locking device.

Suitable for right or left-hand operation



Automatic Model

Suitable for railroads, ferries, amusement parks, baths or wherever the collection of fares or admissions in minimum time is desired. Automatically operated by patron, but cashier can, if necessary, prevent patron from passing. Speed is limited only by ability of cashier in making change.

Equipped with compression spring throw, shock absorber, unbeatable recording meter, solid brass arms of the spread type and automatic locking device



Non-attendant Model

Especially suited for museums, libraries, social centers, parks and public institutions or wherever accurate automatic registration of attendance is required. Automatically released by the patron and registers on each quarter revolution. Locks itself.

Requires no attendant.

Equipped with automatic locking and unlocking device, compression spring throw, shock absorber, unbeatable recording meter and brass arms of the spread type



Perey No. 10 Turnstile

A durable and reliable turnstile of the non-registering type suitable for outdoor or indoor installations at parks or wherever an exit is desired to be barred against entrance or entrance against exit.

Sturdily built of best materials. Workmanship is same as in our other turnstiles. Attractive design. Arms of metal. Finished in aluminum bronze.

Equipped with double ratchet and pawl, making it easy to change direction of rotation.

Net weight, 100 lb. Spread of arms, 40 in. Height to top of arms, 36 in. Height to bottom of arms, 23 in.



Perey No. 11 Wooden Arm Turnstile

A non-registering type suited for libraries, self-service stores, cafeterias, Y. M. C. A.'s, museums, etc., where patrons enter at a given point and exit at another.

Will turn in one direction only, but can be made to rotate in the opposite direction, if necessary, without the purchase of additional parts.

Base finished in aluminum. Arms are of solid oak highly polished in golden oak finish.

Can readily be screwed to counter with lag screws, or, if desired, our No. 12 stand (see opposite illustration) can be furnished for this turnstile.

Net weight, 27 lb. Spread of arms, 40 in. Height to top of arms, 4 in.

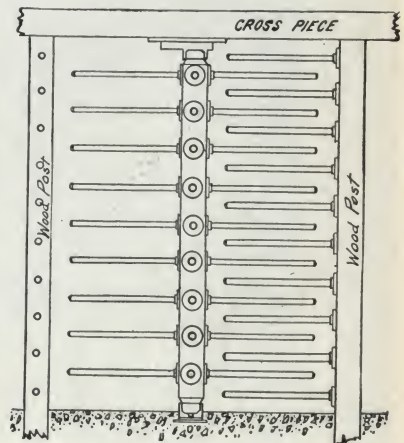


No. 12 Turnstile Stand

Net weight, 43 lb.
Height, 31 in.

Perey Baffle Gate

Suitable for bath houses, amusement parks, railroad stations or wherever it is desired to provide an exit and to bar entrance. We furnish top and bottom bearings and ratchet only (suitable for any size gate or opening), also blue prints from which any mechanic can construct the gate.



Perey Baffle Gate

ROBERT C. REEVES CO.

Manufacturers and Distributors of Wooden Fences

187 Water Street
NEW YORK, N. Y.

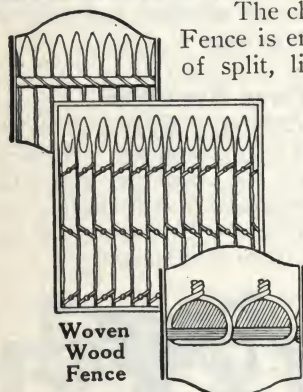
Products

DUBOIS WOVEN WOOD FENCE imported from France.

REEVESHIRE FENCE—an English type of fence.

HABITANT FENCING—a Michigan cedar fence.

Dubois Woven Wood Fence



The charm of Dubois Woven Wood Fence is entirely *natural*, for it is made of split, live, chestnut saplings, firmly bound together with strong, rustproof copperweld wire, looped over several cross braces. The natural color of the saplings quickly mellows to a beautiful gray-brown tone, forming a charming background for shrubbery and flowering plants. All of these features combine to give it great strength with a quaint, rustic appearance.

Uses of Dubois Fencing—Privacy to the home with the added touch of rustic beauty is found in Dubois Woven Wood Fence. It has been used in France, where it is made, for generations and is unique, distinctive, and artistic. It harmonizes with any style of architecture and may be used with city or suburban homes with equally good results.

Although the beauty that Dubois Woven Wood Fence adds to the landscape is a principal feature, many

others have been discovered from long usage. Service yards and driveways are effectively concealed, suburban gardens gain a new privacy and a new beauty, and even city back yards are transformed into secluded, restful spots by this simple means.

Dubois has been used for decades in England as well as in France. It blends equally well with the English style cottage, the stone or brick manor house, the picturesque chateau of the Loire district or the low, quaint Norman type. With homes of strictly American origin, it is equally suitable—simple New England, Colonial, Dutch Colonial, the trim brick and stone houses of old Germantown and the stately, pillared homes of the South.

This imported fencing has been given the enthusiastic endorsement of landscape architects because it solves their most difficult problem.

Sizes and Erection—Dubois Woven Wood Fence is furnished in 5-ft. sections and in two heights—4 ft. 11 in. and 6 ft. 6 in. It is shipped ready to erect against 3 to 4-in. posts placed about 8 ft. apart. The posts should be set 3 ft. deep and extend 5 ft. above the ground, and should be connected at the top and about 1 ft. from the ground with rough 2x4-in. spruce timbers. The sections of fence are simply nailed to this rough framework. Owing to its flexible construction, the fence follows perfectly the contour of the ground, making it equally suitable for use on level or rolling land.

Dubois is also made up into charming gates which are stocked with curved and straight tops. Special designs are made upon order.



Perfectly at Home in This California Setting

Cost and Maintenance—The cost of Dubois Woven Wood Fence is small and no expense is required for maintenance. No paint is ever necessary. It may be truly said that without any attention after erection Dubois mellows as it weathers and becomes more beautiful with the lapse of time. Price list sent upon request.

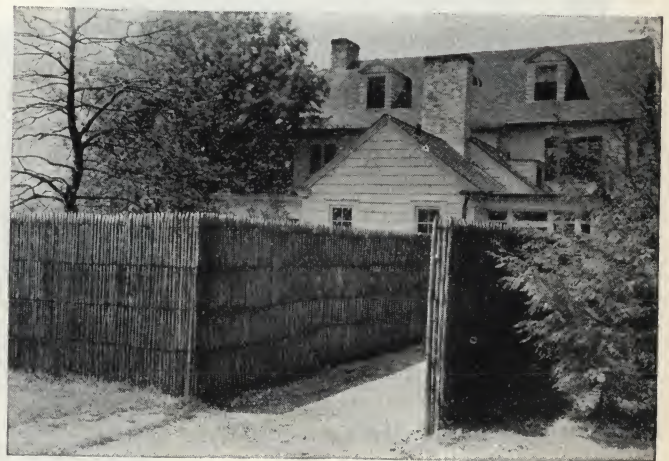
A Few Prominent Users of Dubois Woven Wood Fence

L. R. Andrew, Riderwood, Baltimore, Md.
Mrs. J. Archbold, Thomasville, Ga.
A. Watson Armour, Lake Forest, Ill.
G. B. Baker, Brookline, Mass.
Benjamin Franklin Hotel, Philadelphia, Pa.
Col. Robert W. Bliss, Washington, D. C.
Roland E. Coate, Los Angeles, Cal.
Mrs. Charles T. Crocker, Pinchurst, N. C.
Miss Mary E. Damon, Honolulu, T. H.
R. L. Eacho, Clarendon, Va.
Mrs. Daniel F. Emery, Portland, Me.
Edsel B. Ford, Pontiac, Mich.
C. C. Goodrich, York Harbor, Me.
Philip W. Hall, Cranford, N. J.
L. C. Hanna, Cleveland, Ohio

G. M. Heckscher, Westbury, L. I., N. Y.
Kenneth Ives, Bedford Hills, N. Y.
Mrs. Lola Johnson, Winston-Salem, N. C.
Otto Kahn, Cold Spring Harbor, L. I., N. Y.
LaCrosse Country Club, LaCrosse, Wis.
M. B. Lane, Savannah, Ga.
Mark Lemmon, Dallas, Tex.
Arthur L. Loveless, Seattle, Wash.
Frank M. Mayfield, Denver, Colo.
Cyrus McCormick, Jr., Lake Forest, Ill.
G. W. McNear, San Francisco, Cal.
Bruce McRae, Beachmont, New Rochelle, N. Y.
Metropolitan Museum of Art, "The Cloisters," New York, N. Y.
Phelps Newberry, Detroit, Mich.
W. J. Noble, Clearwater, Fla.
Gustav Pabst, Milwaukee, Wis.
John B. Phillips, Stamford, Conn.
B. Kirk Rankin, Nashville, Tenn.
W. E. Richmond, Providence, R. I.
W. A. Rockefeller, Greenwich, Conn.
Rolling Rock Farms, Ligonier, Pa.
W. W. Steele, North Canton, Ohio
Thos. W. Streeter, Morristown, N. J.
Geo. Tompkins, Greens Farms, Conn.
Wellesley College, Wellesley, Mass.
Mrs. M. Lawrence Wetherill, Palm Beach, Fla.
Franklin L. Wright, Norristown, Pa.



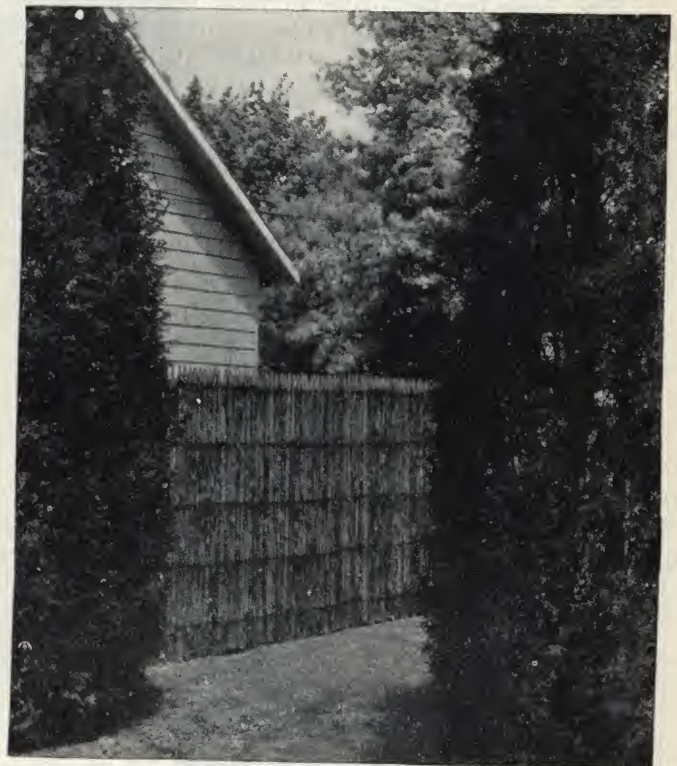
Blends Perfectly with All Types of Architecture



Screens the Laundry Yard from Neighbors' Eyes



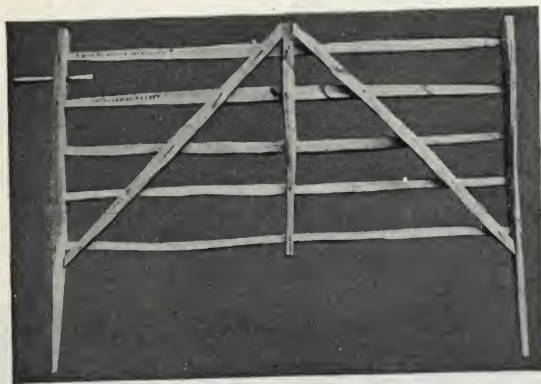
Quaint Gateways Add to Its Rustic Beauty



It Gives Seclusion to the Suburban Home

Reeveshire Hurdle Fence

An adaptation of the cleft chestnut hurdle fence which has been used in England for centuries. It is made of split chestnut timber, constructed in sections or hurdles, each hurdle being 8 ft. 3 in. long. At each end is a 6-ft. post which extends 18 in. into the ground, making the fence 4 ft. high. The posts of one hurdle lock easily with those of adjoining hurdles by means of wooden pins which are supplied. This makes for exceeding strength as no one post is required to support alone a strain on its particular hurdle.



A Section of Reeveshire Hurdle Fence

The hurdles are made in three styles, 4, 5 and 6-bar, all of which are the same length and height, the difference being in the spacing between the bars.

Uses—Reeveshire Hurdle Fence is something more than an enclosure—it is decidedly an artistic fence, possessed of unusual rustic charm, and blends well with many types of architecture. Recently there has been an increasing demand for it as a boundary fence for large estates, a division fence in the suburbs, or to accentuate the setting for a residence of the English farmhouse or similar type.

The 4-bar hurdles are suitable for enclosing pastures for cattle where a close fence is unnecessary.

The 5-bar hurdles make an ideal fence for paddocks or pasture for spirited horses and are used for this purpose on the estates of many of the leading



A Strong Pasture Fence

horsemen of this country. Hurdle fencing is easily seen by colts and they will not injure themselves by running against it.

The 6-bar hurdles make a very close fence and are particularly suited for enclosing pastures or pens for sheep or pigs.

Erection and Removal—Reeveshire Hurdle Fence is easily set, requiring no digging of post holes. Two men can place from one to two hundred sections in a day. A hole is made in the ground with a crowbar and the end posts are driven in. The hurdles are then locked together with the wooden pins. It is easily taken down and transferred from one plot to another,

and during the winter months may be compactly stored.

Reeveshire Hurdle Fence Gates—Made with 4, 5 or 6 bars to conform with the three styles of fencing. Stocked in 10-ft. lengths with extra braces. Furnished to order in any desired length.

Reeveshire Portable Post and Rail Fence—Much heavier than Reeveshire Hurdle Fence though of the same length and height when set. Posts extend 2½ ft. in ground. Generally used as permanent fences in hunting districts.



Old-fashioned Post and Rail Fence

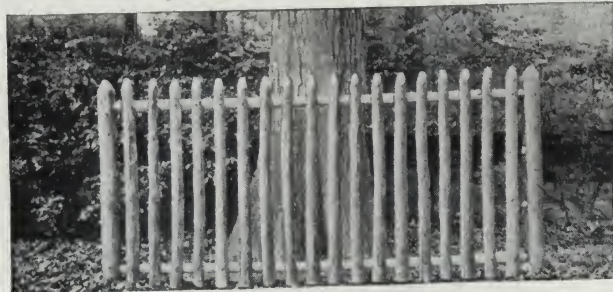
Old-Fashioned Post and Rail Fence

An authentic Early American post and rail fence for farm use. Made of split chestnut. Ideally suited for erection in hunting country.

Habitant Fencing

Made in many designs of selected, seasoned Michigan cedar, known as "the wood of durability." Shipped in sections 7 ft. 6 in. long, complete with posts, in heights ranging from 2 to 12 ft. Pickets are fastened to the rails with rustproof nails and posts are properly mortised to accommodate tenoned ends of the rails. Fencing gives extremely long service and is unaffected by varying climates.

All cedar poles used in Habitant Fencing have the bark removed, which makes a particularly refreshing effect. As time goes on they take on a beautiful dark sil-



Design No. 300, Habitant Fencing

ver-gray tone. The sections are designed to conform to sloping ground, hillside, or bank. They may be readily removed if desired as each section is a complete unit.

Habitant Fencing includes entrances and gates, and many unusually attractive effects are to be had. We will gladly make up special designs.

Service to Architects

Our Service and Advisory Department will gladly assist in the solution of any fencing problem. Our 67 years of experience places us in a position to make specific suggestions as to the adaptability of fencing to special requirements.

ALUMINUM COMPANY OF AMERICA

Manufacturers of Aluminum and Aluminum Alloys

PITTSBURGH, PA.

Product

ALUMINUM for ORNAMENTAL METAL WORK.

For Aluminum Roofing, see page A424; for Aluminum Paint, see page B1609.

Aluminum for Ornamental Metal Work

Aluminum is applicable to ornamental metal work ranging from the finest grades to the commercial grades and forms. Because of its light toned permanent color, high resistance to corrosion, non-staining properties, light weight, uniformity, and easy working properties, it is finding increasing use in the architectural field for general sheet metal and ornamental metal purposes.

Physical Characteristics of Aluminum

Color—The permanent silvery gray color makes aluminum very desirable as a decorative material and the various alloys furnish a considerable range in strength and workability.

Resistance to Corrosion—The resistance of aluminum to atmospheric corrosion is very good, as is witnessed by installations of varied forms ranging in location from tropical to high latitude conditions.

Light Weight—Aluminum has a specific gravity of approximately 2.8 and weighs $\frac{1}{16}$ lb. per cu. in. As this is one-third the weight of other commonly used metals, ease of erection is a natural consequence.

Will Not Discolor Adjoining Materials—Aluminum forms no colored salts and does not discolor surrounding or supporting structures from drip or splash of watershed.

Strength—Specifications of aluminum range from fully annealed 2S0 pure metal (12000 lb. per sq. in. tensile strength, 25% elongation in 2 in., Brinnell hardness, 22) to special 17S alloy (65000 lb. per sq. in., 20% elongation in 2 in., Brinnell hardness, 92).

Easily Worked—Aluminum machines easily and is capable of taking and holding a high polish.

Cost

The cost of installing aluminum is of course dependent on the design and quality of work, and compares with the cost of installing high grade materials.

Actual cost of aluminum per unit of weight is divisible by three for comparison by bulk with cost of other similarly used metals.

Marketable Forms

Aluminum and aluminum alloys are obtainable in the form of ingots, sheets, rods, bars, tubing, rivets, bolts, extruded moulding, and structural shapes for fabrication.

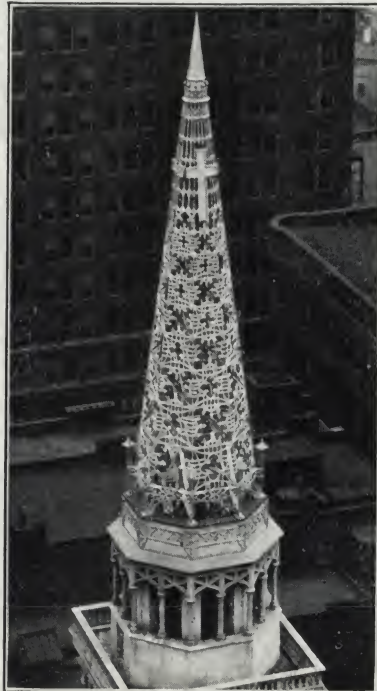
Literature

The following booklets will be mailed on application:

Aluminum Casting Alloys

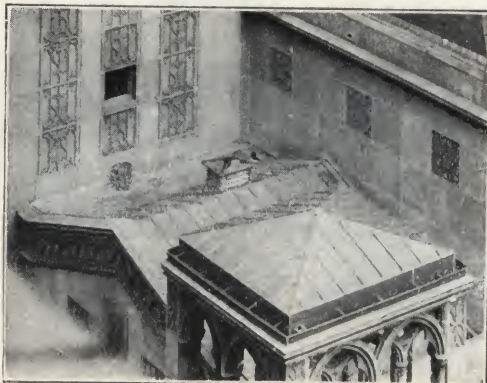
Strong Aluminum Alloys

Machining Wrought Aluminum



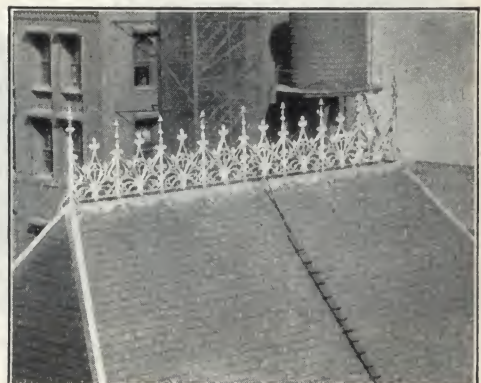
Spire of the German Evangelical Protestant Church, Pittsburgh, Pa.

A striking use of aluminum castings for ornamental architectural decoration



Left
Standing Seams of Aluminum Sheet Used for Roofing of Small Tower

Right
The Aluminum Cresting Which Adorns the Ridge of Main Church Roof



AMERICAN BRONZE CO.

Ornamental and Architectural Bronze Work

OFFICES AND FACTORY
1316 West 63rd Street
CHICAGO, ILL.

Products

ORNAMENTAL and ARCHITECTURAL BRONZE WORK, which includes: Monumental Bronze Work; Doors; Memorial and Commercial Tablets; Cast Bronze Letters, Numerals and Signs for buildings; Stair Rails; Brackets, Grilles and Wickets; Thresholds; Flagpole Bases; Fountains; Clocks; Check Desks; Bronze Inkwell Stands combined with Reflectors; Name Plates, or anything in Ornamental and Architectural Bronze.

ILLUMINATED SIGNS made in cast bronze and drawn metal.

Prices

Quotations submitted promptly upon receipt of specifications.

Service

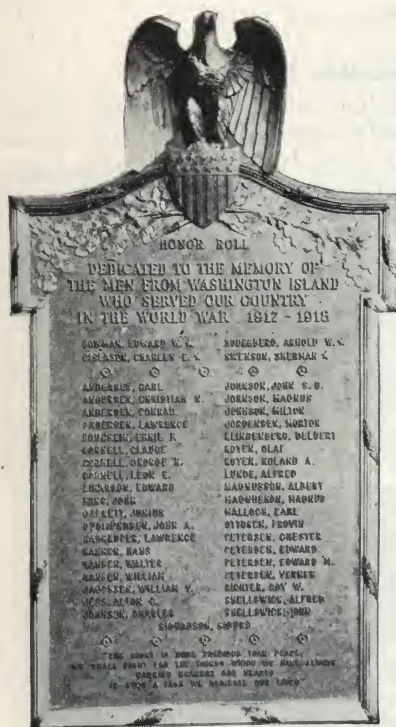
All work is made to order, in any size or shape. Architects' special designs and ideas will be carefully followed.

No order is too large, too small or too complicated for us.

Work made and shipped complete, ready for erection, to any part of the country.

Catalogues

Obtained on application.



Cast Bronze Honor Roll
3 ft. x 4 ft. 3 in.



Bronze Entrance Doors Constructed for
the Pickering Lumber Building,
Kansas City, Mo.
5 ft. 4 in. x 9 ft. 5 in.



Bronze Plaque
1 ft. 7 in. in diameter



Design of Bronze Tablet for Public
Buildings
4 ft. x 4 ft. 5 in.



Illuminated Sign
19 x 8 1/2 in.

ANTIOCH ART FOUNDRY

ASSOCIATED WITH ANTIOCH COLLEGE

Craftsmen in the Art of Modeling, Reproduction and Casting in Bronze

YELLOW SPRINGS, OHIO

(18 Miles from Dayton, Ohio)

Products and Service

CASTING SERVICES:

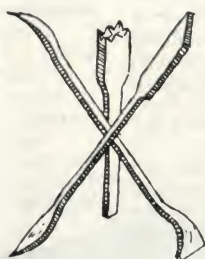
Bronze Tablets.

Detailed Ornamental Bronzes.

Sculptural Statues.

MODELING SERVICES:

Tablet Designing and Reproduction Work.



Architectural Bronze Work Uniquely Executed

The ANTIOCH ART FOUNDRY offers to the architect a foundry service that it believes to be unique among American foundries—the use for architectural bronze work of casting methods heretofore confined through their cost to the production of only the most expensive and artistic sculptural statuary bronze castings.

Our bronze foundry work is of a distinctive, exacting and quality nature rather than the usual "production" castings. Frequently architects search for a foundry that can do an unusually detailed piece of casting in a creditable manner, and we feel that with both our lost wax process and french sand process we are equipped to handle just such inquiries. It is an unusual feature to offer lost wax casting to architects as generally this work is offered solely to sculptors. One outstanding advantage of this process is the easy duplication when more than one casting is desired from a single model.

Signor Giovanni Polizzotti, formerly instructor in

the lost wax process and director of the Art Foundry at the Royal Institute of Industrial and Fine Arts at Palermo, Italy, is now supervisor of all lost wax casting.

Mr. Roger Williams, for thirteen years associated with the Gorham foundry, is in charge of all french sand casting. With these two men in charge of all casting work, we place at the architect's disposal bronze casting work that is essentially craftsmanship and not production work.

Whether the casting is to be made from a plaster model supplied by the architect or from one executed by our designer, the finished bronze will be outstanding as to quality.

Due to favorable factors of location and resulting low overhead costs, the estimates of the ANTIOCH ART FOUNDRY are attractively moderate. The combination of the highest foundry craftsmanship with reasonable cost we believe will be of interest. We shall be glad to furnish full particulars on request.

Feature of Lost Wax Process

The advantage of this casting process, besides being more faithful in reproduction as sculptors have long recognized, is that the completed casting is a duplicate of the original model with very little retouching work necessary. Also, numerous duplicates can readily be made from one mould.



The Goose Girl

6-ft. figure

Modeled by F. L. JIROUCH



Fountain Figure

Half life size

Modeled by C. R. NICODEMUS



Charles W. Eliot

Modeled from life by C. S. PAOLO



City Fettering Nature

8-ft. figure

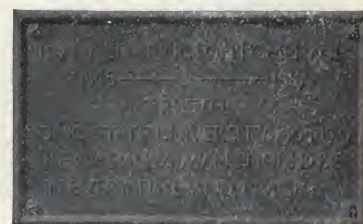
Modeled by ALEXANDER BLAZYS



Stock Design Office Plate
Lettering on both plate faces



Copyrighted Stock Design Tablet for Masonic Temples
Symbolic insignia in border. Two sizes: 7 5/8 x 20 and 7 5/8 x 24 in.



Hand Lettered Bronze Tablet
Cast for ERWIN F. FREY

ARCHITECTURAL METAL PRODUCTS, INC.

FORMERLY THE PROBERT SHEET METAL CO.

Manufacturers of Marquise
COVINGTON, KY.

REPRESENTATIVES IN ALL PRINCIPAL CITIES
For Metal Covered Doors, see pages A848-849

Marquise for All Classes of Buildings

Many years of experience in the manufacturing of marquise for all types of buildings have given us a great fund of practical knowledge on the subject. We design and construct marquise for theaters, hotels, banks, apartment houses, etc. We furnish and erect, any place in the country, all standard steel framing and use galvanized Armco ingot iron or sheet copper on all marquise furnished by us. We also build marquise according to architects' plans.

In our well illustrated marquise catalogue which we will gladly send on request, are shown many of our representative installations. Marquise suitable for buildings of all kinds are included. From these, suggestions of design and practice can be obtained.

Our engineering and architectural departments are composed of men who have specialized on marquise and are espe-

cially capable to solve any problem relating to their design or installation. They are at all times ready to submit sketches and estimates.

When making inquiries, give the following information: width of marquise across front of building and projection over sidewalk; select design from our catalogue or submit sketches; whether wiring is required on underside; specify reading of fixed letter signs; type of construction of building.

Signs, when furnished, are made as an integral part of the marquise with cornices, brackets and all mouldings applied. Wiring is complete with leads ready to connect to wiring in building. Letters furnished as follows:



No. 1 No. 2 No. 3
Interchangeable Letters for Marquise Signs

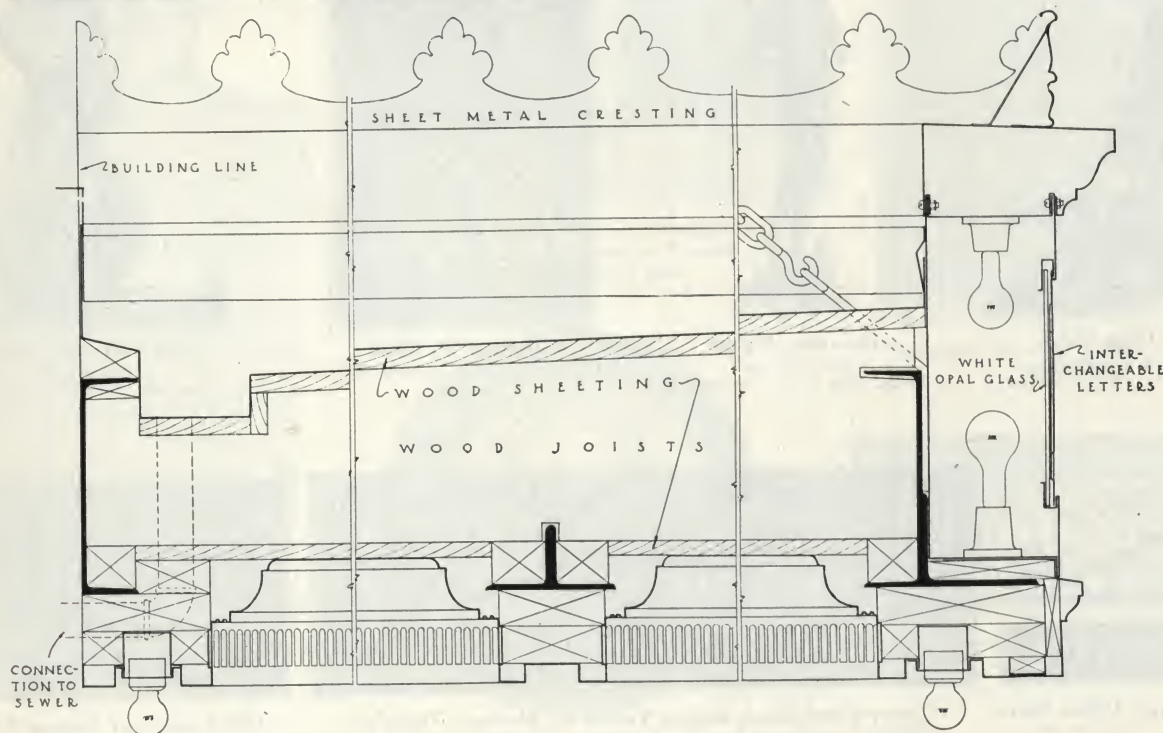
No. 1, a raised glass letter contained in a special frame, sizes from 4 to 12 in. No. 2 has a raised channel of metal outlining the letter, the metal being the only part removed for changing the reading. No. 3, similar to No. 2, either copper or zinc with bright facing on outline of letter. Nos. 2 and 3 in 8 and 12-in. sizes only.

Letters for interchangeable letter signs are furnished in sets of the proper assortment. "In," "and," "the," periods, quotation marks and sufficient blank spaces in assorted sizes are included.

Letters similar in construction to Nos. 1 and 2 and the exposed bulb channel type are furnished for signs having fixed letters

Designs and Catalogue

We have a very complete and comprehensive marquise catalogue which will be sent on request or, should it be preferred, our architectural department will supply a design which will fit the architecture of the building if a front elevation drawing is sent to us.



ART BRASS & WIRE WORKS, INC.

General Metal Work for Banks and Public Buildings

407 East Fort Street
DETROIT, MICH.

Products

ORNAMENTAL METAL and WIRE WORK, including:

Bank Screens, Cages and Entrances
Ornamental Iron Stair Railings
Elevator Cabs
Marquees
Brass Railings
Iron, Wire, Brass and Bronze
Grilles
Bronze Doors
Bronze Tablets
Iron, Brass and Bronze Wickets
Ornamental Iron and Bronze Entrances
Altar, Balcony and Communion
Railings for churches
Wire Partitions
Machinery Guards
Bulletproof Bank Installations
Iron, Brass and Bronze Work for all types of public buildings
Window Guards
Fire Escapes
Ornamental Iron Porch Railings

Service

We solicit inquiries and correspondence with architects, decorators, and engineers on their special problems, as we are equipped to produce designs in any style of architecture or for special purposes.

On request, special drawings will be prepared, carrying out every detail with accuracy. In all cases, complete data requested as follows: style, size, construction, finish and approximate cost. Contracts should be placed early enough to permit first class workmanship.

Metal Construction

All work can be made in genuine bronze, copper, brass, steel, wire and wrought iron; either in solid cast or built-up construction.



Ornamental Cast Iron Bank Entrance



Banking Screen and Cages



Ornamental Iron Stair Railing

Banditproof Bank and Paymaster Fixtures

Installations of bulletproof glass, steel backing, for frame; bulletproof wickets and deal plates which are banditproof, yet unobtrusive, the bullet-stopping features being concealed, leaving the deal plate flush with the counter. Wickets which are simple, effective and inexpensive, yet without the aggressive appearance of the average banditproof wicket.

The entire installation being such as to give perfect security, yet in no way marring the architectural beauty.

Finish

All work can be finished in the following manner:

Oxidized copper	Nickelplate
Plain copper	Oxidized silver
Old copper	Bright silver
Polished brass	Frosted silver
Oxidized brass	Steel blue
Brushed brass	Japanese bronze
Old brass	Statuary bronze
Dull brass	Plain bronze
Egyptian dead black	Genuine bronze
	Electro-bronze

Genuine bower-barff

Imitation bower-barff

Any special colors in oil paints and lacquer paint

Prices

Quotations are furnished upon receipt of information giving design, size, construction and finish. All goods are carefully crated or boxed, free of charge. All prices f.o.b. Detroit.

Guarantee

All work executed by this concern is guaranteed to be of the best metal and workmanship in the market, and is assembled complete in our shops, to insure accuracy, before being shipped.

THE AMERICAN BRASS COMPANY

Manufacturers of Extruded Bronze, Brass and Copper for Ornamental and Structural Purposes; Wire, Rods and Tubes

GENERAL OFFICES
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MILLS AND FACTORIES

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CANADIAN MILL: ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

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NEWARK, N. J., Military Park Building
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PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., Widener Building
PITTSBURGH, PA., Oliver Building

CLEVELAND, OHIO, Union Trust Building
CINCINNATI, OHIO, Dixie Terminal Building
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ST. LOUIS, MO., Planters Building
NEW ORLEANS, LA., Hibernia Bank Building
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Products

ANACONDA ARCHITECTURAL BRONZE, BRASS AND COPPER for ornamental and structural purposes as used for over twenty-five years by leading manufacturers of ornamental and structural metal work, including Cornices, Pilasters, Grilles, Wickets, Counters, Door and Window Trim, Screens, Hand Rails, etc.

For Anaconda Sheet, Roll and Strip Copper, see page A426; for Anaconda Brass and Copper Pipe and Benedict Nickel Pipe, see page C2301.

Extruded Shapes

In the extrusion process, a bar of bronze is forced under hydraulic pressure through a hardened steel die of the proper cross section. The resulting product obtained is of a remarkably homogeneous texture, very strong and durable, and in every way superior to a bronze casting. There are no sandy surface, porosities or any of the defects frequently found in castings. The tensile strength of Anaconda Extruded Architectural Bronze is never less than 45,000 lb. to the square inch.

The edges are sharp and clean, so that the effect desired is invariably obtained.

Standard Patterns and Special Designs of Extruded Shapes

A large selection of standard designs, covering all general uses, offers a wide variety to choose from. A few sections are illustrated on the following page. Where required, dies for new designs will be furnished at cost and held for the exclusive use of the customer.

Since Anaconda Extruded Shapes are produced from bars weighing 100 lbs. or more, it is not practical to execute orders for a smaller quantity than that obtained from a single bar.



Cold Drawn Shapes

When light mouldings and shapes are required with walls $\frac{1}{8}$ in. and thinner, the drawn process is used to produce Anaconda Architectural Bronze Shapes.

These cold drawn shapes are used for a great variety of architectural purposes, such as interior trim, window frames, showcases, store fronts, etc.

Colors

Anaconda Architectural Bronze Shapes, whether made by the extrusion process or cold drawn, have a natural golden color. After exposure the metal darkens and assumes the characteristic color of bronze. For interior use, the metal can be artificially colored to obtain any effect desired.

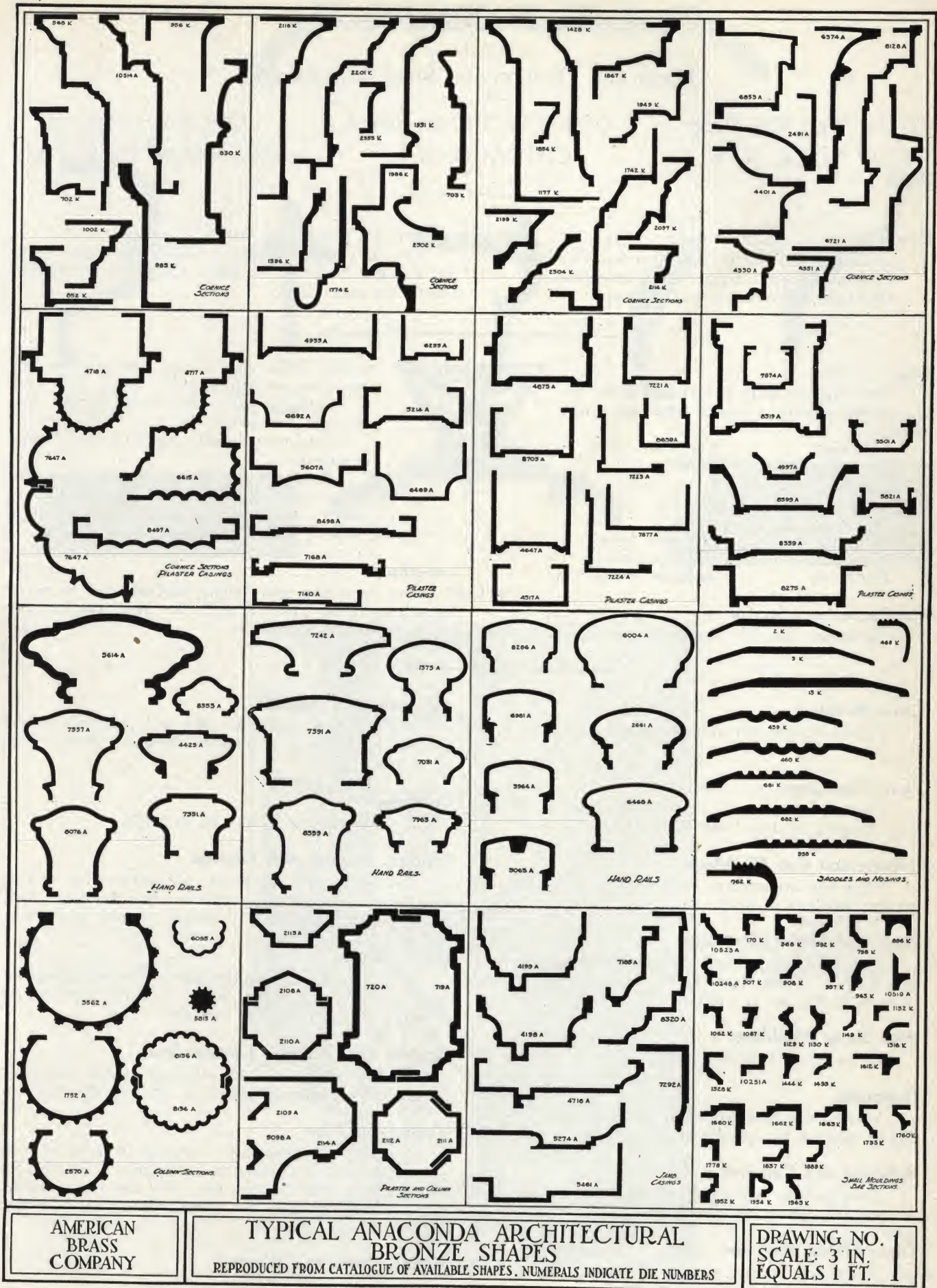
Estimates and Co-operative Service

THE AMERICAN BRASS COMPANY offers full co-operation in furnishing estimates and determining the suitability of Anaconda Metal Shapes for various uses. While estimates can usually be prepared from detailed blue prints and specifications, a representative of THE AMERICAN BRASS COMPANY will be sent at any time to consult with architects or fabricators whenever such consultation is requested.

Facilities

THE AMERICAN BRASS COMPANY is equipped for extensive production of Anaconda Architectural Shapes. The Company has complete facilities for serving the East from its mill at Ansonia, Conn., and the West from its mill at Kenosha, Wis. Inquiries or orders should be sent to the nearest mill.





J. G. BRAUN

Plain and Ornamental Steel Mouldings

537-541 West 35th Street
NEW YORK, N. Y.

609-615 So. Paulina Street
CHICAGO, ILL.

1088 Howard Street
SAN FRANCISCO, CAL.

Products

ROLLED STEEL MOULDINGS, Plain and Ornamental.
PIPE and TUBING, Square and Rectangular.
ORNAMENTS, Wrought and Stamped.

FENCE PICKETS and BALLS.
For Stair and Nosings and Edgings, see page A680;
for Window Sections, see page A929; for Perforated
Sheets, see page C2807.

Uses

Our various products find application in a great many ways; a few of which are mentioned:

Balconies	Stairs and rails
Bank screens	Store fronts
Canopies	Ticket booths
Casement windows	Elevator cabs and fronts
Directory boards	Entrance doors
Fascias	Register grilles
Marquises	Radiator covers, etc.
Partitions	



pickets, balls, etc. It also contains interesting ornamental iron detail.

Catalogue No. 18, drop forged and wrought ornaments.

Catalogue No. 20, stamped iron and brass ornaments.

Catalogue No. 26, perforated sheets for grilles, etc.

Our Service Department is prepared to assist in arising problems.

Lengths

Our moulding and tubing is furnished in warehouse lengths of from 12 to 20 ft. We have facilities to cut to specified lengths.

Catalogues and Service

Catalogue No. 25 illustrates mouldings, tubings,

Cove Mouldings

Fifteen designs in various types and sizes from $\frac{3}{8}$ to $1\frac{3}{8}$ in.

Panel Mouldings

Plain and ornamental. Practically all solid. 40 patterns ranging in sizes from $\frac{3}{8}$ to $2\frac{1}{4}$ in.

Cornice and Cap Mouldings

Plain and ornamental. $1\frac{1}{8}$ to 6 in. in height. 40 varying numbers in stock.

Panel and Scribe Mouldings

Plain and ornamental. 60 patterns carried in various designs. Sizes from $\frac{3}{4}$ to $3\frac{3}{4}$ in. in height and from $\frac{1}{2}$ to $1\frac{3}{4}$ in. in width.

Wall String Mouldings

Seven designs from 1 to $2\frac{1}{4}$ in.

Handrails

Sixteen numbers carried in steel and brass. $1\frac{3}{4}$ to $2\frac{3}{4}$ in. wide to fit top rails of $\frac{3}{4}$ to $2\frac{1}{4}$ in.

Balusters and Columns

Twenty-four varying types and sizes, plain and ornamental. $\frac{1}{2}$ to 2 in. in thickness.

Glass Fillets, Bars and Caps

Thirty-five types and sizes for sashes, doors, windows and casements.

Astragals and Facings

Plain and ornamental, solid and perforated. An array of 125 patterns of beautiful designs. Widths from $\frac{1}{4}$ to 4 in.

Crestings

Twelve patterns $\frac{3}{4}$ to 4 in. in height.

Saddles, Nosings and Edgings

Carried in steel and brass. 20 patterns for varying stair tread and door sill problems. See also page A680 for stair nosings.

Corner Beads

Six numbers excellently suited for protecting corners of plaster and similar walls. Can be furnished cut to length with anchors for concrete.

Angles, Tee, Zee and Channel Iron

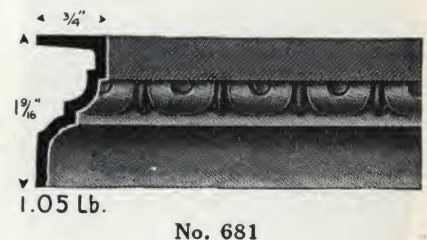
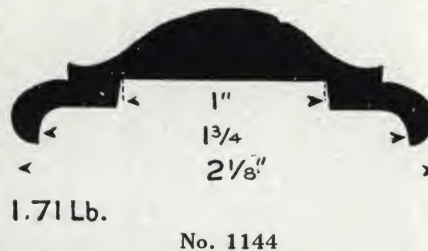
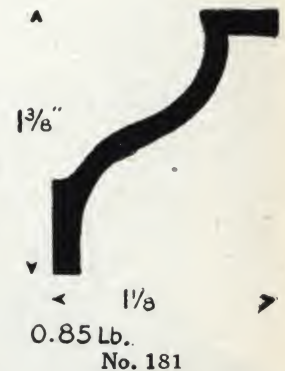
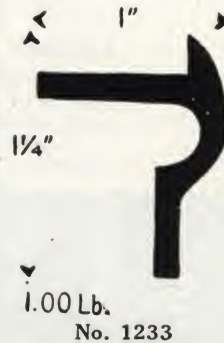
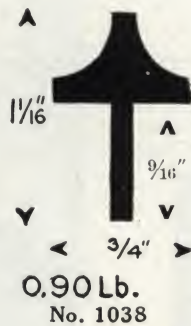
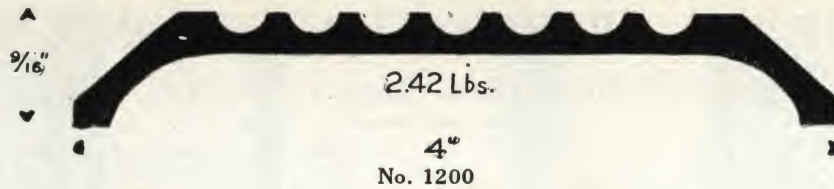
A great variety of the aforementioned shapes in square root of special interest in building construction.

Tubing and Pipe

Square and rectangular; ranging from $\frac{3}{8}$ to 4 in. square and 1×2 to $1\frac{1}{2} \times 3\frac{1}{2}$ in. rectangular. Suitable for newels, rails, door frames, etc. We also carry various types of caps and drops for newels, also locks and hinges for doors.

Pickets, Balls and Rivets

A large range of sizes and designs.



Wrought Iron Ornaments

We carry in stock a line of 5000 ornaments of every style and period.

Their hand forged character adapts them to the finest of work



Stair Rail

This stair rail was designed and executed by PAUL FIEBIGER, New York, N. Y.

Stock ornaments were used throughout

PECORA PAINT COMPANY

Mortar Stains and Sash Putty

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

Products

PECORA MORTAR STAINS.

PECORA METAL SASH PUTTY.

For Calking and Glazing Compounds,
see page B1749.

Pecora Mortar Stains

Uses—A paste, or pulp, *not a powder*, made in 12 standard colors for mixing with lime or cement mortar, or the two combined, in laying brickwork for facing exterior or interior walls in any type of structure. Equally applicable for coloring mortar for mantel facings, fireplaces, hearths, floors—whether of brick, tile, marble, slate or other material. Also used for pointing and jointing mortar of stonework where any color effect is desired; also for producing color tones in exterior "white-wash."

Advantages—Pecora Mortar Stains are offered as heavy paste or pulp, for in that form only, after much experiment, this company has found it is possible to produce *chemical* (not acid) mortar stains which, made from finely ground ores dissolved in chemicals, have the advantage of being absolutely fadeproof, exceptionally strong and thoroughly economical, and which give that deep, rich tone so often sought and so seldom found.

They have the added advantage of being most easily and thoroughly assimilated by the mortar with which they are mixed. The quality of permeability is obtained by mechanical precision in making the paste, instead of uncertain results of hoeing a dry powder into a wet mass of mortar.

This company's many years of successful research and constantly growing business have *proved this superiority of pulp stain*. While a small detail in the construction of a building, it is, nevertheless, an important one. Its correct use helps to build a lasting quality reputation for architect and contractor.

Properties—Being a pulp or paste, constituting a fast *stain or dye*, and differing in that respect from ordinary coloring mediums, they form a chemical union with the mortar and strengthen, rather than weaken, the mortar joint.

Economically they are unapproached as, *being 50% to 100% stronger than any mere mineral coloring material*, they are much less costly in the long run. Manufactured from carefully selected, finely ground, and richest ores in combination with extenders and fixatives, the colors become permanent after mortar is set, making rich, clean, clear shades, free from streaks or spots. Pecora Mortar Stains do not cause or increase unsightly efflorescence on face of brick walls.

Colors—Shades below are always in stock. Special shades made to order.

Black	Red	Amber
Brown	Buff	Terra cotta
Dark brown	Fern green	French gray
Windsor	Colonial drab	

Specifications—Many architects have found that specification by description only has resulted in the substitution of inferior goods, the spotting or fading of which necessitates expensive tuck pointing. Therefore the following outline form is suggested:



All mortar to be colored or stained with Pecora Mortar Stain, manufactured by PECORA PAINT COMPANY, Philadelphia, Pa., using by measure 1 bucket of paste or pulp to 7 buckets of face wall mortar.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly. Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze before being mixed with mortar.

Note: Depending upon depth of shade desired, the following proportions per 1000 brick, ordinary stretches, will be found to approximate quantity desired:

Red, Buff, Terra Cotta and Amber—For $\frac{1}{8}$ -in. joint use 45 to 55 lb.

Brown, Windsor, Colonial Drab, Fern Green, French Gray and Dark Brown—For $\frac{1}{8}$ -in. joint use 35 to 45 lb.

Black—For $\frac{1}{8}$ -in. joint use 20 to 30 lb.

Mortar varies and takes more or less stain according to richness of lime and quality of sand. Before laying brick it is suggested that a small portion of the stained mortar should be taken from the mortar bed and dried out thoroughly to determine whether the proper quantity of stain is being used to produce the shade desired.

Literature—Booklet showing actual colors and giving full details and photographs of important buildings, with testimonials from architects and owners, sent on request.

Pecora Metal Sash Putty

Uses—A specially prepared putty for use in metal sash only.

Advantages—Pecora Metal Sash Putty is the modern plastic product developed by this company to replace white lead, litharge and ordinary putties used in connection with metal.

It is a "special duty" putty, embodying the essential features of retaining its elasticity and staying in place, regardless of the difference in coefficient of expansion between glass and steel.

Properties—It remains soft in the package; and on removal is immediately ready for use. It is "long," therefore readily applied by the workman; and not requiring any manipulation enables the contractor to reduce his cost of installation.

Colors and Samples—The standard shade is dark red. Other shades are made to order. Sample on request.

Specifications—Be sure to specify Pecora Metal Sash Putty. It will be a trouble-saver as evidenced by the fact that thousands of pounds have been used with the greatest success.

References—A few of the large buildings where this material has been used by David Lupton's Sons Co. of Philadelphia, Pa., are:

Bethlehem Steel Co., South Bethlehem, Pa.
General Electric Co., Schenectady, N. Y., and West Lynn, Mass.
Fore River Ship & Engine Building Co., Fore River, Mass.

Dayton Electric Company, Dayton, Ohio
S. L. Allen & Co., Philadelphia, Pa.
Central Railroad of N. J., Elizabethport, N. J.
Keokuk Electro Metals Company, Keokuk, Iowa



Pecora Red Mortar Stain



Pecora Black Mortar Stain



Pecora Black Mortar Stain



Pecora Dark Brown Mortar Stain



Pecora Dark Brown Mortar Stain



Pecora Red Mortar Stain

LOUISVILLE CEMENT COMPANY

INCORPORATED

Speed Building

LOUISVILLE, KY.

Brixment Mills at Brixment, N. Y., and Speed, Ind.; Portland Cement Mills and Natural Cement Mills at Speed, Ind.; Lime Quarries and Plants at Milltown, Ind.

Products

BRIXMENT, a mason's cement for brick, tile and stone masonry and for stuccoing buildings.

Also Speed Portland Cement, Louisville Natural Cement, Speed Chemical Lime, Speed Chemical Hydrated Lime and Speed Mason's Hydrated Lime.



TRADE-MARK

Brixment

Brixment is a mason's cement that combines the characteristics of portland cement and lime, having both strength and plasticity. When mixed with sand and water, it makes perfect mortar for any type of brick, tile or stone masonry.

How Used—The proper mix is 1 part Brixment and 3 parts sand, measured by volume, with water added for proper consistency. Neither portland cement nor lime is necessary. The simple Brixment mix makes strong, smooth-working mortar.

Brixment can be mixed in any quantity either by hand or machine. It is ready to mix and use at once.

How to Estimate—Brixment is packed in cloth or paper sacks. Each sack contains 1 cu. ft. There are 4 sacks to a barrel.

When mixed with 3 parts of sand, a barrel of Brixment will lay between 800 and 1000 bricks, depending on the width of the joint. Therefore, 1000 bricks require 4 to 5 bags.

Uniformity—The use of Brixment is the architect's assurance that all mortar will be uniform in strength and color and that his specifications will be accurately followed. When oversanded, Brixment mortar works short and, since there is no lime in the mix, the necessary plasticity can be secured only by using the proper amount of Brixment.

Strength—The strength of Brixment mortar is greater than that required by the building code of any city for the heaviest load-bearing walls. Its strength increases with age. Its final strength is greater than that of the brick itself.

TEST BY ROBERT W. HUNT & COMPANY

Three specimens of Brixment mortar, mixed 1:3 with sand, were used in 1/2-in. joint between two common bricks. All were tested at the age of 28 days.

Specimen	No. 1	No. 2	No. 3
Mortar started to crush at about	20,000 lbs.	19,000 lbs.	23,000 lbs.
Brick started to crush at about	25,000 lbs.	24,000 lbs.	25,000 lbs.

TEST BY PITTSBURGH TESTING LABORATORY

Sample from warehouse of H. B. Rosenberger, Doylestown, Pa.

Fineness through 100-mesh sieve, 97.8%
Fineness through 200-mesh sieve, 90.2%
Soundness in water, O.K.
Soundness in air, O.K.
Initial setting time, 3 hours
Final setting time, 6 hours
7-day tensile strength, 1:3 sand, 107 lbs. per sq. in.
28-day tensile strength, 1:3 sand, 232 lbs. per sq. in.

Bond—Brixment makes a stronger, tighter bond between the brick and the mortar. It is ground finer and hardens more slowly than portland, thus permitting

deeper penetration and a more thorough keying into the pores of the brick.

Resists Moisture—During the process of manufacture a small amount of mineral oil is intimately mixed with Brixment. For this reason Brixment resists the passage of moisture through the mortar joint.

For Walls Below Grade—Brixment is a true hydraulic cement. This, with its water-resistance and freedom from lime, make it ideally suited for walls below grade.

Convenient Setting Time—The manufacture of Brixment is controlled to give Brixment mortar a slower, more convenient setting time than portland cement mortar. This keeps the mortar from setting up on the board and enables the mason to strike the joints conveniently before the mortar has hardened.

Clean, Permanent Joints—Because of the slower set and unusually smooth-working quality of Brixment mortar, cleaner, neater joints can be struck. The absence of free lime keeps them from scaling, crumbling or popping.

No Efflorescence—Efflorescence is due to the presence of soluble salts in masonry materials. Brixment itself never causes efflorescence because it contains less than 1/2 of 1% of such salts. Even when soluble salts are present in the other materials, the water-repellent quality of Brixment resists the passage of the salts in solution and usually prevents them from coming to the surface of the mortar.

Does Not Fade Colors—Colors mixed with Brixment mortar develop and hold their full strength permanently. Brixment contains none of the acids and strong alkalis which are so frequently the cause of fading in portland cement and lime mortars.

Economy—Brixment costs less than the portland cement and lime necessary to make an equal amount of mortar. It saves labor because it requires no soaking or slaking and its plasticity enables the mason to do faster work. There is no waste of time and material because Brixment mortar sticks to the brick.

Specifications

(1) All mortar shall be composed of Brixment, manufactured by the LOUISVILLE CEMENT COMPANY, and sand. (2) The mortar shall be mixed by measure in the proportions of 1 part Brixment to 3 parts clean, sharp, dry sand. (3) The Brixment and sand shall be mixed dry until the color of the mass is uniform. Clean water shall then be added to make mortar of the proper consistency for the work to be done. All mortar shall be mixed by machine (or by hand for small operations where machine mixing would not be practicable). (4) If mortar colors are used, they shall be mixed with the mortar in the proportion and manner specified by the manufacturer of the particular color used. (5) In freezing weather the sand and water shall be heated.

Some Brixment Buildings

Biltmore Hotel, Miami; Schultz & Weaver, Architects
New York Times Annex, New York; Ludlow & Peabody, Architects
Fisher Body Co. Plant, Cleveland; Albert Kahn, Architect
U. S. Railway Terminal Post Office, Chicago; Graham, Anderson, Probst & White, Architects
Children's Hospital, Pittsburgh; York & Sawyer and E. T. Mellon, Architects

C. K. WILLIAMS & CO.

Manufacturers of Anchor Brand Cement and Mortar Colors

MAIN PLANT
EASTON, PA.

RAW MATERIAL AND SUPPLY PLANTS

ALLENTOWN, PA.
GRANITE CITY, ILL.EAST ST. LOUIS, ILL.
LEHIGH GAP, PA.EMERYVILLE, CAL.
MALAGA, SPAIN
MONROE, LA.FLEETWOOD, PA.
MARTINS FERRY, OHIOFRUITLAND, N. Y.
MINERAL POINT, MO.

MINES AND RAW MATERIAL DEPOSITS

ALLENTOWN, PA.
LEHIGH GAP, PA.EASTON, PA.
MINERAL POINT, MO.FLEETWOOD, PA.
MONROE, LA.
WYOMISSING, PA.FRUITLAND, N. Y.
READING, PA.JAEN, SPAIN
ST. GENEVIEVE, MO.

AGENTS IN ALL PRINCIPAL CITIES

ProductsANCHOR BRAND STUCCO COLORS.
ANCHOR BRAND MORTAR COLORS.
ANCHOR BRAND CEMENT COLORS.**Anchor Brand Cement Colors**

Anchor Brand Cement Colors are very finely ground and produce clear, bright tones with a minimum of coloring material. They are used in floors, sidewalks, cast stone work, roofing and floor tile, stucco, etc., and should not be confused with mortar colors.

For Cement Floors—Although colored cement floors are comparatively inexpensive, they should never receive the treatment of a cheap floor. Colored cement, if carefully laid, finished and protected, will be found to possess all the decorative qualities of more expensive materials, along with the strength and economy of concrete.

For Stucco—The popularity of colored or tinted stucco surfaces is increasing rapidly. Directions for the use of our stucco colors will be furnished on request.

Available Colors—Our list of colors suitable for cement and stucco work is too long to publish here, but the more important numbers are given below. For special shades or tints, we will be glad to supply samples as requested.

No. 500	Red Oxide	No. 17	Dark Buff
No. 1195-B	Red Oxide	No. 1169	Brown
No. 1241	Red Oxide	No. 805	Brown
No. 305	Red Oxide	No. 269	Green
No. 690	Red Oxide	No. 271-S	Green
No. 1149-M	Yellow Oxide	No. 328	Blue
No. 5	French Yellow	No. 246	Black

Specifications for Coloring Cement Floors

Subfloors under colored cement topping should be specified as usual, although it is better to use a fairly dry mix and tamp thoroughly. Allow 1 in. for top dressing, which should be laid immediately. The following paragraphs should be incorporated in the specifications:

Cement Floor—Cement color, wherever specified, shall be Anchor Brand Cement Color, manufactured by C. K. Williams & Co., Easton, Pa., and delivered to site in original packages.

Top Finish—A top finish not less than 1 in. thick shall be applied to floors in (state part of work), topping to be composed of 1 part cement and 2 parts of sharp clean sand, free from loam, and from 3 to 10% of color, according to results desired.

Mixing—Cement, sand and color shall be thoroughly mixed before water is added. Only enough water shall be added to make a heavy paste. Mixing shall continue till the mass is absolutely free from spots or streaks of color.

Application—While base is still moist, top dressing shall be applied as follows: Trowel down about ½ in. of colored cement at a time, so as to work the air out of the mass. Build to the surface in this manner. Use the stroke board to chop the surface, as the mass will be too tough to stroke in the usual way.



Take off any surplus with the trowel. Level the surface and let it lie till it becomes dull. Do not trowel until all water on the surface disappears.

Tile Effect (Optional)—48 hours after application of top finish, floors shall be cut ⅛ in. deep with a three-cornered file sharpened to a diamond point, so as to produce a tile effect in the pattern directed by the architect.

Note: Cutting floors while green will produce a ragged edge.

Protection—As soon as topping is sufficiently set, floors shall be covered with a 2-in. thickness of sawdust, which shall be kept wet for at least 2 weeks.

Cleaning and Waxing (Optional)—When protective coating is removed, the surface shall be washed with linseed oil soap, using a wire brush if necessary, to remove dirt and stains. When clean and dry, the surface shall again be covered with a 2-in. thickness of sawdust.

Just before the floor is to be put into use, it shall be polished with a floor wax approved by the architect and applied in accordance with the manufacturer's directions.

Anchor Brand Mortar Colors

The growing popularity of Mortar Colors during the past decade is largely due to the following reasons:

(1) **Mortar to Match Brick**—Where particular color effects are desired, such as in brick panels of contrasting or harmonizing color or for interior work, especially hearths, mantels, etc., the effects are greatly increased by coloring the mortar to match the brick. The American Face Brick Association standard specifications provide:

"The hearth shall be of (name) brick laid as per drawings in a 1:3 cement mortar to match the brick."

(2) **For Mortar Contrasting with Brick**—By laying the brick in mortar of a color and shade which will bring out the full value of brick texture and tone gradation, a beautiful effect is secured. Some combinations which have become very popular are as follows: rough texture variegated red brick with buff or chocolate mortar; red brick with black mortar; and smooth-surface light buff or yellow brick with red mortar.

(3) **For "Mellowing" the Mortar**—One of the principal charms of old brick buildings is the warm and mellow tone of the mortar. To reproduce the charm of half-century-old mortar, a judicious use of mortar colors will prove most satisfactory.

(4) **For Color Control**—The color value of sand and cement varies greatly with the source of material. Our standard specifications provide architects with an exact method of color control.

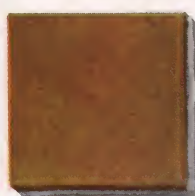
(5) **One-fifth of the Brick Wall Surface Is Mortar**—Proportions vary, but in the ordinary wall with ½-in. mortar joints, approximately one-fifth of the wall surface is mortar. For this reason architects realize the necessity of selecting the mortar color with the same discriminating care that is used in the choice of the brick.



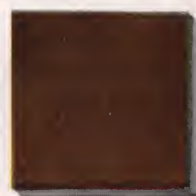
BLUE



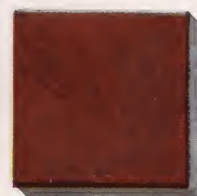
GREEN



YELLOW



BROWN



RED



BLACK

Cement Floor Tile Colored with Anchor Brand Cement Colors



Left
Five Range Rough Texture Brick
 Laid with Anchor Brand
 No. 19 Buff
 188 lbs. Sand (2 cu. ft.)
 94 lbs. Cement (1 bag)
 9½ lbs. Hydrated Lime
 15 lbs. No. 19 Buff



Right
Full Range Rough Texture Brick
 Laid with Anchor Brand
 No. 1151 Red
 188 lbs. Sand (2 cu. ft.)
 94 lbs. Cement (1 bag)
 9½ lbs. Hydrated Lime
 20½ lbs. No. 1151 Red

Anchor Brand Colors are manufactured in our own mills to meet the three essential requirements: *permanence of color*, so the mortar will not change its shade with age; *uniformity of color*, so that all batches of mortar in which a given color is used will be exactly alike; and *fineness of grinding*, so that the maximum coloring power is developed.

Colors—The following ten colors are standard:

No. 1151 Red	No. 19 Light Buff
No. 115 Red	No. 220 Single Strength Black
No. 1184 Brown	No. 222 Double Strength Black
No. 17 Dark Buff	No. 1174 Double Strength Chocolate
No. 18 Dark Buff	No. 257 Lime Proof Green

For special work we can supply special colors of any shade desired. Also some very good tints can be obtained by mixing the regular colors. Grays are obtained by using black sparingly, etc.

Sold in Dry Form—It is our experience that colors in the dry form are least expensive to the user and show the greatest coloring power per unit of weight.

Specifications for Anchor Brand Mortar Colors

The following paragraphs are to be inserted in the Brick Masonry specifications:

Mortar Color—Mortar color shall be Anchor Brand Mortar Color, manufactured by C. K. WILLIAMS & Co., Easton, Pa., and delivered to the site in the original packages.

Cement Mortar—All mortar for face brick work in (state part of work) shall be accurately mixed to the formula: 188 lbs. (2 cu. ft.) sand, 94 lbs. (1 bag) cement, 9½ lbs. hydrated lime, with the proper amount of Anchor Brand Mortar Color.

The exact quantity of color to be used will be decided by the architect after the construction of test panels.

Mixing—Dry color, sand, hydrated lime and cement shall be thoroughly mixed before water is added. After the water is added, mixing shall continue until the mass is absolutely free from spots or streaks of color. Mortar shall be mixed as stiff as is practicable, and batches shall be kept as nearly as possible at the same consistency throughout the job. The same proportions of ingredients shall be accurately maintained in all the batches. The kinds of lime, sand, cement and color shall not be changed after the work has begun. *See Notes (1) and (2).*

Test Panel—Test or sample panels as required by the architect shall be constructed in the same manner and of the same thickness as the finished wall. Face brick for test panel shall be laid in mortar mixed according to the formula and directions given above. After test panels are thoroughly dry, the architect will decide whether the color of the mortar is satisfactory, or whether the amount of mortar color in the formula should be increased or reduced. *See Notes (3) and (4).*

Cleaning and Pointing—When plasterer has left building, all surface brick and mortar shall be thoroughly cleaned down by applying a solution containing not more than 1 part of muriatic acid to 20 parts of water, using a stiff wire brush. Surface shall then be rinsed with clean water. All defective joints shall be pointed up at this time. *See Notes (5) and (6).*

Notes to Specifications

(1) **Lump Lime**—If lump lime is used in place of hydrated lime, it must be thoroughly slaked and allowed to cool at least 24 hours before being brought in contact with mortar colors. *Hot lime bleaches color.*

(2) **Accurate Mixing Necessary**—Lime is a strong pigment; sand and cement also have an important effect on color. It is important to measure accurately and maintain same proportions throughout the work.

(3) **Omission of Test Panel**—For smaller jobs where cost is an important consideration, the test panel may be omitted. In this case, a little of the mixed mortar may be taken from the first batch and pressed into a small cake. When this cake is dry, it can be determined whether the color of the mortar will be satisfactory.

(4) **Pigments Differ in Strength**—For this reason, a specific formula is given for the use of every mortar color.

(5) **Raking Joints**—Defer raking till mortar has begun to set.

(6) **Prevention of Efflorescence**—If mortar is mixed stiff and raking of joints deferred till mortar has begun to set, efflorescence will rarely be found. Efflorescence is in no way caused by Anchor Brand Mortar Color. It is due to the occurrence of soluble salts in cement, sand, lime, water or the brick, and is just as common in plain mortar as in colored mortar, though not so easily visible.

Special Facilities of C. K. Williams & Co.

C. K. WILLIAMS & Co. has a highly specialized organization, and a plant equipment which consists of a group of mines and a color plant located in Spain, where it produces its own Spanish Oxides. Other plants are located in different parts of the United States, as near as possible to the sources of supply of raw materials. Production of colors of maximum quality and uniformity has been the Company policy for nearly fifty years.



Left
Five Range Rough Texture Brick
 Laid with Anchor Brand No.
 1174 Double Strength
 Chocolate
 188 lbs. Sand (2 cu. ft.)
 94 lbs. Cement (1 bag)
 9½ lbs. Hydrated Lime
 15 lbs. No. 1174 Double
 Strength Chocolate Brown



Right
Full Range Rough Texture Brick
 Laid with Anchor Brand No.
 222 Double Strength Black
 188 lbs. Sand (2 cu. ft.)
 94 lbs. Cement (1 bag)
 9½ lbs. Hydrated Lime
 14 lbs. No. 222 Double
 Strength Black

HENRY MAURER & SON

Manufacturers of Refractory Clay Products

TELEPHONE
ASHLAND 1510

420 East 23rd Street
NEW YORK, N. Y.

PLANT, MAURER, N. J.

Products

FIRE BRICK for high pressure boiler settings to meet the modern engineering demand for intensive power plant operation, and for the various general types of industrial furnaces, including both a complete line of 9-in. standard shapes and sizes and special shapes and intricate designs to order. A special department is maintained for the production of all items of an intricate nature.

Also Fire Clay for laying up brick and for foundry use.

For Terra Cotta Hollow Tile Block, see page A366.

Facilities and Experience

Plant—Our plant is located at Maurer, New Jersey, on tidewater in New York Harbor and on two railroads (Central R. R. of New Jersey and Lehigh Valley R. R.) with all facilities for shipment by boat and rail. Motor truck deliveries direct from factory to destination can be made when expedient.



A Clay Mine of Henry Maurer & Son

Clay Resources—All Henry Maurer Fire Brick are manufactured from the highest refractory New Jersey fire clay obtained from our own extensive clay mines.

Mines located in the famed Woodbridge district, nearby the plant.

Seventy Years' Experience—HENRY MAURER & SON have been manufacturing refractory and other clay products for more than seventy years.

Substantial and superior workmanship is typical of all Henry Maurer products.

Maurer Fire Brick

All brands of Henry Maurer Fire Brick are made with the same exacting care, to insure uniform brick, true to size and shape, with sharp edges, so that they can be laid with minimum thickness of joints. The following principal brands have been developed:

Henry Maurer

No. 1 AA—For furnaces fired by fuel oil. Contains our most suitable clays prepared and combined to meet the conditions incidental to the use of liquid fuels.



Henry Maurer

No. 1 A—For high pressure boiler settings operated by stokers or powdered coal systems. Has great strength to resist compression and load stress in carrying the weight of the higher furnace walls. The rugged texture retards the abrasive action of fuel and slag.



Henry Maurer

No. 1—The original brand of Maurer fire brick. Recommended for use in hand-fired boilers and for various types of industrial furnaces. This brand has been used in mechanically stoked furnaces with complete satisfaction.



Henry Maurer

Royal No. 1—A fire brick for moderate heat duty. Of first class workmanship; uniform in size and shape.



THE ALABAMA MARBLE COMPANY

Producers of All Grades of Alabama Marble and Manufacturers and Contractors for Interior Marble Work in Any Kind of Marble

MAIN OFFICE AND PLANT
GANTT'S QUARRY, ALA.

SALES DEPARTMENT: 1701 Avenue A, BIRMINGHAM, ALA., and 303 Railway Exchange Building, CHICAGO, ILL.
Inquiries should be addressed to Sales Departments

Alabama Marble

The white marble deposit which runs northeast and southwest through Talladega County, Alabama, is, like all such deposits, variable in thickness and quality.

At Gantt's Quarry, where the quarries of THE ALABAMA MARBLE COMPANY are located, the merchantable marble in the deposit attains an uninterrupted thickness of 120 ft., measured at right angles to the beds, and is of high average grade. It is a remarkable and probably a unique feature of these particular quarries, that fully 75% of the entire output from top to bottom of the deposit falls into one well defined grade. For a fine grained saccharoidal white marble, such as these quarries produce, this is very unusual. The grade referred to is Alabama Cream A (A.C.A.)

Alabama Cream A (A.C.A.)

We believe we may fairly claim this grade to be a *standard* among interior white marbles available at this time. It is fine grained, has a warm, creamy background with light to moderate clouding; carves and polishes perfectly; is impervious and non-staining, strong, elastic and hard, and extremely durable under all ordinary exposures, either interior or exterior. It is available in slabs and pieces of any size likely to be required, and in quantities sufficient for any job, however large. The great amount of marble on THE ALABAMA MARBLE COMPANY's properties, and the extensive development of their quarries insure both the *adequacy and permanence* of the supply. Moreover, THE ALABAMA MARBLE COMPANY has a record extending back many years and cover-

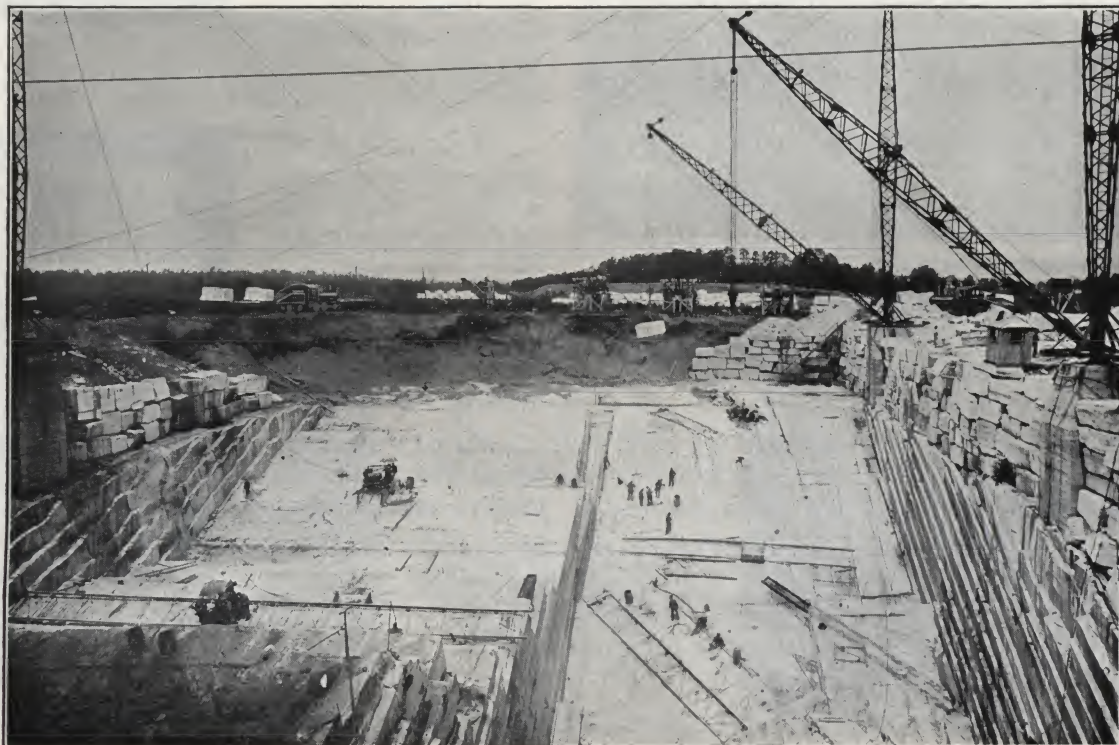
ing the delivery of millions of feet of marble for hundreds of buildings *without having been the cause of delay on any one of them.*

Alabama Cream Blanc P (A.C.B.P.)—Creamy white, free of any but the merest suggestion of clouding and veining. Practically a statuary marble. It is separated from other grades by sawing. It is difficult to secure in large slabs, and in thicknesses greater than twelve inches. The supply is not unlimited but is available in sufficient quantity for pilasters, bases, caps and stiles. Also for rails in large decorative schemes where a framework of white marble of the very highest grade is desired for luxurious bathrooms, lavatory slabs, memorial tablets, etc.

Alabama Clouded Cream (A.C.C.)—This grade differs from Alabama Cream A (A.C.A.) in the greater amount and intensity of the clouding. In A.C.A. the dominant feature is the creamy white background; in A.C.C. the clouding is co-ordinate in importance with the background. A.C.C. is available for large jobs, though the supply is less abundant than in the case of A.C.A.

Alabama Cream Veined A (A.C.V.A.)—Fine grained creamy white background, with many pencil-like veins of grayish color. It matches perfectly, is highly decorative, yet restrained and dignified in its general effect. It is available in any reasonable amount—there need be no fear of not getting it.

Alabama Pocahontas (A.P.)—Somewhat similar in veining to A.C.V.A. but the veins may be heavier; they are greenish or blackish and bordered by orange or



One of the Quarries of The Alabama Marble Company

pink clouding. A very decorative marble—quite different from any other. Available in moderate quantities. An excellent material for unique decorative effect in jobs of moderate size. Highly effective when used in panels framed in white—such as A.C.B.P.

Alabama Ivory Pavonazza (A.I.P.)—The most richly colored and marked of any Alabama Marble so far produced. The ground tone is of a creamy ivory white, with veins varying from black to greenish black and clouding of yellow, orange and pink. It matches perfectly and is an extremely rich decorative material, especially when framed in with A.C.B.P. It is available only in moderate quantities, and its occurrence in the deposit is rather erratic. When available it is a beautiful and unique material. It is one material that can not be overdone by too general use.

Alabama Terrazzo

THE ALABAMA MARBLE COMPANY is also the largest producer in the country of pure white marble terrazzo. Alabama Terrazzo is unexcelled in all the qualities which make such material desirable. The capacity of THE ALABAMA MARBLE COMPANY's terrazzo plant is 200 tons per day and there is always a large reserve of material, both crushed and ready to crush, so that prompt shipments are always possible.

General Characteristics of Alabama Marble

All of the grades of Alabama Marble are alike in their perfect crystallization, fine grained texture, warmth of tone in the background and in their working qualities. The three last named grades, like similar marbles from other places, require a little waxing and occasional liners.

If you specify any of these marbles by the name of the grade, as established by THE ALABAMA MARBLE COMPANY, you can be sure that the material you have in mind is available and can be obtained—each grade at a fair price; but in specifying a grade, use a *completed*

job as a standard, not a small sample. No small sample can ever correctly represent a grade of marble to the extent of giving an accurate idea of what it will be like in a completed job. A completed job, in any of our marbles, can always be duplicated to your satisfaction.

Some of the Prominent Buildings Where Alabama Marble Was Used and Their Architects

Interiors

David Whitney Building, Detroit, Mich., Graham, Anderson, Probst & White
 Alworth Building, Duluth, Minn., Graham, Anderson, Probst & White
 Straus Bldg., Chicago, Ill., Graham, Anderson, Probst & White
 Peoples Gas Building, Chicago, Ill., Graham, Anderson, Probst & White
 Continental & Commercial Bank Building, Chicago, Ill., Graham, Anderson, Probst & White
 Insurance Exchange Building, Chicago, Ill., Graham, Anderson, Probst & White
 Westminster Building, Chicago, Ill., Alfred S. Alschuler
 United States Custom House, New York, N. Y., Cass Gilbert
 Arkansas State Capitol, Little Rock, Ark., Cass Gilbert
 Cleveland Discount Building, Cleveland, Ohio, Walker & Weeks
 First National Bank, Youngstown, Ohio, Albert Kahn
 Atlanta Biltmore Hotel, Atlanta, Ga., Shultz & Weaver
 Northwestern Mutual Insurance Building, Milwaukee, Wis., Marshall & Fox
 Bankers Trust Building, Philadelphia, Pa., Horace Trumbauer
 Public Library, Philadelphia, Pa., Horace Trumbauer
 William Penn Hotel, Pittsburgh, Pa., Benno Janssen
 Union Arcade Building, Pittsburgh, Pa., Fred Osterling
 Jefferson Standard Life Insurance Building, Greensboro, N. C., C. C. Hartman
 Pike Consistory, Little Rock, Ark., Mann & Stern
 Johnson Building, Charlotte, N. C., W. L. Stoddard
 Packard Building, Philadelphia, Pa., Ritter & Shay
 Book-Cadillac Hotel, Detroit, Mich., Louis Kamper
 Book Tower, Detroit, Mich., Louis Kamper
 New Peabody Hotel, Memphis, Tenn., Walter W. Alschlager
 General Hospital, Philadelphia, Pa., Philip E. Johnson
 Jewelers Building, Chicago, Ill., F. P. Dinkelberg

Exteriors

Maryland Institute, Baltimore, Md., Pell & Corbett
 Connecticut Savings Bank Building, New Haven, Conn., Tracey & Swartwout



Arkansas State Capitol, Little Rock, Ark.

CASS GILBERT, Architect

Entire interior finished in Alabama Cream A (A.C.A.) Marble, produced, manufactured and finished by THE ALABAMA MARBLE COMPANY



Hall Building, Little Rock, Ark.

THEO. SANDERS, Architect

Wall: marble, Alabama Cream Veined A (A.C.V.A.) trimmed with Alabama Cream A (A.C.A.); floor strips and base, Vermont Verde Antique. Marble work produced and finished by THE ALABAMA MARBLE COMPANY.
 Set in place by Southwestern Marble & Tile Co., Little Rock, Ark.

CARTHAGE MARBLE CORPORATION

Producers of Ozark Gray Marble, Veined and Veinless

QUARRIES AND MILLS

CARTHAGE, MO.

Product

OZARK GRAY MARBLE:

Sawed, Planed, Turned and Cut for polished interior and exterior work.

Facilities

The CARTHAGE MARBLE CORPORATION owns eight plants and quarries which include 55 gang saws, 25 polishing machines, 15 rubbing beds, 8 diamond saws, 12 planers, 11 traveling cranes, 30 channelers and 20 derricks.

Ozark Gray Marble can be furnished by marble or stone dealers anywhere in the United States or Canada.

Color and Texture

Veined Interior—A true gray with veins varying in color sufficiently to give life and beauty to the marble.

Veinless Interior—A soft gray, fine grained, monotone marble with a tinge of buff. Uniform in color, but with enough variation to be interesting.

Ozark Marbles, either veined or veinless, can be used economically wherever it is practical to use marble, and their neutral tones blend readily with any color scheme.

Exterior—White with a tinge of gray. Because of its wearing and non-stain qualities, its use is especially recommended for steps, base course, trim or entire building. Fabricated price for the exterior is, we believe, lower than for any other marble, and only slightly higher than for ordinary limestones.

Finish—On exterior work, sand rubbed finish shows up to best advantage on ordinary work, but where a special finish is wanted, rock face, bush-hammer or tooled may be used. It is susceptible to all finishes of any natural stone or marble, but polished finish is recommended for interior finish only.

Veining—Attention is called to the fact that this Company cannot agree to furnish Carthage Marble free from veins, which are characteristic of all marbles.

Analysis

Chemical analysis shows that Ozark Gray Marble contains nothing which can in any way discolor it. It is 99% calcium carbonate and is free from iron.

Non-absorbent

The ratio of absorption of this marble is 45/100 of 1%. Such a quality is of great importance in both exterior and interior work, for stains that cannot penetrate the marble can be easily removed from the face, a feature of great value in sanitary work.

Strength

The strength of Ozark Gray Marble is such that it stands all tests subjected through various kinds of work. Its crushing strength is about 18,000 lb. per sq. in., which is considerably more than is required in any building work.

Short Specifications

Exterior Work—All cut stone to be of properly selected Carthage building stock, as furnished by the CARTHAGE MARBLE CORPORATION, Carthage, Mo. Veining averaging $\frac{1}{4}$ in. or less, if tight and sound, is permissible anywhere in the face of the marble.

All steps, door and window sills, coping and projecting courses shall be cut to lay on the natural bed. Base, belt courses, ashlar, lintels, etc., shall be set on edge. On marble set on edge, veining shall not intercept the face but clouded faces are permissible.

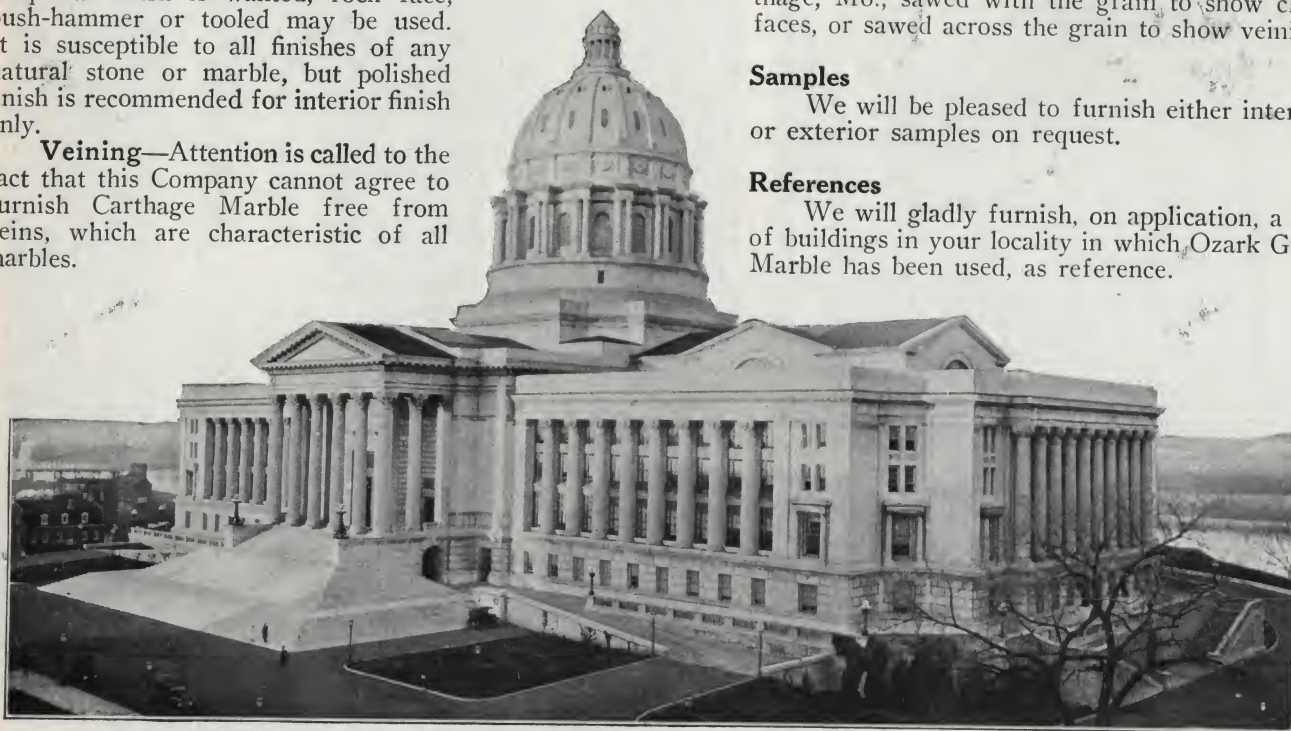
Interior Work—Marble to be Ozark Gray as furnished by the CARTHAGE MARBLE CORPORATION, Carthage, Mo., sawed with the grain to show clear faces, or sawed across the grain to show veining.

Samples

We will be pleased to furnish either interior or exterior samples on request.

References

We will gladly furnish, on application, a list of buildings in your locality in which Ozark Gray Marble has been used, as reference.



Missouri State Capitol—Ozark Gray Exterior and Ozark Gray Interior

APPALACHIAN MARBLE CO., INC.

Quarriers and Manufacturers of Appalachian Tennessee Marble
Manufacturers of Foreign and Domestic Marble

KNOXVILLE, TENN.

APPALACHIAN TENNESSEE MARBLE, especially for interior use, including Appalachian Golden Vein, Appalachian Champion Pink, Appalachian Roseal, Appalachian Special Silver Gray, Appalachian Dark Choco-

late, Bond Pink, Bond Tavernelle and other Appalachian colors.

Foreign and Domestic Marble.

Floor Tile, Ashlar, Rubble Marble, Tennessee Granito.



Bond Pink

A sturdy marble, that may be used in any type of building and for any part of the design. It is remarkably uniform in color and veining, more so, in fact, than any domestic marble, and is rapidly gaining favor as the most popular pink marble on the market. The supply is unlimited, and on account of the tremendous quarry volume, can be priced very low.

Quarry

The quarry holdings of the APPALACHIAN MARBLE Co., INC., are so great that its marble actually in sight will not be exhausted within a century. The quarry equipment is adequate and of the most modern type.

Reserve Supply

The APPALACHIAN MARBLE Co., INC., stores its own production to create a reserve supply. Every bit of marble waste is utilized and sold.



Interior Marble Treatments,
Chicago Union Station, Chicago, Ill.
(Left)

Interior Marble Treatments,
Morton Building, Chicago, Ill.
(Right)



Appalachian Golden Vein

The aristocrat of the field, a marble expressing a cool quiet monumental dignity not found in any other material. Has been selected for special interior treatments by the most fastidious architects and owners in the country. This marble is an exclusive Appalachian product available in reasonable quantities, but lower price than marble of like quality.

Mill

The mill has a yearly handling capacity of 200,000 cubic feet, or a daily capacity of three carloads of finished marble. Use of hydro-electric power further lessens production cost.

Shipping Facilities

The fifteen-acre mill property of the APPALACHIAN MARBLE CO., INC., has one-half mile of railroad tracks with continuous loading points to facilitate rapid loading of all shipments.

Quality

Appalachian Marbles are non-absorbing, long wearing, strong and easily workable.

	Average
Co-efficient of absorption.....	.047
Tensile strength (transverse to bed).....	1,554 lbs. per sq. in.
Tensile strength (with bed).....	1,551 lbs. per sq. in.
Transverse strength (modulus of rupture).....	2,686 lbs. per sq. in.
Compressive strength.....	18,274 lbs. per sq. in.

These tests made by U. S. Bureau of Standards and reported by T. Nelson Dale, Retired Geologist, U. S. Geological Survey.

Standard Thickness

Appalachian Marble is cut in standard thicknesses. They are (after honing and polishing): $\frac{7}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 inches. Other thicknesses on order.

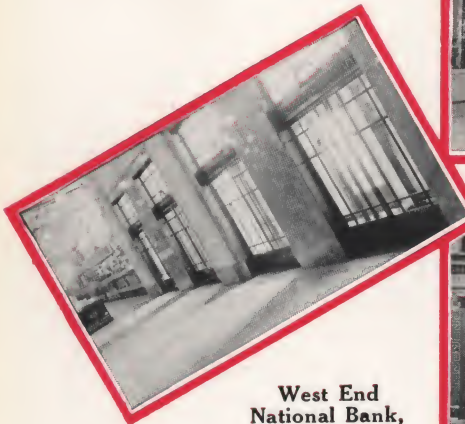
Floor Tile

Appalachian Tennessee Floor Tile comes in 8x16, 10x20 inches, and 12 inches square standard sizes. It can also be obtained in any special sizes the architect may desire for exactly carrying out his own ideas. It can be had in a wide variety of beautiful colorings.

Appalachian floors are low in initial cost, low in maintenance cost and last the life of the building. They are easy and economical to keep clean, materially reduce the dust nuisance and make for better health. They subdue traffic noise and afford a safe, comfortable walking surface.

8x16 and 10x20-inch tile is always on hand, and shipment can be made on receipt of order.

Gimbels Department Store,
Milwaukee, Wis.
(Below)



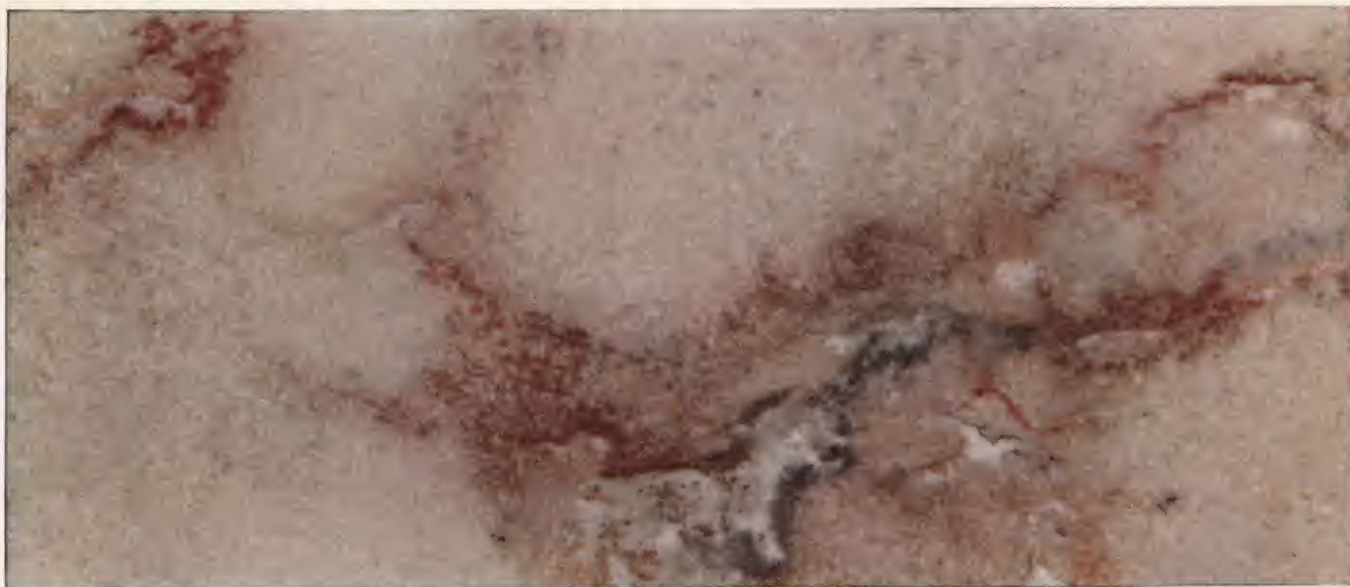
West End
National Bank,
Shamokin, Pa.
(Bottom Center)



West End National Bank,
Shamokin, Pa.
(Top Center)



Chevy Chase
Bank,
Chevy Chase, D. C.
(Above)



Appalachian Roseal

An exclusive Appalachian marble, of rich mottled coloring, suitable for out-of-the-ordinary treatment for interior, superior to imported marble on account of higher quality, and equal beauty, at a considerable lower price, available in unlimited quantities

Ashlar

Appalachian Marble tile for ashlar, either hone or polish finish, can be furnished in our standard tile sizes at prices which make marble ashlar available for the comparatively moderately priced home as well as for more pretentious structures. This is because it is one of our by-products.

Crushed Tennessee Marble

Beautiful, bright Pink Tennessee Marble suitable for stucco work. For color see (cut No. 1) Bond Pink Marble.

Tennessee Granito

Sizes No. 1, 2 and 3 for terrazzo floors. Crushed from Bond Pink Marble, making a dark, bright Pink Tennessee Granito.

Tennessee Rubble Marble

This company is in a position to ship large quantities of one man's size stone for prompt delivery.

Price

Because of quantity production Appalachian Marbles, although as beautiful as most fine foreign marble and superior in quality to the best of them, are a great deal cheaper in price than imported marbles, as well as like quality domestic marbles.

Installation

Appalachian Marble has been manufactured exclusively by us for sixteen years. More than \$1,000,000.00 of it is sold annually in England, Canada, Latin America and every state of the Union.

Many of the most noted public and office buildings, churches, schools, theaters, hospitals, stores, banks, etc., have interiors, including floors and ashlar work of Appalachian Marble.

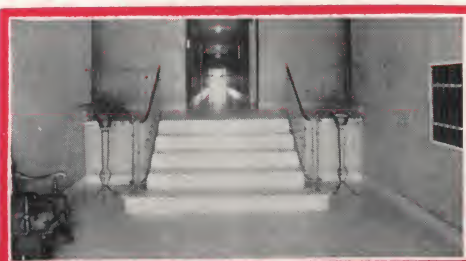
Foreign Marble

Our established connections with the leading foreign quarries enable us to manufacture practically any desired foreign marble at a substantial cost saving.

Carlton Hotel,
Washington, D. C.
(Below)



Child's Restaurant,
Washington, D. C.
(Bottom Center)

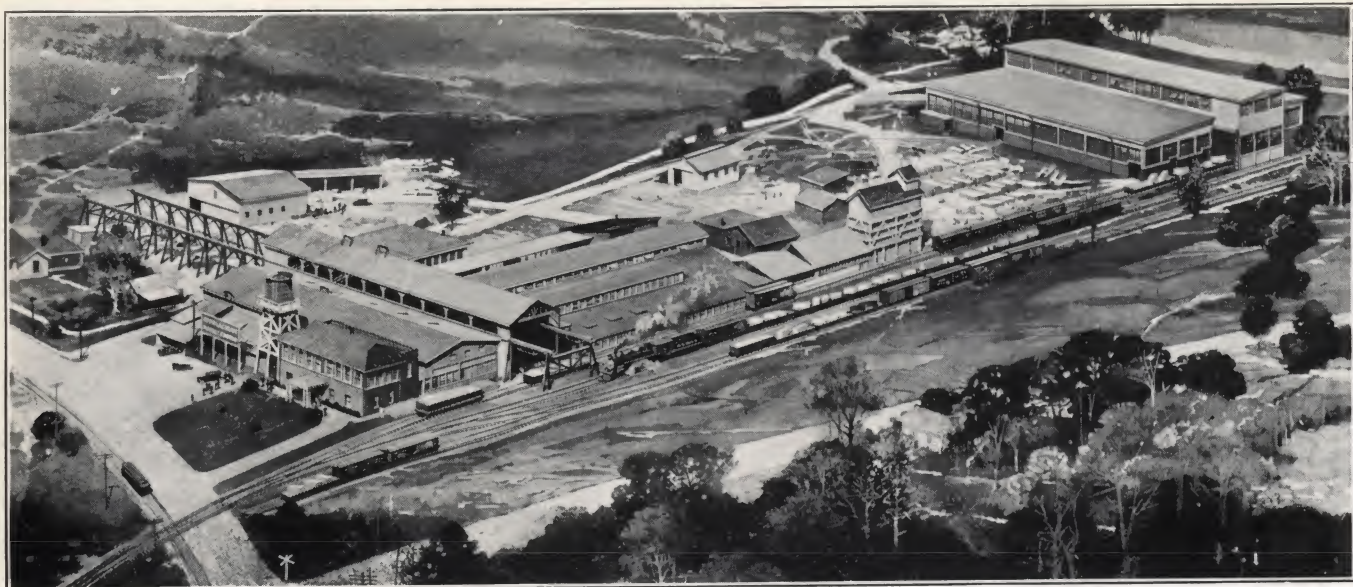


Davenport Apartments,
Washington, D. C.
(Top Center)



Wardman Building,
Washington, D. C.
(Above)





Appalachian Marble Company Mill

Prompt Shipments, Low Rates

Huge production facilities and entire absence of labor troubles insure quick deliveries. Freight rates on marble from the Appalachian mill are estimated at commodity rates to all points in U. S. and Canada.

Samples

Polished samples, showing the beauty of the Appalachian Marbles, will be sent to any interested architect or contractor, upon request.

Cost Estimates and Co-operative Service

The Service Department of the Appalachian Marble Co., Inc., welcomes the opportunity to co-operate with the architect. This co-operation reaches its highest state of efficiency when architects furnish the Appalachian Service Department with blue prints of the projects upon which they are working. The Service Department is then in a position to carefully estimate on work and offer all possible co-operation.

All Marble from One Source

Though a project may contemplate the use of foreign marble in addition to Appalachian Tennessee and other domestic marble, the complete cost estimate may be obtained from the Appalachian Service Department. Obtaining all marble from one source is not only a convenience but has definite shipping and price advantages.

Marble Working Drawings

Complete marble working drawings are made up by our drafting department to be used in submitting to the architects for approval as to jointing and for the securing of accurate Building Measurements.

Catalogue

A copy of the elaborate Appalachian loose leaf catalogue, illustrated in full colors, will be gladly furnished to architects and others interested in interior marble.



Taylor Alderdice High School,
Pittsburgh, Pa.
(Above)



Columbian Life Building,
Memphis, Tenn.
(Top Center)



Taylor Alderdice High School,
Pittsburgh, Pa.
(Above)



Godchaux Building,
New Orleans, La.
(Bottom)

CLARENDON MARBLE COMPANY

Producers of Vermont Marble

WEST RUTLAND, VT.

Product

Producers and manufacturers of EXTERIOR and INTERIOR MARBLE in blocks, sawed and finished.

Facilities

A fully equipped quarry, sawmill and finishing plant are maintained at West Rutland, Vermont, which furnish exterior and interior marble for banks, schools, churches, public buildings and residences.

A large supply of quarry blocks is on hand at all times so as to insure prompt deliveries of work of any nature.

Service to Architects

We are prepared to furnish samples of any type of Clarendon marble upon request. We are always pleased to advise the architect as to grades, colors, finishing, or any other items which may assist him in the execution of his design.

Physical Properties of Marble

Vermont marble has an ultimate crushing strength of about 14,000 lb. per sq. in. and absorbs about one-tenth of one per cent by weight when immersed in water.

These figures were obtained from tests made by the United States Bureau of Standards.

Varieties

Exterior—Clarendon Light—A very hard and durable marble which cuts and carves freely. It is non-absorbing and does not disintegrate. The color is very light with a moderate clouding.

Clarendon Dark Vein—This grade in-so-far as durability is concerned has the same qualities as Clarendon Light. It is a veined marble running somewhat darker in color, but it cuts and carves very freely.

Interior—A number of varieties, including light variegated, light clouded, dark clouded with white background, dark veined with white background, green veined with white background, green veined cream, cream with golden vein, and blue.

References

E. P. Prentice Residence, Williamstown, Mass.
First National Bank & Trust Co., Hamburg, Pa.
Cleveland Mausoleum, Cleveland, Ohio
Fitchburg Mausoleum, Fitchburg, Mass.
Leominster Mausoleum, Leominster, Mass.
S. Abramowitz Residence, Kingston, N. Y.
Numerous others.



State Educational Building, Albany, N. Y.

Clarendon Marble used for the exterior
© 1921 Fellowcrafts Studio, Albany, N. Y.

THE GEORGIA MARBLE COMPANY

TATE, GA.

BRANCH OFFICES

ATLANTA, GA., 511 Bona Allen Building

NEW YORK, N. Y., 1328 Broadway—Telephone, Wisconsin 6574

CHICAGO, ILL., 456 Monadnock Block

Products

GEORGIA MARBLE for exterior and interior building and monumental work.

Rough quarry blocks, sawed stock or finished work in the following marbles produced by us: "WHITE," "LIGHT CHEROKEE," "SILVER GRAY," "MEZZOTINT," "CREOLE," and "PINK."

Durability

Georgia marble, owing to its dense, flawless, crystalline formation and non-absorbing qualities, does not disintegrate. It will stand the test of time, as proved by use in many fine buildings and memorials.

Colors

"White"—This company operates four quarries of white marble ranging from almost pure white to white with more or less dark marking, known as "White Georgia" and "Kennesaw."

"Light Cherokee"—A very light gray with clouding and veins running in waves well distributed.

"Silver Gray"—A uniform pearl gray, practically free from marking.

"Mezzotint"—Gray background with rather heavy dark marking occurring in waves, between "Silver Gray" and "Creole."

"Creole"—Heavily veined and having white background with black and bluish black veining and figures.

"Pink"—Ranges from a very light salmon to a deep old rose with very warm tints.

Physical Properties of Georgia Marble

Crushing Strength—Tests by the Ordnance Department, United States Army, show crushing strength to be from 11,000 to 16,000 lbs. per sq. in.

Analysis—Made at Worcester Polytechnic Institute:

Carbonate of Calcium.....98.96%

Carbonate of Magnesium.....0.13%

Alumina0.22%

Silica0.61%

Loss0.08%

Weight—The specific gravity at 60° Fahr. is 2.7178, equaling a weight of 169.5 lbs. per cu. ft.

Absorption—A 2-in. cube was dried at 220° Fahr. till its weight was constant; it was then placed in water at 60° Fahr. for 24 hours, and reweighed. It was found to have absorbed only 0.028% of moisture.

Statuary

The "White" and "Silver Gray" Georgia marble are unexcelled for sculpture work exposed to the weather. The marble is unaffected by the most severe weather. Large sizes can readily be obtained.

Columns and Monoliths

Special attention is given to the production of long columns in one piece. The company has furnished monoliths 30 ft. long by 4 ft. diameter.

Facilities

Facilities for production and finishing are unexcelled. Eight quarries are operated, which will easily produce 1,000,000 cu. ft. per annum. The equipment of the four plants consists of upwards of 100 gang saws, 22 rubbing beds, planers, lathes, diamond saws, carborundum machines, etc.; and with an unlimited supply of marble any size order can be accurately and promptly filled.

References

A few representative buildings in which Georgia marble has been used, location, and architect or sculptor:

EXTERIOR OF BUILDINGS

Cleveland Museum of Art, Cleveland, Ohio, Hubbell & Benes
New York Stock Exchange, New York, N. Y., Trowbridge & Livingston

Girard Trust Company, Philadelphia, Pa., McKim, Mead & White, and Furness, Evans & Co.

U. S. Post Office, Birmingham, Ala., Supervising Architect, Treasury Department

Pan American Building, Washington, D. C., Albert Kelsey and Paul P. Cret

Federal Reserve Bank, Atlanta, Ga., A. Ten Eyck Brown

Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks

INTERIOR OF BUILDINGS

Guardian Savings & Trust Co., Cleveland, Ohio, Walker & Weeks

State Capitol, Salt Lake City, Utah, Richard Kletting

House of Representatives Office Building, Washington, D. C., Thomas Hastings and Elliott Woods

Manufacturers & Traders National Bank, Buffalo, N. Y., Furness, Evans & Co.

MONUMENTAL AND SCULPTURE

Lincoln's Statue, Lincoln Memorial Building, Washington, D. C., Daniel Chester French

"Civic Virtue" Municipal Fountain, City Hall Park, New York, N. Y., Frederick W. MacMonnies

Pediment, National Capitol, Washington, D. C., Paul Bartlett

Du Pont Memorial Fountain, Washington, D. C., Daniel Chester French

Columbus Memorial Fountain, Washington, D. C., Lorado Taft



McKINLEY BIRTHPLACE MEMORIAL, NILES, OHIO

McKIM, MEAD & WHITE, Architects

Entirely of Georgia marble, including statue of McKinley in center of peristyle. 28 columns, 25 ft. high, 3 ft. 4 in. in diameter; furnished in monoliths

THE STANDARD MARBLE WORKS CO.

Manufacturers of Foreign and Domestic Marble

TELEPHONE
WEST 2705

CINCINNATI, OHIO

Products

Any MARBLE manufactured for interior and exterior of buildings; MARBLE ALTARS; FURNITURE MARBLE, etc.

Also Soapstone and Slate for all purposes.

Facilities

We have a complete sawing and finishing mill and are prepared to execute work promptly from our large stocks of sawn and block marble, which are always on hand.

Orders for blocks, full sized slabs and custom sawing solicited.

Service

We contract for marble installed anywhere, or finished f.o.b. Cincinnati.

Installations

We can refer to many large jobs, located in practically every state.

Estimates

Estimates will be submitted upon definite plans and specifications, or complete lists.

Marble Classifications

To convey a knowledge of the characteristics of the various marbles, we have allotted each kind to one of four groups, viz:

Group A—A marble obtained in fair size regular blocks and sold as sound marble.

Group B—A marble obtained in medium size or irregular blocks and sold as sound marble.

Group C—A marble which has a minimum amount of natural faults that are treated in an approved manner and sold as semisound marble.

Group D—A marble generally obtained in irregular shaped blocks, including most all highly colored decorative marbles, having natural faults which are treated by approved methods and are sold with this understanding.

Standard Thickness for Wainscot

Marble is sawn in thickness to finish approximately $\frac{7}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 in.

Other thicknesses to order.

Standard Size Floor Tile

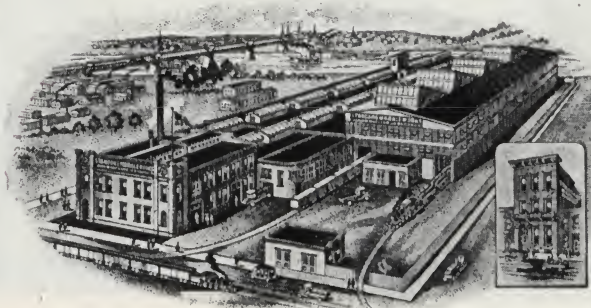
8x16-in. and 10x20-in. tile carried in stock in $\frac{7}{8}$ -in. thickness only.

Other size tile and pattern floor to order.

List of Marbles

The following, while only a partial list of the marbles and kindred products we carry in stock, gives suitable variations to complete any marble installation:

TRADE NAME	GROUP	WHERE QUARRIED
Alabama Madre Cream	B	Alabama
American Paonazzo	B	Vermont
Alberene Stone	A	Virginia
Belgium Black	B	Belgium
Bianco P.	B	Italy
Black & Gold	D	Italy
Bleu Belge	B	Belgium
Breccia Violette	C	Italy
Breche Paonazzo	C	Italy
Breche Opal	C	Italy
Bois Jourdan	C	France
Botticino	C	Italy
Champville	B	France
Colonial Gray Veined or Veinless	A	Missouri
Escalette	C	France
French Gray	A	New York
Georgia Creole, Gray or White	A	Georgia
Glens Falls Black	B	New York
Grand Antique	D	France
Hauteville	C	France
Italian English Vein	A	Italy
Italian Paonazzo	C	Italy
Italian Statuary Vein	A	Italy
Italian Second Statuary	A	Italy
Italian White (slightly veined)	A	Italy
Jaune Nile	C	Italy
Lanquedoc	D	France
Levanto	D	Italy
Light Cloud	A	Vermont
Napoleon Gray	A	Missouri
Numidian Red or Cipollino	D	Africa
Onyx Pedrara	D	Mexico
Pink Lepanto	A	New York
Pittsford Italian	A	Vermont
Rosata	C	Italy
Royal Jersey Green	C	Pennsylvania
Second Statuary	A	Vermont
Sienna Gray	D	Italy
Sienna Yellow	D	Italy
Skyros A, 12 or 14	C	Greece
Sonora	C	France
St. Baume	C	Italy
Ste. Genevieve Golden Vein	C	Missouri
Sylvan Green	D	Pennsylvania
Slate, Clear Black or Ribbon	A	Pennsylvania
Soapstone	A	Virginia
Tavernelle Claire or Rose	C	Italy
Tennessee Chocolate	A	Tennessee
Tennessee Gray or Pink	A	Tennessee
Tennessee Roseal or Travernelle	A	Tennessee
Tinos No. 3	C	Greece
Travertine, Roman	A	Italy
Travertine Biesanz	A	Minnesota
Venosa	A	Vermont
Verdello	C	Italy
Vermont Verde Antique	C	Vermont
Verona Red or Yellow	C	Italy
Westfield Green	C	Massachusetts
York Fossil	B	New York



VERMONT MARBLE COMPANY

Producers and Manufacturers of Exterior and Interior Marbles
PROCTOR, VT.

BOSTON, MASS., 44 School Street
ALBANY, N. Y., 62 Waldorf Building
CHICAGO, ILL., 5535 No. Lincoln Street
CLEVELAND, OHIO, 9508 Quincy Avenue, S. E.
DETROIT, MICH., % BUILDERS & TRADERS
EXCHANGE, 439 Penobscot Building
NEW YORK, N. Y., 101 Park Avenue

BRANCHES AND SALES OFFICES
PHILADELPHIA, PA., 22nd and Westmoreland
Streets
WASHINGTON, D. C., Commercial National
Bank Building, 14th and G Streets, N. W.
CHARLOTTE, N. C., First National Bank
Building
SAN FRANCISCO, CAL., 244 Brannan Street
TACOMA, WASH., East End 11th Street Bridge

LOS ANGELES, CAL., 605 Roosevelt Building
DALLAS, TEX., VERMONT MARBLE COMPANY OF
TEXAS, 1513 Wall Street
HOUSTON, TEX., VERMONT MARBLE COMPANY
OF TEXAS, 920 Electric Building
PETERBORO, ONT., ONTARIO MARBLE COM-
PANY, LTD., Maria Street

Facilities

The company has large sawing mills and finishing plants in Vermont; also finishing plants in Philadelphia, Cleveland, Chicago, Dallas, San Francisco and Tacoma. At the last-named plant is the storage yard for the Alaska marble, which can be shipped from there in rough or finished state. Alaska marble can also be supplied from any of the other plants.

Varieties

Exterior—Mountain White Danby, Imperial Danby, Highland Danby, Corona, Eureka and Pearl Gray Vermont.

Interior—*Vermont Marble*—Over 40 varieties, including white, lightly clouded and veined; gray, light green and dark green; red and black.

Alaska Marble—Several different kinds, the predominating color being pearl white veined with gray or black.

Physical Properties of Marble

Tests made by the United States Bureau of Standards show Vermont marble to have an ultimate crushing strength varying from 11,000 to 16,000 lb. per sq. in.

Tests made by the United States Bureau of Standards show that Danby Vermont marble, a variety much used for exterior purposes, absorbs about one-tenth of one per cent by weight when immersed in water.

Suggested Specifications for Exterior Marble

Material—All cut stone work shall be (insert name of variety of marble wanted).

Quality—All marble entering into the construction of the work shall be selected for uniform color. It must be free from cracks, chips, stains, or other defects upon exposed surfaces.

Samples—Before proceeding with the work the contractor shall submit a sample 4x8x2 in. of the marble he proposes to use. One face of this sample shall have (specify what finish is desired).

Joints—All marble shall be cut for $\frac{3}{16}$ -in. joints.

Finish—All exposed surfaces of marble work shall have (specify desired finish).

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's approval, shop drawings showing in plan and elevation the dimensions of all stones, position of joints, and the spacing of dentils or other repeated ornament.

Cutting—All cutting must be done in a workmanlike manner and in accordance with the shop drawings referred to. All faces shall be free from winds, so as to present a true and even surface. Joints shall be at right angles to the face. Intersecting profiles shall be accurately cut. Re-entering angles of mouldings shall be cut from the solid, unless otherwise shown by the drawings. The contractor shall, where called for by the architect's drawings, cut the marble work to accommodate steel, flashings, leaders or other structural materials.

Delivery—All marble shall be crated or otherwise protected so as to be delivered at site in good condition.

Storage—All marble stored at the site shall be on cleats, off the ground, and protected where necessary from any stains from above.

Setting—Marble shall be set with a derrick and in full bed of mortar. The mortar-bed shall be kept back at least 1 in. from the face of the stones.

Mortar—Mortar for setting marble shall be composed of 1 part white non-staining portland cement, 3 parts clean, sharp sand and a quantity of hydrated lime equal to 10% of the volume of cement.



Public Library, Detroit, Mich., Built of Vermont Imperial Danby Marble
CASS GILBERT, Architect

Protection—During construction, all sills, moulding, or other work liable to injury shall be suitably protected by boards which shall not be removed until the cleaning and pointing is done.

Anchors—Anchors to be of wrought iron, heavily galvanized or painted 2 coats with an approved brand of dampproofing paint and allowed to dry before using. For each stone 2 ft. long one anchor shall be used, and for each stone over 2 ft. long, at least two anchors. Provide suitable clamps at corners and such special anchors as the architect may direct. Balusters shall be doweled top and bottom with brass, copper, zinc or some other non-staining metal.

Pointing and Cleaning—All exposed surfaces of the building shall, on completion, and when directed by the architect, be cleaned with clean water only and fiber brushes. All joints shall be raked out, 1 in. back from the face, and carefully pointed with a mixture of 1 part white non-staining portland cement and 2 parts clean white sand. Joints shall be ruled with a tool of approved shape.

Vermont Interior Marble Service

We contract either for interior marble work installed or to finish and furnish it to local interior marble dealers, following whichever method will give best service to architects, contractors and owners.

Suggested Specifications for Interior Marble

Material—All interior marble shall be as follows: All toilet marble, Vermont Venoso; all corridor marble, Vermont Brocadillo. (Always insert the name of the desired grade, avoiding the too general term "Vermont Marble.")

Quality—All interior marble shall be of good quality, free from stains. Patching will be permitted only where the natural imperfections of a particular stone are subject to correction by the established usage of the industry.

Samples—Before proceeding with the work the contractor shall submit to the architect samples of all the marble specified above, 1 ft. square and $\frac{7}{8}$ in. thick.

Finish—All floors and stair treads shall have a fine sand finish. All standing marble shall be highly polished.

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's ap-

proval, shop drawings showing proposed jointing.

Measurements—Before proceeding to finish the interior work the contractor shall verify all measurements at the building.

Cutting—The marble contractor shall do such necessary cutting and fitting to accommodate his work to other trades as is sanctioned by common usage in the trade.

Setting—All floor marble shall be set in a cement mortar of 1 part cement and 3 parts sand, adding a quantity of hydrated lime, not exceeding 10% of the volume of cement. The concrete fill must be swept and thoroughly sprinkled before setting is started. All stair treads and all standing marble shall be set in plaster of paris. All wall marble shall be securely anchored with brass, copper or aluminum wire.

When work is completed all marble shall be cleaned and left in good condition.

Classes of Work Supplied

Wainscot and interior decorative treatment generally: floor tile, stair treads, bank screens, counter tops, soda counters, electric switchboards, scale tops, lamp bases, and many other purposes.

Adaptability

Innumerable are the ways in which Vermont marble may be applied to building construction. Nor is it merely a beautiful product. It is thoroughly sanitary as well as fireproof, though it may be readily cleaned. It needs no refinishing. Although initial cost of marble may be slightly in excess of certain other materials, in the end it is no more expensive.

Marble Exhibit in New York City

There is an exhibit of large-sized samples of our marbles at our New York office in the Architects' Building, 101 Park Avenue, to which architects, engineers, contractors and owners are cordially invited.

"The Book of Vermont Marble"

A brief compendium of our products and the best ways to use them; our facilities; a number of drawings and details showing most approved methods of construction in exterior and interior marble work, etc. Contains 65 pages, of standard architect's size. Furnished without charge to any architect upon request.



Vermont and Alaska Marble—Orpheum Theater, Boston, Mass.
THOS. W. LAMB and THE HOFFMAN COMPANY, Architects

THE CENTRAL OOLITIC STONE CO.

Indiana Limestone

TELEPHONES

LAWNDALE 8940, 5490

CHICAGO OFFICE

2120-2140 South Kedzie Avenue

CHICAGO, ILL.

MILL: BLOOMINGTON, IND.

Products

Selected, Standard and Rustic Grades of Buff, Gray and Variegated INDIANA LIMESTONE in the Rough Block, Sawed, Planed, Turned or Cut ready to set in the wall, supplied from any of the well-known quarries in the district.

Facilities

Our mill, located in the heart of the Indiana Limestone district, modernly equipped with electrically operated machinery of the latest approved type, offers

**INDIANA
LIMESTONE**
The NATION'S BUILDING STONE
TRADE-MARK

excellent facilities for the prompt and efficient execution of contracts of any size.

Description

For complete description of the colors and grades of Indiana Limestone, refer to pages of the Indiana Limestone Quarrymen's Association.

Quality

The policy of this company is to see that no work leaves its mill not thoroughly executed in a workmanlike manner, and that the grade of stone is in accordance with the specifications and equal to approved sample submitted.

Samples

To interested parties and prospective buyers will be sent, express prepaid, on request, samples of ordinary size to any part of the United States or Canada.

Estimates

Requests for quotations on stone work are solicited and will be given prompt attention.

Co-operative Service

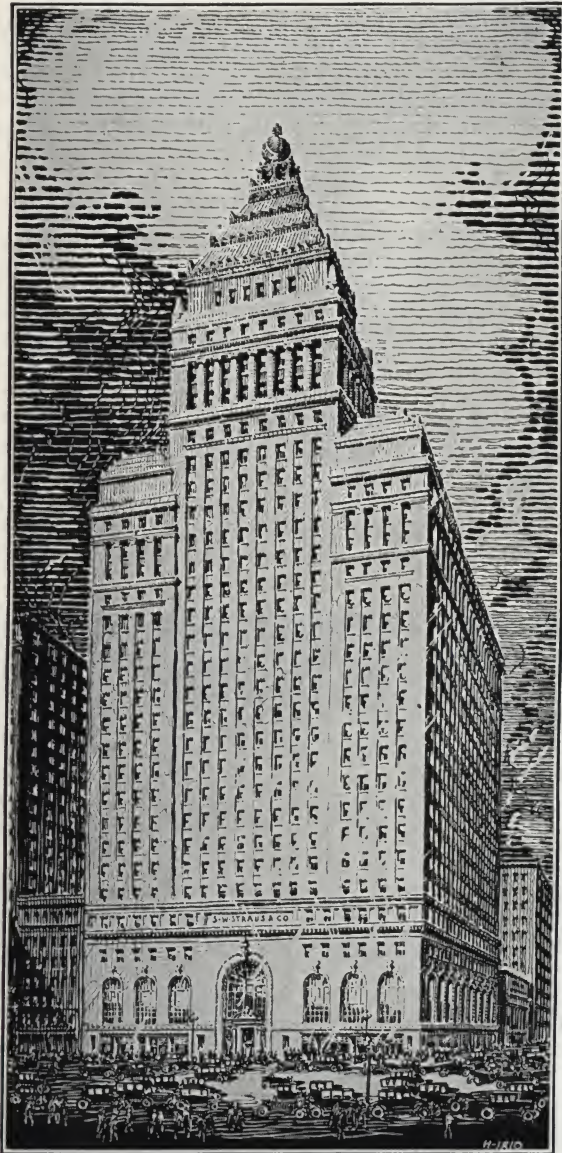
This company has an organization composed of men thoroughly experienced in their respective lines, and will gladly give information or render service to the architect, owner, and general contractor when called on. Prompt and satisfactory attention will be given to all inquiries and attractive quotations made at all times.

References

This company has executed the stone work for some of the prominent buildings of the country, and points with satisfaction and pride to its references. Some recently completed contracts follow:

London Guarantee & Accident Building, Chicago, Ill., Alfred S. Alschuler, Chicago, Ill., Architect
Union Trust Building, Cleveland, Ohio, Graham, Anderson, Probst & White, Chicago, Ill., Architects
S. W. Straus Building, Chicago, Ill., Graham, Anderson, Probst & White, Chicago, Ill., Architects
Woodward-Duffield Building, Detroit, Mich., Albert Kahn, Detroit, Mich., Architect
Illinois Life Insurance Building, Chicago, Ill., Holabird & Roche, Chicago, Ill., Architects
American Exchange National Bank, Dallas, Tex., Lang & Wittchell, Dallas, Tex., Architects
Municipal Courthouse, Des Moines, Iowa, Keffer & Jones, Sawyer & Watrous, Kraetsch & Kraetsch, Norman T. Vorse, Associated Architects of Des Moines, Iowa
Durant Building, Detroit, Mich., 15-story Colonnade and Court Walls, General Motors Co., Owners, Albert Kahn, Detroit, Mich., Architect
First Church of Christ, Scientist, Oklahoma City, Okla., Courtland L. Butler, Tulsa, Okla., Architect
University of Michigan Hospital, Ann Arbor, Mich., Albert Kahn, Detroit, Mich., Architect
First National Bank, Detroit, Mich., Albert Kahn, Detroit, Mich., Architect

Other references gladly supplied on request.



S. W. Straus Building, Chicago, Ill.

GRAHAM, ANDERSON, PROBST & WHITE, Architects, Chicago; Ill.

100 YEARS OF SERVICE

ST. PAUL STONE QUARRIES CO.

Pioneer Quarriers and Manufacturers

OFFICES, QUARRIES AND MILLS

ST. PAUL, IND.

Product

ST. PAUL STONE, a non-absorbent, non-staining limestone which affords the architect a splendid stone for Base Courses, Steps, Platforms, Door Sills, etc., equal to granite in appearance and durability and at *considerable less cost*.

St. Paul Stone

The merit of St. Paul Stone for these purposes has been established. Light bluish gray in color, it harmonizes admirably with the Indiana limestones, sandstones, terra cotta, etc., that may be used in the superstructure.

Facilities

An increasing demand for St. Paul Stone has warranted this company installing modern machinery, so that today we are in position to promptly supply this stone cut, ready to set. It may be specified with the assurance that the cut stone contractor (who is neither equipped nor accustomed to working such a hard stone) can obtain promptly from this company the St. Paul Stone cut and ready to set in the building.

Uses

St. Paul Stone is available for any stone need in the architectural or landscape fields. Where a permanent, clean exterior and absolutely dry interior are required for a structure, we ask your consideration of our product.

Quality

Close grain, with resulting non-absorbent qualities, prove St. Paul Stone practically voidless. Its toughness and resistance to wear are



Christ Church, Indianapolis, Ind.

Hand hewn St. Paul Stone set on edge. Rough quarry bed exposed to weather. 70 years in the heart of city shows this stone mellow and clean. As a contrasting stone result note the "Van Camp" Residence on Meriden Street where the stone is laid on its natural bed



A Modern Example

Dressed St. Paul Stone trim, with field of rock face set on its actual bed



OUR HOBBY—BASE COURSES, STEPS, ETC.

remarkable; it therefor should not be confused with other so called "hard limestones" that are but slightly different from standard oolitic limestones.

Facts

Specific gravity 2.67; net weight 170 lb. per cu. ft.; strength about 22,000 lb. per sq. in.

Specification Data

Portland cement (a real non-staining test) does not stain St. Paul Stone. Moisture does not penetrate face of stone. The use of non-staining cement and waterproofing when setting is not required. You need only to protect stone from rough handling during construction.

For ashlar, base courses, etc., stone should be set on edge. For steps, door and window sills, coping and projecting courses, stone should be set on its natural bed.

Carborundum and sand rubbed or planer and smooth sawn finishes recommended. Pleasing results can be obtained under any specification finish, all of which are applicable to St. Paul Stone. Where desired bush hammered treads with smooth risers add charm. On interior stone floors, etc., polishing with terrazzo polisher produces a unique and beautiful floor.

Cleaning should be done by the use of water and silica sand, rubbing with a stiff fiber brush. A piece of 40KG4 carborundum stone or wire brush will remove any accidental spotting. St. Paul Stone may be cleaned by these methods regardless of the years in place.

Service

No requirement is too small to receive careful attention; no demand is too large for our facilities.

References (Exterior)

A few buildings completed or under contract, in which St. Paul Stone has been used:

BUILDING AND LOCATION	ARCHITECT
Masonic Temple, Dayton, Ohio	Herman & Brown
Stouder Memorial Hospital, Troy, Ohio	Schenck & Williams
Phelps Apartment Building, Cincinnati, Ohio	Garber & Woodward
Booth Memorial Hospital, Covington, Ky.	Samuel Hannaford & Sons
Bethesda Hospital, Cincinnati, Ohio	
Mariemont Hospital, Mariemont, Ohio	Howard Dwight Smith
McGuffey School, Columbus, Ohio	
McKinley School, Columbus, Ohio	Prof. Jos. N. Bradford
New West High School, Columbus, Ohio	
Ohio State University:	Glass & Ramsey
Administration Building	
Starling Loving Laboratory	Walker & Norwick
Agricultural Building	Stanley Mathews
Animal Husbandry Building	Vonnegut, Bohn & Mueller
Pomerene Hall	
Chemistry Building	
Holy Name Church, Columbus, Ohio	
Lincoln Junior High School, Dayton, Ohio	
Fleishman Estate, Cincinnati, Ohio	
Meridian Service Station, Indianapolis, Ind.	

No stronger evidence can be offered as to the beauty, harmony and durability of St. Paul Stone than repeat specifications.



The Judicious Use of a Small Amount of "St. Paul Stone" at Entrances for Plinths, Sills, Platforms, Steps and Buttresses, together with Base Courses at Grade, Affords the Ultimate in Protection of Design and Structural Value, without Appreciably Increasing the Cost of the Building

INDIANA LIMESTONE COMPANY

(Capitalized at Over 46 Million)

An Organization to Serve the Users of Indiana Limestone—
"The Nation's Building Stone"

GENERAL OFFICES AND ARCHITECTS' SERVICE BUREAU

BEDFORD, IND.

EXECUTIVE OFFICES: Tribune Tower, CHICAGO, ILL.

PRINCIPAL SALES OFFICES

Sales Offices Have Now Been Established in the Following Cities, Through Which Every Effort Will Be Made to Render the Most Efficient Service to the Users of "The Nation's Building Stone"

ATLANTA, GA.	CINCINNATI, OHIO	DES MOINES, IOWA	NEW ORLEANS, LA.	ST. LOUIS, MO.
BEDFORD, IND.	CLEVELAND, OHIO	DETROIT, MICH.	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
BOSTON, MASS.	DALLAS, TEX.	KANSAS CITY, MO.	PHILADELPHIA, PA.	SYRACUSE, N. Y.
CHICAGO, ILL.	DENVER, COLO.	MINNEAPOLIS, MINN.	PITTSBURGH, PA.	WASHINGTON, D. C.
		TORONTO, ONT., CANADA		

BRANCHES OF SERVICE BUREAU

NEW YORK, N. Y. CHICAGO, ILL. DETROIT, MICH. KANSAS CITY, MO.

The Properties and Plants of the Following Twenty-four Concerns, Which Embrace All the Largest and Oldest Indiana Limestone Producing Companies Located in the Bedford and Bloomington, Indiana District, Were Acquired and Are Now Operated by This Company

INDIANA QUARRIES COMPANY
STRUBLE CUT STONE COMPANY
THE CONSOLIDATED STONE COMPANY
W. McMILLAN & SON
FURST-KERBER CUT STONE COMPANY
STAR STONE COMPANY
DOYLE STONE COMPANY, INC.
HOOSIER CUT STONE COMPANY
NATIONAL STONE COMPANY
CRESCENT STONE COMPANY
MATHERS STONE COMPANY
SHEA & DONNELLY COMPANY

J. HOADLEY & SONS CO., INC.
HOADLEY STONE COMPANY
HUNTER VALLEY STONE COMPANY
THE MONROE COUNTY OOLITIC STONE CO.
THE IMPERIAL STONE COMPANY
INTER-STATE CUT STONE COMPANY
CLEAR CREEK QUARRIES COMPANY
JOHN A. ROWE CUT STONE COMPANY
C. D. DONATO CUT STONE COMPANY
BOWMAN-KING STONE COMPANY
BROOKS CUT STONE COMPANY
UNITED INDIANA STONE COMPANY

Product

INDIANA LIMESTONE
(which is often called "Bedford Stone").

Gray (or Blue), Buff and Variegated (or mixed); also certain other varieties, including "Old Gothic"—a grade showing interesting texture and color-tone variations; also the rough Sawed-four-side Indiana Limestone of Short-length stock for Random Ashlar, range work and other informal types of Ashlar Facing for moderate cost buildings.

See complete listing of classifications under the present system of grading the product on following pages.

Indiana Limestone

Indiana Limestone is a *natural stone*, not a manufactured product. It is a fine even-textured non-crystalline limestone of beautiful soft color-tone, ranging in the various grades from a somewhat grayish buff, on through silver gray to a medium-toned gray of slightly



bluish cast. The massive deposit forming the ledges in the hills of Southern Indiana, from which this fine,

easily worked, yet durable and permanent stone is quarried, constitutes one of the most wonderful and probably the most useful, of building stone deposits in the world. An interesting booklet, Volume 1 of the Indiana Limestone Library, which describes the stone and its structural qualities, will be sent free upon postal request.

Cost

The cost of this stone compared with substitute products is always such as to make it economically available for use in all classes of buildings—especially store fronts and small commercial buildings, schools and institutional work—as well as for larger and more monumental work for which a natural stone is always used.

The rough sawed strip stone makes it in every way suitable for use in decidedly moderate cost houses.



Ledge at the Indiana Limestone Company's Dark Hollow Quarry

The largest single ledge in operation in the Limestone district, measuring 1400 ft. long, 140 ft. wide and 60 ft. deep. This will cube 11,760,000 ft., approximately 20,000 large car loads of Indiana Limestone.

The New Company's Facilities

Indiana Limestone is found only in two counties of the state of Indiana (Lawrence and Monroe).

The INDIANA LIMESTONE COMPANY owns, approximately, 6,600 acres of land, of which over 1,600 acres are proven stone land available for immediate quarry development.

Engineers estimate that at the present rate of production and shipment, there is sufficient stone in these proven areas for seventy years' operation.

INDIANA LIMESTONE COMPANY has a quarrying capacity of 16,000,000 cu. ft. per year, a sawed stone capacity of 6,000,000 cu. ft., and a cut stone capacity of 3,000,000 cu. ft. per year.

Millions of dollars are invested in machinery, equipment, buildings, and a network of railway tracks.

The entire production operation is handled with precision and efficiency, more like large-scale manufacturing than quarrying, as quarrying is ordinarily carried on. This enables the industry to give rapid delivery and most satisfactory service, regardless of the quantity of material required, or the size or number of contract operations.

The merging of these vast limestone interests into one well-financed and properly managed organization is in line with the whole trend of modern large-scale business, the object of which is to secure the benefits of quantity production and the efficiency that goes with this method. More effective co-operation with the architectural and building professions, and the production of Indiana Limestone at a price that would make it more attractive to the public, were the principal ideas behind the consolidation.

Practically all of the long established and proved quarries from which this dependable stone has been produced for generations are owned by this company.

Transportation Facilities

Owing to the fortunate central location of quarries and unsurpassed railroad facilities, Indiana Limestone can be transported to all points in the United States and Canada with exceptional promptness and at minimum cost.

Distribution of Stocks

Good sized stocks of Indiana Limestone are carried by cut stone contractors in nearly all the principal cities of United States and Canada.

It is a standard product available in quantity for prompt deliveries at all times.

Architects Service Bureau

Architects and builders are cordially requested to make free use of the Architects Service Bureau of the company as a source of reliable information regarding its product, its most effective and economical use and for assistance on any problems pertaining to structural design and use of Indiana Limestone in building construction.

The activities of this Technical Department are chiefly educational, comprising investigation and research work, publicity, technical service and assistance to the architectural profession, to the trade, and to others directly interested in the use of the product.

Selection of Most Suitable Material

The selection of the kind or grade of stone to be used for a particular building often does not receive the careful consideration which it deserves. When a building is intended to become the art or cultural center of a community, its administrative headquarters, or the realization of the life-dream of some influential citizen, it is natural to think that only the very best is good enough. In such cases, there is a temptation to specify the fine-textured "Select" or what is really selected stone, the highest in cost, for all parts of the work. This is rarely necessary or desirable.

All grades of Indiana Limestone are equal—in-so-far as soundness is concerned. The production processes employed in a cut stone mill, further, are such as will automatically eliminate any blocks or pieces that contain planes of weakness, as in the average run of work the stresses set up in machining the stone and in handling it by the travelers from one machine to another, are greater than would be permitted in building, and serve to test effectively all of the stone as it passes through the various milling operations that are employed to shape and prepare it for its position in the building.

For many types of structures, especially for sawed-finish wall facing, the Old Gothic grade, which is decidedly low in cost is the most fitting to use. The moderate cost Variegated grade is suitable for all purposes, either for trim or for all-stone faced buildings.

During the past few years the proportionate use of the gray stone on account of its fine, close, even texture has been rapidly increasing. Many architects now prefer and specify it regularly, on account of its density, uniformity and fine weathering qualities, together with dignity and pleasing color-tone which becomes progressively lighter in shade with the passing years. It most effectively resists the accumulation of grime and in appearance is the nearest approach to a costly light-colored fine grain granite that it is possible to obtain in the field of an easy-working, moderate cost building stone.

Architects will never regret specifying this material for their best work, as exemplified by some of the finest buildings in America that have been constructed of it.

The well-known Oolitic Limestone of Indiana, formerly called Bedford Stone, is commercially available only in Lawrence and Monroe Counties, and the architect should protect both his client and himself against substitutes. All of the long established and proven quarries from which this dependable stone has been produced for generations are located within these two counties, a majority of them owned and operated by the INDIANA LIMESTONE COMPANY.

Colors and Textures

The INDIANA LIMESTONE COMPANY classifies its product by color-tone and texture and recommends the use of these terms to indicate the character of stone required.

Regular classifications are as follows:

Select Gray	Select Buff
Standard Gray	Standard Buff
Coarse Gray	Coarse Buff
	Variegated

Special classifications are as follows:

Rustic Buff	Special Hard Gray
Old Gothic	Special Hard Buff
	Buff Statuary Stock

Other specialties, ranging in color-tone from very light, almost a cream white, to distinctly dark, are also usually available, samples of which will be furnished by the Company upon request. A general description of the various grades and recommendations as to their selection and employment is given below.

Architects should remember that the classification established by the former Indiana Limestone Quarrymen's Association which, with minor changes in the system of grading, was adopted by this company, is for their direct benefit and the protection of their clients in the specifying of Indiana Limestone.

"Select" Stock (Either Gray or Buff)—"Select" stock is the average finer grained stone. It is more uniform in color-tone and texture than standard and is finer in texture than is required for the average run of exterior work. "Select" stock is suitable for the finer class of exterior work in monumental buildings and especially for entrances and those portions of a building that are within ready range of vision, also for carving, interior work and other particular uses. The use of this grade is also recommended for carving, important entrance and other prominent features of commercial and various other types of buildings in which standard or the coarser textured grades are otherwise employed. "Select" stock as produced by the quarries

may contain some fine streaks of crystalline calcite and minor variations in texture that do not impair the strength or appearance of the finished stone or that can be eliminated readily from appearing on the face of stonework in the finished building.

"Standard" Stock (Either Gray or Buff)—"Standard" stock is the average product of the quarries and constitutes the bulk of the total output. It is thoroughly sound stone, having some variation in color-tone and texture. It may contain some streaks of calcite or slightly coarse grained formation, but such variations in this grade are confined with reasonable limits in the grading of the quarry blocks that will usually make it impossible to determine in the finished work at a short distance any difference between the general appearance of this and "Select" stock. Stone of the "Standard" classification is suitable for all purposes in the regular run of building work.

"Coarse Stock" (Either Gray or Buff)—This stock is the average coarse grained stone having a greater variation in color-tone and texture than "Standard," somewhat shelly in formation and may contain some pit holes, but is not as variable, coarse or open in texture as "Rustic."

"Coarse" stock is suitable for large cornices and other boldly detailed work in the upper part of any building, the lower part of which is built of "Standard" or "Select." It is also recommended for the cut work, trim, etc., in combination with sawed ashlar of "Rustic" or "Old Gothic" stock.

"Variegated" Stock—The "Variegated" stone is an irregular mixture of the gray and buff produced from the blocks that are quarried where the buff and gray color-tones adjoin in the quarry, showing some variation in color-tone as well as in texture. Such material, when cut up for building purposes, will, in the finished work, produce pieces of each color-tone and a small percentage of stone with both color-tones in one piece. It is unusually effective in giving variety to plain surfaces and is a desirable class of material for trim as well as for wall facing.

"Variegated" stock will embrace stone that will range in texture from a fair grade "Standard" to "Select," and consequently will include some stone containing streaks of crystalline calcite and shelly formation that do not make the quarry blocks too coarse or variable to be used for the average run of cut stone work, trim, etc. The coarser grained and more variable of the "Variegated" stone is included in the "Old Gothic" Classification.

Where only a uniform fine grained selected grade of "Variegated" stock is desired, "Variegated Statuary Stock" may be specified. This is not a regular classification and is not included in price list or segregated in the stock piles. Stone of this character is usually available in moderate quantities, and will be furnished on special order only at a differential in price covering the cost of selecting the quantity required from the stacks.

"Rustic" Stock (Buff Only)—"Rustic" stock is the coarser grained stone, having an interesting, more or less open shelly texture, with a varying amount of crystalline calcite intermixed, some of which will have a decidedly coarse somewhat honeycomb formation; some of it is likely to be darker in color-tone, and some of it is quite hard, due to the size of grain and amount of calcite that it contains. It is therefore coarser and more distinctive in texture, showing a wider range of granular formation and more variation in color-tone than any other grade, except "Old Gothic."

This grade is particularly suitable for the sawed ashlar facing of walls, for which purpose it may be to advantage combined with trim of either "Variegated," "Standard," "Coarse" or "Select" stock. "Rustic" stock is not generally recommended in place of "Standard" or other grades for any portions of a building on which there is much molded work and cutting, on account of its texture and hardness and the consequent greater cost of cutting this kind of stock.

"Old Gothic" Stock—This class of stone is unselected as to color and texture, and embraces the gray, buff and variegated stone, which, although varying in texture from medium fine to distinctly coarse, will generally be of fairly coarse texture, containing shelly formation with both white or dark crystalline streaks, and streaks of calcite, shelly matter, crowfeet, etc., that do not affect the structural soundness of the stone. It has the widest range of variation in color-tone and texture and is recommended especially for all forms of rough-sawed masonry field work; range work, random ashlar, etc.

Buff Statuary Stock—This grade covers only the very fine uniform grain buff stock as produced by certain quarries in comparatively limited quantities. It is not a regular grade and is sold principally for sculpture and carved doorways, tracery, sculptured panels, memorials and elaborate interior work, for which purposes the higher cost of this stock is fully warranted. For all exterior work with the possible exception

of occasional pieces of statuary, fine tracery or intricate carving, "Select" stock available at lower cost will be found eminently satisfactory.

"Special Hard" Stock (Either Gray or Buff)—"Special Hard Gray" and Special Hard Buff" are especially adapted for base or grade courses, steps and platforms, buttresses, floor tiling, terrace paving, and other work that is subject to abrasion, or constant wear under foot traffic; for which purposes these special grades of stone are principally recommended. This class of stone is not recommended in place of the regular classes for the average run of work, such as ashlar, trim, etc.

Ease of Working

No other commercial stone is so easily worked as Indiana Limestone. In spite of its great strength it can be freely sawed, planed, turned and carved, and be otherwise worked by machinery, as well as by hand.

Physical Characteristics

Indiana Limestone is *non-crystalline*; the aggregate filler and matrix are all pure carbonate of lime.

CHEMICAL ANALYSIS (AVERAGE)

Carbonate of lime.....	97.23%
Carbonate of magnesia.....	1.20%
Silica .....	.74%
Alumina .....	.56%
Oxide of iron.....	.15%
Water and loss.....	.12%
	100.00%

PHYSICAL DATA ON INDIANA OÖLITIC LIMESTONE

Average weight (dry).....	144 lb. per cu. ft.
Average absorption by weight.....	4.6%
Average crushing strength seasoned stone from 6000 to 8000 lb. per sq. in.	

It is not a hard or brittle stone, and can be cut with equal ease in any direction. For all practical purposes it is considered a free stone, having no evidence of cleavage plane. It possesses far greater strength than required for any ordinary building purpose, the seasoned stone having an average crushing strength as given above and a remarkably uniform modulus of rupture value, whether tested parallel to or at an angle with the grain, making it safe for long lintels, etc. It is unnecessary to set this stone on its natural quarry bed.

Indiana Limestone is to all intents and purposes fire-proof. It calcines above 1500° F. and will not spall, crumble, split nor check at temperatures up to 1000° F. when drenched with cold water.

Possessing a wonderful internal elasticity, adapting itself without damage to extreme temperature changes and other conditions of permanence that exist in modern building structures, it is for this reason alone particularly well adapted to use both in building masonry and as a facing material in the colder northern sections of the United States and in Canada.

Permanence

Durability and resistance to atmospheric action is proved by the exposed quarry ledges that are centuries old and by many fine existing structures of considerable age. The soft light color-tones are permanent, and no other building material remains clean so long or better resists the accumulation of grime from the smoke-laden atmosphere of manufacturing cities.

Many fine monumental and commercial buildings in the South and in Canada may be referred to as attesting the beauty, adaptability, permanence and genuine value of this fine natural building stone under varied climatic conditions.

Finishes

Any hand-tooled, machine, or sawed finish, including rubbing and honing, may be applied, except bush

hammering and other so called "hardstone" finishes which are used only infrequently for special purposes.

Additional information on finishes will be found in the service publications of the Company.

Uses

Indiana Limestone, to the extent of many millions of cubic feet, is used each year for all classes of buildings. A large proportion of the United States Government buildings have been built of this stone.

Many of the finest office buildings, banks, stores, and other commercial structures, churches, school and college buildings, residences, apartments, as well as monumental buildings of all sorts have been built of Indiana Limestone.

It is unsurpassed as a material for residence trim, and for the trim of schools, factories and industrial buildings of all types where it is used in walls of brick or other native stone.

The finer grades of Indiana Limestone are much used for interior work in churches, public buildings, fine residences, etc. The fine grained buff stone, when in place, can scarcely be distinguished from the caen stone of France; and having much greater strength and durability is conceded to be its superior.

The finest and most elaborate carved work, both interior and exterior, is easily, beautifully and permanently expressed in this material.

It is widely used for the larger kinds of architectural sculpture and statuary groups, gateways, pergolas and memorials with most gratifying effects. For such uses, the practically unlimited size of the perfect units which may be had is a great advantage. Monolithic columns, up to any size which can be transported, are always obtainable.

In addition to its regular use as cut stone for the various purposes already enumerated, it is also used in the rough-sawed form, for masonry facings, forming the field work of walls trimmed with cut stone, as described on the next page.

An example of this class of usage in church building is illustrated on the fourth following page.

In engineering, Indiana Limestone is extensively used where an architectural effect is desired for walls, piers, bridge abutments, etc., and especially for the balustrades and trim of bridges built of other masonry, or of reinforced concrete.

Literature and Samples

Literature useful to architects in the form of service publications, including technical information, construction details, service plates, etc., is constantly being prepared, and as published will be furnished gratis to those requesting it.

Samples of the stone will also be furnished to architects and others interested.

Data on anchorage, setting mortars, stain-prevention and cleaning, and other related subjects will be furnished on request.

Every architect should have on file a copy of the latest edition of the Indiana Limestone Specification Manual.

All architects should also obtain a copy of the new specifications for random ashlar masonry.

Rough-sawed Indiana Limestone

Rough-sawed Indiana Limestone in "Old Gothic" and Short-length "Variegated" or other classifications is one of the Company's more recent developments

for the facing and building of moderate cost masonry walls.

The wall construction and facing schemes that are embraced within the class of random ashlar, range work, etc., as covered by this specification, are many and varied in detail and effect, and cover a wide field of usage in buildings of various types. These forms of stone-faced wall construction are especially adaptable for church, scholastic and institutional buildings of all kinds, as well as for residences, and, in fact, for all other classes of buildings for which a somewhat informal architectural style is considered most suitable.

The architect will find these forms of construction are decidedly economical and possess advantages that are worthy of careful study.

On account of the saving in labor that is afforded by the use of material already squared to the exact height and thickness of the different units required by the particular jointing scheme adopted, ashlar of this rough-sawed limestone will frequently be found less costly and more effective in the finished building than walls built of or faced with cheap local stone; especially so, as the facing units may be dimensioned to fit and bond with the brick or tile backing units; also by reason of the easy working qualities of Indiana Limestone, which make possible the breaking and trimming of the sawed stone strips to the proper lengths at a minimum of labor cost.

The Rough-sawed, "Old Gothic," "Variegated" and "Rustic" Indiana Limestone in strip form gives the architect a wider range of choice in the employment of stone for the facing of buildings, by filling the gap that has heretofore existed between the regular cut stone ashlar, on the one hand, and the rougher types of wall such as field stone or rubble work and other forms of rock-faced masonry, on the other. It also affords a means of using stone in an economical manner for buildings of moderate cost, for which any form of cut stone facing, however desirable, might be considered as involving an unwarranted increase in the cost.

For further information and data address the Architects' Service Bureau at Bedford, P. O. Box 308.

Preface to Standard Form of Cut Stone Specifications for Indiana Oolitic Limestone

For the convenience of architects and others using this specification, it has been prepared and published both in loose leaf typewritten form and in folder form, and *will be mailed free to architects on receipt of postal request.*

It is particularly important that the Company's bulletins in reference to setting mortar, sand for setting and pointing mortar, flashing and calking of projecting members, detailing of stone in connection with reinforced concrete and the protection of cut stone at time of delivery, during and after erection, also be carefully studied.

Note: It being more or less usual for cut stone to be furnished to the contractor either f.o.b. cars at destination or delivered alongside curb at the building site by trucks or teams, the specification is so arranged that either the setting only, or the delivery and setting, may be readily separated under an entirely separate "Setting Contract."

Specification for Cut Indiana Limestone

(1) **Work Included**—The work under this contract shall include all labor and material for the furnishing of cut stone work in accordance with the drawings and as hereinafter specified.

(2) **Description of Stone**—All Limestone specified or shown on drawings shall be Indiana Oolitic Limestone building stock, free from all defects that would materially impair its strength, durability or appearance, and within the range of variation of color and texture represented by two samples approved by the architect.

Specially graded stone, acceptable as to hardness and color, as per samples to be submitted, shall be employed where indicated on drawings, for and all other positions in contact with the soil or exposed to direct wear.

Wherever the terms "Indiana Limestone" or "Limestone" occur in this specification, they specifically refer to and shall imply "Indiana Oolitic Limestone" quarried in Lawrence or Monroe Counties, Indiana, all such stone to be from a quarry the product of which has been tested at the U. S. Bureau of Standards for physical properties and weathering with satisfactory results.

(3) **Finish**—The finish on exposed surfaces generally, except where tooling or carving is indicated, shall be smooth, machine-dressed, showing no tool marks.

(4) **Samples**—The contractor shall submit to the architect two samples which shall be typical of the extremes which the contrac-



Tribune Tower, Chicago, Ill.

JOHN M. HOWELLS and RAYMOND M. HOOD, Associated Architects
HEGEMAN-HARRIS, INC., General Contractors



War Memorial, Southampton, L. I., N. Y.

GOODWILLIE & MURAN, Architects

One of the many recent fine monuments constructed of Indiana Limestone

tor proposes to furnish. Samples to be about $3\frac{1}{2}$ in. wide by 7 in. long by about 1 in. thick, produced with the large faces cut across the grain of the stone, the finish specified to be indicated on the large faces and at least two of the edges to be rock-face. Similar samples shall be provided when "Special Hard" stone or any other grade of stock is specified for certain positions in the building.

All samples shall be labeled or otherwise clearly marked with the grade of the Limestone, the name of the contractor submitting them, and with the statement: "Samples of Indiana Limestone to be furnished for the Building."

(5) **Standard Practice**—The standard practice established by the former Indiana Limestone Quarrymen's Association of Bedford, Indiana, shall govern, except where this is in direct conflict with the specific intent of the architect's detail drawings. Bidders not familiar with these standards relating to grading, cutting, setting and anchorage practice, etc., are cautioned to inform themselves regarding them.

The architect reserves the right to approve the sub-contractors for both the cutting and setting of the stone, before this portion of the work is awarded.

(6) **Cutting and Setting Drawings**—The cut stone contractor shall prepare and submit to the architect for approval, complete cutting and setting drawings, in triplicate, for all of the Limestone work under this contract and no stone shall be cut until these drawings are approved by the architect. Such drawings shall show in detail the sizes, sections and dimensions of stone, the arrangement of joints and bonding, anchoring and other necessary details.

These drawings shall be based upon and follow the drawings and full size details prepared by the architect, except where it is agreed in writing that changes be made. Each stone indicated on these drawings shall bear the corresponding number marked on the back or bed with a non-staining paint.

(7) **Bonding and Anchorage**—All projecting stones, except where otherwise shown as anchored to the structure, and so provided for by details on setting drawings, shall have beds in the wall at least 1 in. greater in depth than their maximum projection.

Moulded projecting courses, unless shown as secured by suitable anchorage or steel supports, shall have not less than four-sevenths ($\frac{4}{7}$) of their cubic contents inside the face of wall. There shall be "through" or bond stones wherever indicated on approved cut stone drawings.

Provision for the proper anchoring, doweling and cramping of work in keeping with standard practices, also for the support of stone by shelf angles and loose steel, etc., when required, shall be clearly indicated on the setting drawings.

(8) **Details for Lintels, etc.**—Lintels, architraves and other members spanning openings, whether supporting a superimposed load or only their own weight, shall be of the proportions and sectional area that will provide an ample factor safety based on the average ultimate breaking strength of the stone specified.

(9) **Carving and Models**—All carving shall be done un-

der this contract by skilled carvers in a correct and artistic manner, in strict accordance with the spirit and intent of the architect's sketches, or from plaster models provided or approved by the architect.

All carving to be executed.....

Contractor shall include in his estimate the sum of..... to be expended by the architect for the models that are required.

(10) **Cutting**—All stone shall be cut accurately to shape and dimensions and full to the square, with jointing as shown on approved "cutting and setting" drawings. All exposed faces shall be cut true. Beds and all joints shall be dressed straight and at right angles to the face, unless otherwise shown, and except where otherwise shown or noted on drawings the joints shall have a uniform thickness of $\frac{1}{4}$ in.

The patching or hiding of defects will not be permitted.

Washes shall be as deep as practicable and drips of sufficient width and depth to shed water shall be provided on all projecting stones and courses.

Raglets for flashing, etc., shall be cut in the stone where so indicated on the drawings.

Moulded work shall be carefully executed from full size details, supplied by the architect, and must match perfectly at joints. All arrises shall be sharp and true.

Quoins, pier and pilaster stone shall be checked at back as indicated.

All columns shall be accurately cut with the entasis shown on drawings. All pilasters to be cut straight without entasis or taper.

(11) **Back Checking and Fitting to Structural Frame**—Stone coming in contact with structural work shall be back-checked as indicated on the general drawings, and where shown resting on structural work shall have beds shaped to fit the supports.

(12) **Lewis Holes and Cutting for Dowels, Anchors, Cramps, etc.**—Holes and sinkages shall be cut in stones for all anchors, cramps, dowels, etc., called for under this specification or indicated on the "cutting and setting drawings."

Lewis holes shall be cut in all stones weighing more than 100 lb. No lewis or other holes shall be cut in exposed washes or come closer than 2 in. to the exposed face of the stone.

(13) **Cutting and Drilling for Other Trades**—This contractor shall do all cutting and drilling of stone for electric conduits, piping, leaders, etc., required for the installation of the work of other trades, as shown on the details for cut stone work.

(14) **Field Cutting**—Specify in detail any field cutting that will be required.

(15) **Loading and Shipment**—The Cut Indiana Limestone shall be carefully packed for rail or wagon transportation, with exercise of all reasonable and customary precautions against damage in transit.

All cut stone under this contract shall be delivered promptly as ordered and in the sequence in which it is to be set.

Setting Cut Stone

(16) **Work Included**—Contractor shall refer to the preceding specification for Cut Indiana Limestone for more detailed information regarding the cut stone that is to be set under this contract; also refer to "General Masonry," "Sheet Metal Work," "Roofing" and "Carpentry" specifications for references to other work that must be executed in conjunction with this work.

(17) **Delivery and Storage**—All Indiana Limestone delivered f.o.b. cars at destination under contract shall be carefully unloaded and delivered to the building site.

The cut stone shall be handled throughout by competent workmen and by such methods as will guard against soiling, mutilation or snipping in transit to and upon delivery at the building site.

The stone shall be stored at the building site on planking set so that the stone will rest entirely clear of the ground, and be protected by proper means from damage to arrises and from contact with anything which would result in the accumulation of dirt, dust, soot, mud, grease and other staining or disfiguring elements. The stone shall be covered with tarpaulin, stout non-staining paper or boards during extended periods of storage at destination or building site.

(18) **Setting Mortar**—All Indiana Limestone shall be set in carefully prepared lime mortar tempered with non-staining cement of an approved brand. The mixture shall consist of 1 part dry hydrated lime or lump lime paste, to not over 3 parts sharp, *clean washed* sand, with the addition of non-staining cement in an amount equal to at least 15% by volume of the lime used.

Lump lime paste shall be made from the best quality of freshly burned lump lime, slaked with cold water and screened through a $\frac{3}{8}$ -in. mesh screen into a settling box, following the practice employed in preparing lime for plastering. The lime putty thus prepared shall stand in the settling box not less than one week and then mixed with sand and be properly stacked to age; the cement to be added and thoroughly worked into the mixture in small batches just prior to its use for the setting of cut stone.

The sand must be *washed* entirely free from loam, silt, vegetable matter, salts and all other injurious substances, and shall be screened if containing pebbles or coarse grains that would interfere with the proper bedding and jointing of the work. The water shall not be alkaline and must be clear and devoid of salts and injurious elements.

(19) **Scaffolding**—The scaffolding required for the use of all trades, including scaffold for the proper execution of the cut stone work, will be furnished and erected by the masonry contractor.

(20) **Centering**—The wood centering required for the proper setting of cut stone work will be furnished and erected by the carpentry contractor.

(21) **Anchors and Dowels**—All anchors, cramps, Lewis anchors, etc., required by setting drawings or necessary for the proper erection of the work shall be included under stone setting contract. Except where otherwise specified, all anchors shall be of iron, thoroughly galvanized after they have been bent to shape.

Anchors for ashlar and face work generally shall be the standard $\frac{3}{8}$ x 1-in. ashlar anchor or be of equivalent cross section, one anchor to each stone over $\frac{1}{2}$ sq. ft. in area and at least two anchors to all stone over 2 ft. long or more than 3 sq. ft. in superficial area.

All dowels required for light stone work shall be made of standard heavy brass pipe of the size required.

(22) **Grade Course**—Where the Limestone extends down to the grade line, the stonework above grade shall be protected by a properly installed layer of approved non-staining impervious material.

(23) **Setting Cut Stone**—The Indiana Limestone shall be set accurately in accordance with the requirements of the

drawings. Before setting, all stone shall be *washed clean on all sides* and, if required, shall be scrubbed with fibre brushes using only soap powder and water and then be thoroughly rinsed with clean water. Just prior to setting, all stone shall again be sponged or drenched on all sides with clean water.

All stone shall be properly set, by competent stonemasons, true to line and level, with full flushed joints, filling all anchor holes.

All beds and vertical joints shall be $\frac{3}{4}$ in. in width, except where otherwise indicated. Wood wedges may be used only where necessary to prevent the crushing of mortar under heavy blocks, and shall be thoroughly soaked before use.

Mortar shall be raked out $\frac{3}{4}$ in. from the face of the stone to allow for pointing; excepting for such parts of the work as may best have the joints pointed or grouted full as set. The stone as set shall be sponged off along all joints.

Steps shall be set with a slight pitch to the front.

The ends only of lugged sills shall be bedded with mortar, balance of joint to be left open until pointed.

Heavy stone or projecting courses shall not be set until the mortar in courses underneath has hardened, all projecting stone to be securely propped until the wall above them is built.

All cornices, copings and projecting belt courses and all stones forming gutters, etc., shall be set with the vertical joints unfilled. The exterior profile of these joints shall then be calked with rope yarn or picked oakum and be filled solid from above with a mortar grout composed of 1 part non-staining cement and 1 part fine white sand, mixed in small quantities, and of as thick a consistency as can be poured into the joints. Grout shall be stirred vigorously until used.

Splashing exposed faces of stone with mortar shall be avoided, and any splashings be immediately removed with a clean sponge and water.

(24) **Parging and Backing Up**—The entire backs of all stone, as set, shall be plastered with not less than $\frac{1}{2}$ -in. coat of stone setting mortar before backing is built, and the first course of brick in back of stone shall be laid in this same kind of mortar. Where the stone occurs as a facing applied direct to previously erected structural members, both back of stone and face of structural work shall be plastered with setting mortar and any space left be grouted where required, to insure a thoroughly filled back-joint.

(25) **Protection of Finished Work**—Contractor setting cut stone shall co-operate with the carpentry contractor, who will furnish and erect the necessary protection for sills and all projecting stonework. All steps and platforms shall be protected with boards during the entire period of construction.

(26) **Replacement Damaged Stone**—No defective stone, and no broken, spalled, patched or otherwise damaged stone shall be set without first obtaining the architect's approval. All damaged stone shall be recut or repaired, if approved, or be replaced by the contractor free of cost to the owner.

(27) **Pointing**—All face joints shall be raked and brushed out clean to a depth of at least $\frac{1}{2}$ in., carefully removing any wedges and loose mortar so that pointing will be continuous, and after a thorough wetting of the stone the joints shall be pointed flush with mortar consisting of 1 part non-staining cement, 2 parts clean white sand and sufficient cold lime putty to make as stiff a mixture as can be worked.

(28) **Cleaning**—The face of all stonework under this contract shall be properly cleaned down upon completion; if necessary, this cleaning shall be done by scrubbing with soap powder boiled in clean water, applied vigorously with stiff fibre brushes, adding clean, sharp, fine, white sand to the soap and water mixture, drenching all exposed surfaces of stone with clear water after cleaning.

The use of wire brushes or acids of any kind will not be permitted under any circumstances for cleaning the stonework.



Twin Cities Plant, Ford Motor Company, St. Paul, Minn.

ALBERT KAHN, Architect

Interesting example of usage for Industrial Building



Redeemer Presbyterian Church, Detroit, Mich.

GEO. D. MASON & COMPANY, Architects

Interesting example of "Variegated" random ashlar, showing a mixture of rough-sawn and split face finish

Specification for Random Ashlar Wall Facing of either Sawed-finish "Old Gothic" or Short-length Indiana Limestone (Note A)

All exterior wall facing, except cut stone trim which is elsewhere provided for under the heading of "Cut Stone Work," shall be of ["Old Gothic"] ["Variegated"] Indiana Limestone, laid up in random ashlar, using the stone of varying textures, sawed on four sides in the several heights required to lay up the work as indicated on the (detail) drawings, with the finish as it comes from the saw. (Notes B and C.)

This facing shall be bonded to the backing as shown, having at least one bonding stone 4 in. thicker than facing to each (Note D) sq. ft. of wall, and the units shall be arranged to bond properly with the cut stone quoining at corners, window jambs, etc., and to fit in generally with the bonding scheme of cut stone trim throughout.

All stone for this purpose shall have faces square and be furnished in lengths of not less than 3 ft. 6 in., and shall be broken up and jointed on the job to the sizes required (Note E). All stone shall be set with level beds, shoving each block on to a full bed of mortar. End joints shall be (vertical) and be properly staggered, and shall be worked off square with the face of the stone (Note F). All joints shall be thick (Notes G and H), weathered joints well filled with setting mortar struck full to the face of stone as the blocks are set, and each block shall be carefully backplastered with a thick coat of the same mortar as that used for setting.

All mortar droppings adhering to stone shall be immediately removed and the face of stone along all joints be sponged off clean as the work is set.

The specification for setting mortar and for backing up of stone should follow (Note I).

Explanatory Notes—

Note A—This specification should preferably be included under a separate heading of its own, as given above, or be made a part of the general masonry specification, under such a subheading, so as not to form a part of or be confused with the specification for cut stone work.

Note B—This Sawed-four-side, "Old Gothic" or "Variegated" may also be used where a rock face random ashlar is required. In such cases, for a 4-in. thick ashlar facing, the stone would be sawed to a thickness of 10, 11, 12 in., or more, according to the amount of rock required on the face, and then be split apart on the job giving two rock-faced slabs with sawed beds and backs. After the strips have been jointed off to the required lengths, the rock-face is pitched off to a line parallel with the back.

Or, as an alternate, sawed slabs may be used for rock-face work, involving a little more labor at the building but costing less than Sawed-four-side material f.o.b. the quarry.

Note C—Where the desired design has not been fairly well indicated on the drawings, it is advisable to add the following clause to the first paragraph:

"The length of Random Ashlar units generally shall not be less than one and one-half times their height" (except for closures and except where a long effect is desired) "nor more than three and one-half times their height."

Note D—The requirement for bond stones will vary somewhat with the ashlar design and unit height of units employed, and a small section of the wall should be carefully detailed to determine this. These units should generally be worked out in multiples of the brick or hollow tile backing units. Under usual conditions, one bond stone in from 8 to 12 sq. ft. of wall is considered sufficient.

Note E—The stone stock of any grade furnished under the Short-length classification will vary from 3 ft. 6 in. to 5 ft. 11 in. in length. Where greater length of stock is required the ashlar must be cut from full dimension quarry blocks, and the regular grade must be specified, as the Short-length classification will not apply.

Note F—This provides for the more regular and usual form of random ashlar. Where the irregular form with the angular end joints is desired, omit the word (vertical) and substitute either the words (irregular) or (hammer broken).

Note G—It is not practicable nor desirable to require joints less than $\frac{3}{8}$ in. thick for wall facing of this rough-sawn material, and this thickness is recommended as the minimum, $\frac{1}{2}$ -in. joints to be specified for the ordinary run of work. For rock-face work or where a rougher effect is desired, a wider joint than $\frac{1}{2}$ -in. is often preferable. For rough, irregular work, where the end joints are not vertical but are pitched off at an angle with the bed, fairly wide joints should be specified. It is not intended that the joints be raked out and pointed later but that the work be laid by masons with a full joint struck off flush, or weathered, at the time of setting.

Note H—A struck weathered joint, finished as the stone is set and requiring no pointing up later on, is specified, as it is considered the most appropriate type of mortar joint for this character of stone work.

As an alternate to this, especially when the joints are not very wide and it is considered advisable to accent them, a slightly raked out joint may be specified. For a raked joint, especially if wide, an unusually stiff mortar is sometimes necessary.

Note I—Where the use of a lime mortar is impracticable for any reason, a lime-cement or cement-lime mortar, made with a non-staining cement, should always be used.

Ordinary gray portland cement should not be used, because of its detrimental effect on any natural stone and on account of the frequently resultant staining of the limestone. A lime or lime-cement mortar, similar to that employed for cut stone work, is recommended for this work and for parging or immediate backing up of it.

Particular mention of careful backplastering in connection with the setting of all cut stone trim, should be made in the specification for that portion of the work.



Santa Monica Church, Santa Monica, Cal.

A. C. MARTIN, Architect

An example of rough-sawn random ashlar

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The Association and Its Functions

The chief aim of this Association is to further the use and sale of granite for building purposes by extending the knowledge of its many qualities and merits and by establishing means of closer co-operation between the producers of granite and the architects and general building public.

Service to Architects and Users—The Association offers a convenient and unbiased service to all interested in the use of granite for permanent construction.

This service is freely offered wherever it may assist in the logical and proper use of granite, or help to solve the economic and aesthetic problems which may arise when the use of granite is under consideration.

Through the gathering of available information concerning granite from within and without the industry, and through continual research and study of the product itself, its chemical and physical properties, production methods and experience in actual use, the Association has become a clearing house for the best information available.

Requests for information pertaining to granite and its use for building purposes will receive the willing and careful attention of the Association office, backed up by the combined knowledge and experience of its membership.

Estimates and Samples—The Association does not quote prices, but requests for preliminary or final estimates will be transmitted to its members and estimates promptly obtained.

Requests for samples will be transmitted to members producing the kind and quality of granite desired and information will be furnished as to where specific colors and qualities of granite may be obtained.

Sample Exhibits—Permanent exhibits of samples of the various granites produced by Association members are maintained at the following addresses:

Architects Samples Corp., 101 Park Avenue, New York, N. Y.
Master Stone Cutters Association, 220 South 16th Street, Philadelphia, Pa.

National Building Granite Quarries Association, 31 State Street, Boston, Mass.

Here will be found the standard building granites of various colors and textures, also complete sets of samples illustrating the standard building granite finishes. In the New York exhibit will be found a model "Study in Granite," illustrating the possibilities of combining different colors and textures, using standard granites.

Architects and the general building public are invited to visit these exhibits when considering the selection of material or finish.

Proposal and Contract Forms—Uniform Proposal and Contract Forms have been prepared and adopted by the Association in which the terms and conditions are fairly standardized, and the equity of both parties carefully studied and protected.

Competition—The Association, by its impersonal publicity and through its reports to members concerning prospective work and bids desired, insures a wider and more intelligent range of competitive bids, backed up by the best organized and equipped plants in the granite industry.

Architects and contractors, who refer their requests for granite bids through the Association, may secure a larger number of responsible competitive bids with a minimum of effort and expense. Requests for bids, with information as to closing dates, will be transmitted to

the members. Architects and contractors are invited to avail themselves of this service, which has proved its value and frequently produces bids which might not otherwise have been secured.

The Association stands for fair practice in bidding and advocates that bids, tendered in good faith in accordance with plans and specifications, should be fairly considered and used, both as a matter of principle and in order that the best interests of all parties concerned may be assured.

Granite and Its Architectural Qualifications

Granite has many and varied qualifications suiting it for architectural uses. Its natural qualifications are unsurpassed by any other material for exterior building purposes.

In its form of origin and in its physical characteristics, granite is distinct and different from other building stones such as marble, limestone or sandstone. It is of igneous origin and is composed of the crystals of minerals which include the most durable and beautiful substances known to man. Its constituent minerals are of the kind and substance which form many of our precious and semi-precious gems. The humblest piece of granite is a veritable natural mosaic of gem minerals, everlastingly welded together and retaining all the priceless virtues of its gems in blended beauty, color, texture, and durability, unequalled by any other building stone and unattainable in man-made imitations.

The various combinations of intergrown gem crystals, differing in kind, size and arrangement in the different granites available for architectural uses, provide the great range in colors and textures which sets granite apart from all other stone not so wonderfully made and constituted. These features, peculiar to granite and so obviously apparent and compelling under the microscope, are responsible for the inherent character and beauty which is always manifest in granite but not so easily accounted for under casual observation.

Aside from its natural beauty, and also due to its form of origin and mineral constituents, granite is the most durable of building stones, and is also harder, stronger and more resistant to the effects of climate, weather and ravages of time than other stones.

Granite may be cut into any form desired for architectural use. Exposed faces may be dressed in a great variety of finishes, including the highly polished finish which in other stones is either impossible or not sufficiently durable to withstand long exposure to the weather and the elements.

Granite is often and erroneously considered as suited only to plain or massive work. It is, however, a well established fact that granite may be carved with as much refinement and delicacy of detail as, for instance, marble, and with the added certainty that such detail, in granite, will retain its original sharpness and delicacy indefinitely, unaffected by action of weather or time.

Granite has a well recognized value as a commercial building material, due to its great strength and durability. It is also pre-eminently suited for perpetuating architectural masterpieces, where ultimate and lasting results far outweigh mere cost considerations. Modern tools and processes have made it possible to execute fine architectural details and ornament in granite within reasonable time and cost, having always in mind the worthwhile results.

Description of Granite

Granite is technically described as a holocrystalline, granular rock of igneous origin. The essential constituents are quartz and a potash feldspar. The principal accessory mineral is usually either mica or hornblende. Other minerals occur in small quantities, but are generally secondary to those mentioned.

The accessory mineral, mica, occurs in two forms—black mica or biotite, and white mica or muscovite. The hornblende in building granite is usually black or a very dark green.

Granites are technically classified by the predominating accessory mineral. The most common varieties of building granites are known as biotite, muscovite, biotite-muscovite, muscovite-biotite, hornblende, biotite-hornblende, and quartz-monzonite granites.

As a general rule the color of granite is determined by that of its feldspars, and the hardness by the quartz and feldspars, varying according to the proportion and hardness of the feldspars.

Colors and Textures—The granites produced by Association members include many shades of gray, lavender, pink, red, green, brown, buff and white.

Natural texture varies according to the distribution and size of crystals of the constituent minerals. Granite is graded, as to grain, by the size of its feldspar crystals, from very fine to very coarse. The size of crystals or coarseness of grain has practically no bearing on the structural qualities, but gives to granite the variety of texture which adds greatly to its architectural possibilities.

Physical and Chemical Tests

The standard building granites so far exceed all ordinary architectural requirements as to chemical and physical properties, that specific data on tests has little or no bearing upon the relative architectural merits of the different granites.

In confirmation of this, the following statement, prepared by Mr. G. F. Loughlin of the U. S. Geological Survey is quoted in full:

"Physical tests have supplemented actual experience in the use of granite by showing that it exceeds the requirements for the tallest and most exposed buildings to a great degree. With this fact demonstrated, the actual results of strength and porosity tests are of little significance; far less than an accurate knowledge of the component minerals and their state of preservation as revealed by the microscope.

"Recorded crushing strengths of granite may serve as relative measures of soundness provided the tests were all made on machines that are calibrated alike and provided enough samples of each granite are tested to show its range in strength, also provided all samples are prepared with equal care; but as even the lowest recorded results obtained under unfavorable circumstances are far above the maximum required for the tallest buildings, the fact that the crushing strength of one granite is somewhat more than that of another should be of no concern to the architect or builder. Only when monuments of solid masonry and of unusual height are to be erected or when paving stone for extremely heavy traffic is to be laid, do crushing tests of granite need any consideration.

"Transverse breaking strengths of granites are also quite adequate to support any load that they are expected to support in buildings. There is much more danger of cracking from uneven settling of foundations than from overloading, and examples can be shown where granites with the highest recorded transverse strength have cracked when the load upon them was relatively low.

"Issues have been raised at times regarding the porosity of granite. Unweathered granites such as are supplied to the high class building trade are for all practical purposes absolutely impervious except close to the surfaces of blocks where minute cracks have been developed during splitting or tooling. 'Porosity' varies with the number and depth of these cracks. Differences in 'porosity' may indicate which granites are most likely to 'blister' from frost action if tooled too severely. If 'blistering' takes place it extends only to the depth of the minute surface cracks and thereafter weathering effects are imperceptible. That granite weathers in nature is undisputed, but conditions of

weathering in the walls of a building are much less severe and not strictly comparable, and the time necessary for unweathered and properly fabricated granite to show appreciable effects of weathering in buildings is too long to cause concern except for monumental structures intended to last for thousands of years.

"Chemical analyses of granite, as usually recorded, are of little or no value from the builder's standpoint. For proper interpretation they require microscopic study. Such study supplemented by examination of the granite in the quarry and in the building, will disclose the essential facts regarding weathering qualities and other important questions. Such study may result in a call for special chemical tests, for example, to determine permanency of color, and then specific directions should be given to render the test thorough. For most granites, however, competent examination in the quarry and in structures supplemented by microscopic study will give all the information needed without resort to any physical or chemical tests."

Production Facilities

Certain definite requirements are essential for any granite producer to successfully meet the demands of modern building construction. These requirements apply to organization, quarry and finishing plant. Association members have been and are the leaders in developing their organizations and production facilities to keep pace with these exacting requirements. They can furnish unquestionable references as to past performance, financial responsibility and ability to supply the material and render the services which they may undertake. They have earned and are entitled to preferential consideration wherever building granite is under consideration.

In granite, as in other materials, there are concerns which will submit bids and undertake contracts on work for which they lack the ability and experience to execute satisfactorily, and their quarries and finishing plants may be totally inadequate to meet the requirements for quality of material and delivery schedules.

These facts should be very carefully weighed and considered whenever a granite is to be selected and a contract awarded. Bids tendered by Association members should receive especial consideration on the ground that contracts based upon them will be conscientiously and satisfactorily executed.

Quarries—In selecting granite for building purposes, the ability of the quarry to produce the quantity, sizes and quality of granite desired is the first essential, and the quarry must be so equipped that its output may be handled and shipped at a rate to meet the cutting requirements, not only for the work under consideration, but all the work which may be simultaneously under contract.

The Association quarries, without exception, meet the above requirements. They are all quarries of established reputation and have been developed to meet the requirements of quantity production.

Cutting and Finishing Plants—Modern time requirements demand that building granite plants be well equipped with up-to-date machinery and appliances for manufacturing and handling granite in considerable quantity without sacrificing quality of workmanship. Association plants include the largest and best equipped plants of their kind in the country.

Granite is delivered to the finishing plant from the quarry in rough blocks—some already split to approximate dimension sizes and others in random sizes to be drilled and split to dimension or sawed into slabs for ashlar or polished work.

Among the essential equipment of a modern granite finishing plant are pneumatic drills and hand tools, pneumatic surfacing machines, saws, polishing machines, lathes and carborundum machines. The handling, machining, sawing, and polishing of granite consumes power in large quantities and adequate power is a most

important essential. Adequate blacksmith shops, carpenter and repair shops are also necessary accessories.

Handwork is required in finishing practically every piece of architectural granite, and a good journeyman granite cutter is one of the most skillful craftsmen in industry today. Modern tools and machinery have relieved this craftsman of a great deal of laborious and time consuming work, but his skill of hand and eye is as indispensable today as when the Egyptians cut their granite temples.

The plants of Association members have been established for considerable periods and a "home guard" of skilled workmen has been built up and established to supply the demands of their home plant. This is a very important factor in the ability of Association plants to fulfill both the quality and quantity demands of their contracts and further entitles them to preferential consideration.

Organization—Organization is by no means the least important factor to be considered. In fact without a properly manned and experienced organization, even an adequate quarry and finishing plant will not ensure satisfactory execution of contracts.

Association members have built up organizations having the necessary experience and ability to put through whatever they may undertake. Their estimators have the benefit of actual cost figures covering a wide variety of executed work, thereby removing much of the guess-work and chance taking for which many a job has been skimmed and botched. Their draftsmen are the best trained men to be had and their knowledge of practical stereotomy, skill in layout and accuracy in figures may be counted upon to discover in advance errors in vital dimensions or impractical points in construction and jointing which frequently cause delay and expense to all concerned.

The planning and routing of work through the mill and the thorough inspection while in process and at completion, due to well trained and experienced supervision is all reflected in expedited erection at the building and a minimum of interference with the progress of the work of other trades.

Experienced and practical salesmen constitute a service as well as a sales force, and the co-operation they are able to offer is frequently of no small importance in the securing of preliminary estimates and in consultation as to the practical economies possible.

The Association itself, is maintained by these members as a vital and necessary extension of their individual organizations, to carry on collectively those important services which make for efficiency and economy and are alike beneficial to the users and producers of granite generally.

Carving and Models

Granite can be carved with the same delicacy of treatment and detail as much softer and less durable stones. The pneumatic carving tool in the hands of a skilled granite carver has made it possible and practical to carve granite to almost any extent desired.

In the preparation of details and models for granite carving, three points should be considered; the color and texture of the granite; location in the building as to distance from the eye; and location as to sunlight.

Color and texture regulate to a material extent the decorative value of the detail produced. Delicate detail

would generally be wasted on a coarse grained granite with strongly contrasting mineral constituents.

In a fine grained light colored granite, or a granite of light, nearly uniform tone regardless of grain, delicate details would appear more nearly in their true relative values.

Distance from the eye should obviously regulate the character of detail and treatment, both from the aesthetic and economic viewpoints.

Location as to sunlight is generally the least considered point of all.

The relative light and shade values of different exposures should regulate to some extent the character of detail and mass.

With the assurance that granite may be carved to almost any extent desired, it lies chiefly with the architect and modeler to get the best results with the greatest economy.

Standards of Quality

It will be noted under "Physical and Chemical Tests" that these standard building granites come well within all possible requirements of architectural use, so that standards of material are unnecessary. The cutting properties of the granites from different quarries vary quite materially and it would be very difficult to define standards of workmanship.

Quality of workmanship has been graded by usage into three classifications, which, while somewhat elastic and difficult to define exactly, are pretty well established and recognized by the manufacturers.

Monumental Building Grade—For permanent buildings designed to perpetuate public pride or civic spirit, where utility and economy are subordinate to architectural merit, such as state house, courthouse, library or public memorial.

Good Commercial Grade—For high class buildings designed both for utility and to express something of the character, dignity and stability of the occupancy, such as banks or insurance buildings, high class office buildings, churches, schools, etc.

Ordinary Commercial Grade—For buildings where architectural appearance is subordinate to utility and governed by economic considerations. Workmanship will meet requirements of structural safety, but not carried beyond the point of a good appearance to the casual observer.

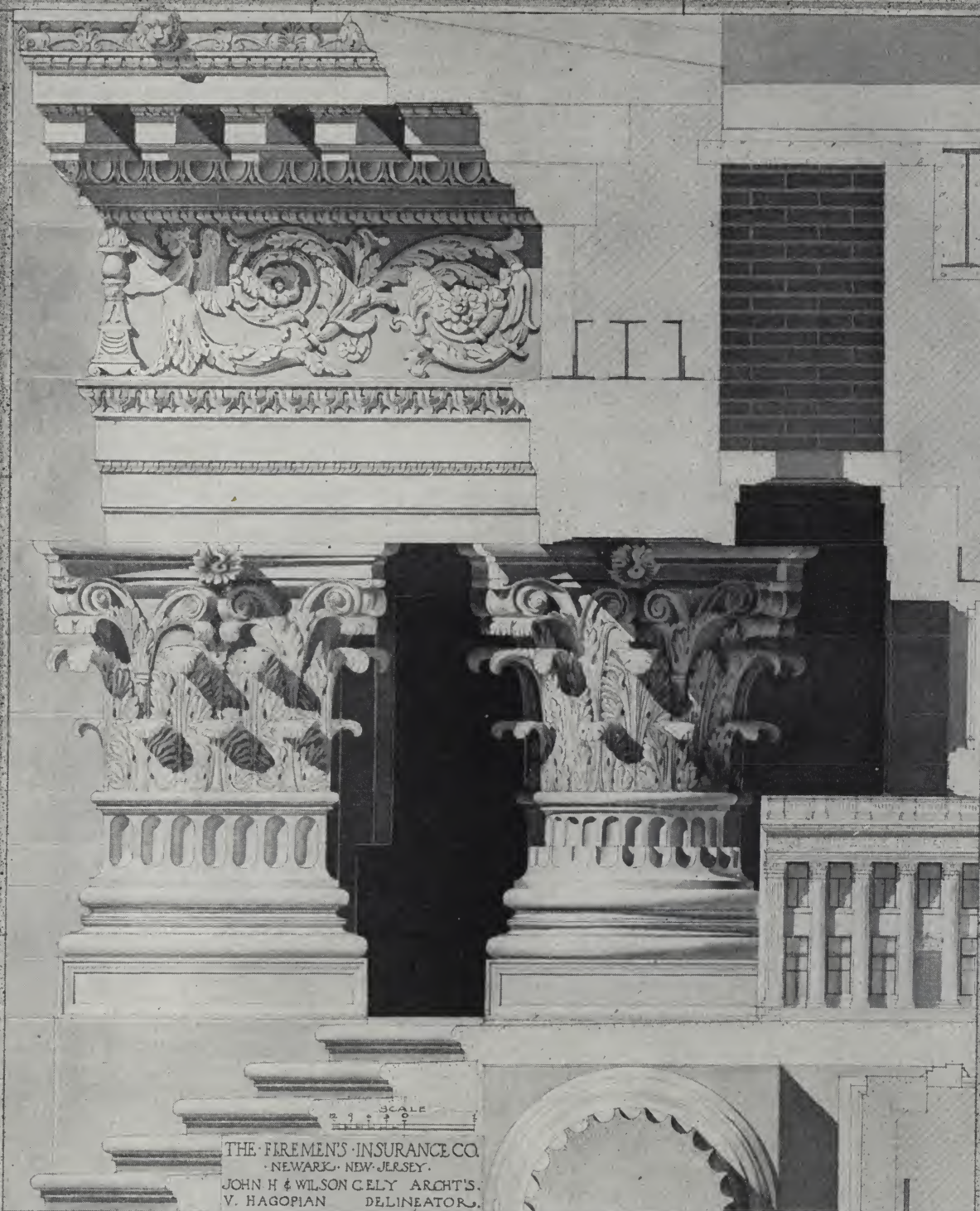
Booklet of Color Plates

The Association has published a 24-page booklet, titled "Architectural Granite," which contains twenty-one color plates of some of the principal building granites produced by Association members.

These color plates serve a two-fold purpose—they give at a glance some idea of the great range in colors and textures available in standard American granites, and they also serve as preliminary samples for making preliminary selections for specific jobs, thereby avoiding the necessity of securing actual samples until final selection is to be made.

When color in granite is under consideration it should be borne in mind that, as a rule, polishing produces a darker tone and brings out the color of each component mineral crystal, while a hammered finish gives a much lighter tone to the granite and softens the colors of the contrasting minerals.

This booklet, "Architectural Granite," is a reprint of our catalogue in the twenty-first edition of SWEET'S ARCHITECTURAL CATALOGUE and will be sent on request to any one desiring a copy for their files.



Modern granite methods permit a delicacy and richness of detail once thought adaptable only to softer stones.

There is such a wide range of colors and textures available that a granite may always be selected which best fulfills both the esthetic and economic requirements.

National Building Granite Quarries Assn., Inc.
31 State Street, Boston, Mass.

H. H. Sherman, Sec.

STUDIES IN GRANITE PLATE XXV

Designing in Granite

The use of granite is frequently restricted because of excessive cost as compared to other stones. The cost of most jobs in granite need not be prohibitive if certain fundamental facts are taken into consideration by the specification writer and designer.

The customary insistence upon uniform color and texture often adds unnecessary expense. Substantial savings may be effected if the natural range of tone and texture, characteristic of most quarries, is permitted, eliminating only too obvious and sharply defined deviations such as unsightly knots and clearly defined stripes.

The simplification of mouldings, eliminating unnecessary members and unimportant minor details will reduce cost materially. A study of the section on "Granite Mouldings" on the next page and the Member Chart on second page following will be pertinent in this connection.

The finer surface finishes are often specified where the coarser finishes would be as good or better and considerably less expensive. For certain types of buildings, especially in combination with other materials, rock face and the pointed finishes may be successfully used at reduced expense. The treads of steps and platforms, as a safety measure, should never be finer than four-cut and machine pointed is even more practical.

Beds and joints constitute a surprising percentage of the total cutting cost. Elimination of superfluous labor here will also materially reduce cost. Specifications requiring bush-hammered edges and unnecessary fullness add unnecessary expense. $\frac{1}{4}$ in. joints should be the minimum allowance for even the highest grade of monumental building work. On work of coarser texture and finish, allowances of $\frac{3}{8}$ in. and even $\frac{1}{2}$ in. are reasonable and on more massive masonry, such as bridge or rock faced work, even larger joint allowances are both good practice and more economical.

Before a superior material, such as granite, is ruled out because of supposed prohibitive cost, even greater latitude in stock, finish and jointing should be permitted, with their consequent and material savings, than might be expected and necessarily accepted in a lesser material which would otherwise be substituted.

Innumerable minor details, studied from the viewpoint of economical production in granite, will increase the gross savings possible. A few are mentioned here as typical examples, and a study of Drawings No. 2 and 3 will suggest others.

Internal angles cut on the solid are more expensive than a straight run-by bond.

Allow at least 2 in. between top of concrete and bottom of steps to obviate bedding off steps.

Area copings may well be finished with four-cut or machine pointed top and rock face. Omit rabbet for grills and substitute iron brackets. Eliminate lock joints and substitute dowels.

Avoid projections on courses which might otherwise be sawed or machine surfaced.

Detail rustications, checks, rabbets and sinkages to take fullest advantage of carborundum saw cutting.

Joint cornices to save stock and cutting labor.

Avoid raised seats on balustrade base and substitute round for square plinths on the balusters.

Eliminate the need for guess work and chance taking in the plans, details and specifications and ensure close estimates on the actual work required thereby.

Detailing for stone, regardless of whether it is to be granite, marble or limestone is responsible for much of the extra cost in granite. Best results will be secured if details are specifically made for granite. The Association can render real service here.

Sand Blast Carving

The attention of architects and designers is directed to a recently developed method for producing ornament on granite by use of the sand blast process. The use of this process has been developed to a considerable degree in the granite memorial industry but has not as yet been applied in the architectural building field.

It is the purpose here to briefly present its possibilities, believing that progressive architects and designers will recognize at once its aesthetic and economic significance. It seems quite possible that herein lies a means for developing a distinct type of ornamentation for modern American structures.

This process may appropriately be termed the intaglio process, as it engraves or etches into the flat surface of the granite, in clean cut intaglio, ornament having a quality and distinction out of all proportion to its cost to produce.

The architectural building field offers far greater latitude for its application and further development than the memorial field. To adapt this process to the building field and to create appropriate designs it is essential that the process itself, its scope and limitations be fully understood.

The Process—This process has been well termed a "harnessing of the sand storm," controlling it at will to the creation of unique and beautiful ornament. The cutting medium is a white silica sand driven by compressed air at very high velocity under absolute control of a skillful operator.

The face of the stone to be "blown" is protected by a special composition, termed "glue" or "dope" by the trade, and this blanket of "dope" is cut away to form, in effect, a stencil of the ornament to be carved. This ornament is etched into the exposed granite to the depth desired in a remarkably short time, and removal of the "dope" reveals a remarkably clean cut intaglio, with its unique texture and beauty impossible to duplicate by any other means.

This, in brief, is the process, but there are many variations in technique, and combinations of blowing, re-doping and re-blowing by means of which a skilled operator may produce effects in shading, variable depth and texture which have unrealized possibilities of development.

Application to Architectural Ornament—Space here is too limited to reproduce some of the many beautiful applications developed in the memorial field, or to illustrate suggestive architectural applications. The process and type of ornament produced is especially adaptable to the embellishment of otherwise plain, flat surfaces, and herein lies its especial adaptability to modern American architecture.

Classic forms may readily be conventionalized and adapted to execution by this process in intaglio, or new forms created utilizing the deeply etched line alone or in combination with various forms of surface sinkages. It is especially adapted for running ornament, panels, embellishment around door and window openings or reveals, vertical or horizontal delineations without projection, inscriptions and countless other applications.

While the sinkage is relatively slight as compared to regulation carving, the sharpness of its cuts and the unique tone and texture of its surfaces in contrast with hammered or polished surfaces produce remarkable effects, which can not be duplicated by any other method.

The Association will be glad to co-operate with any architect or designer who may desire to utilize this form of ornament, and who will necessarily require more detailed information. It certainly offers very interesting possibilities.

Granite Mouldings

The cutting and finishing of mouldings on granite work is almost exclusively a hand process. No practical machine has yet been devised which will do this work and eliminate the more expensive hand work.

In limestone and marble, machine processes are almost universally utilized on moulded work, and here lies one of the most essential differences between the cutting of granite and of the softer stones.

The pneumatic tool, during recent years, has materially facilitated the hand cutting process, making it possible to produce the most delicate and intricate detail of moulding or carving at costs materially less than would otherwise maintain. The fact remains, however, that until the right machinery is devised, the cutting of granite mouldings will continue to be a hand process and their cost one of the principal factors in the total cost of granite work.

As the hand process is relatively more expensive than an equivalent machine process, it can be readily seen that a knowledge of the essential facts and relative cost factors is very valuable in the preparation and study of economic granite details.

The simple illustration shown below will visualize the purpose and use of the chart of granite mouldings, illustrated on Drawing No. 1 in determining the relative "cost importance" of adding or eliminating moulded members when detailing granite work.

In estimating the cost of cutting granite mouldings the so-called "Member System" is generally used. In this system each moulded section is divided into "members." A moulded "member" is a more or less arbitrary unit in which the edges, contour and changes in direc-

tion of the surface between edges, and the width between edges is taken into consideration. The determination of the number of "members" in a moulded section is a combination of rule and judgment.

The Association "Member Chart" (Drawing No. 1) represents the combined judgment of several experienced granite estimators, and is in effect an average, based upon experience with a number of granites of variable cutting qualities. The Chart is designed for approximate comparisons of relative cost in the study of moulded granite details, and is not intended as an exact basis for estimating cost in any particular granite.

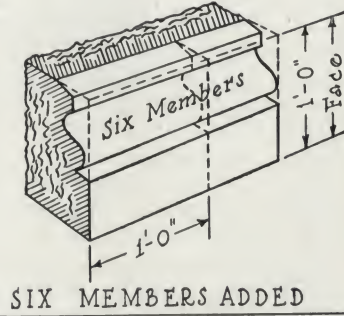
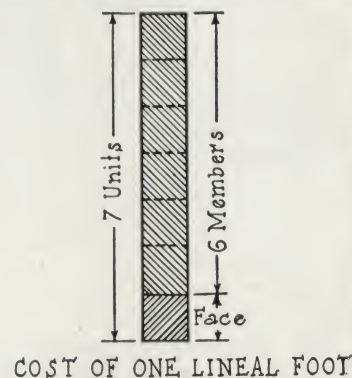
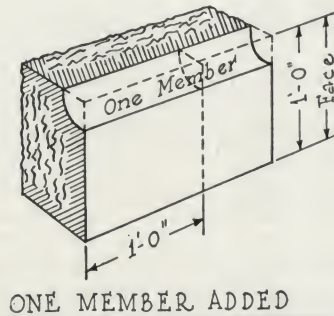
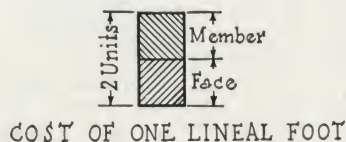
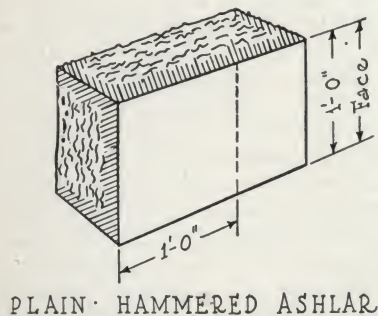
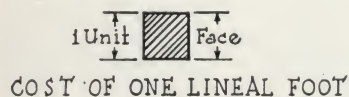
"Studies in Granite"

A series of plates entitled "Studies in Granite" is being prepared and published by the Association for the information and use of architectural designers, draftsmen and students of architecture.

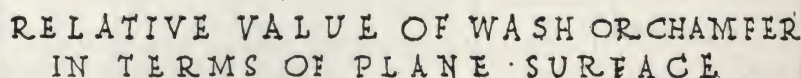
These plates cover a wide range of subjects and the details illustrate both the interesting architectural features and something of the granite construction in each case. The projects illustrated have been in most cases designed by contemporary architects of standing and actually executed in granite. The original architectural drawings and the actual granite shop drawings have been used in the preparation of these plates, making them accurate delineations of the work as executed.

A typical plate is illustrated in this catalogue. The series now numbers twenty-five plates, which will be sent, upon request, in a file size portfolio, to architects and others interested in the use or design of granite work.

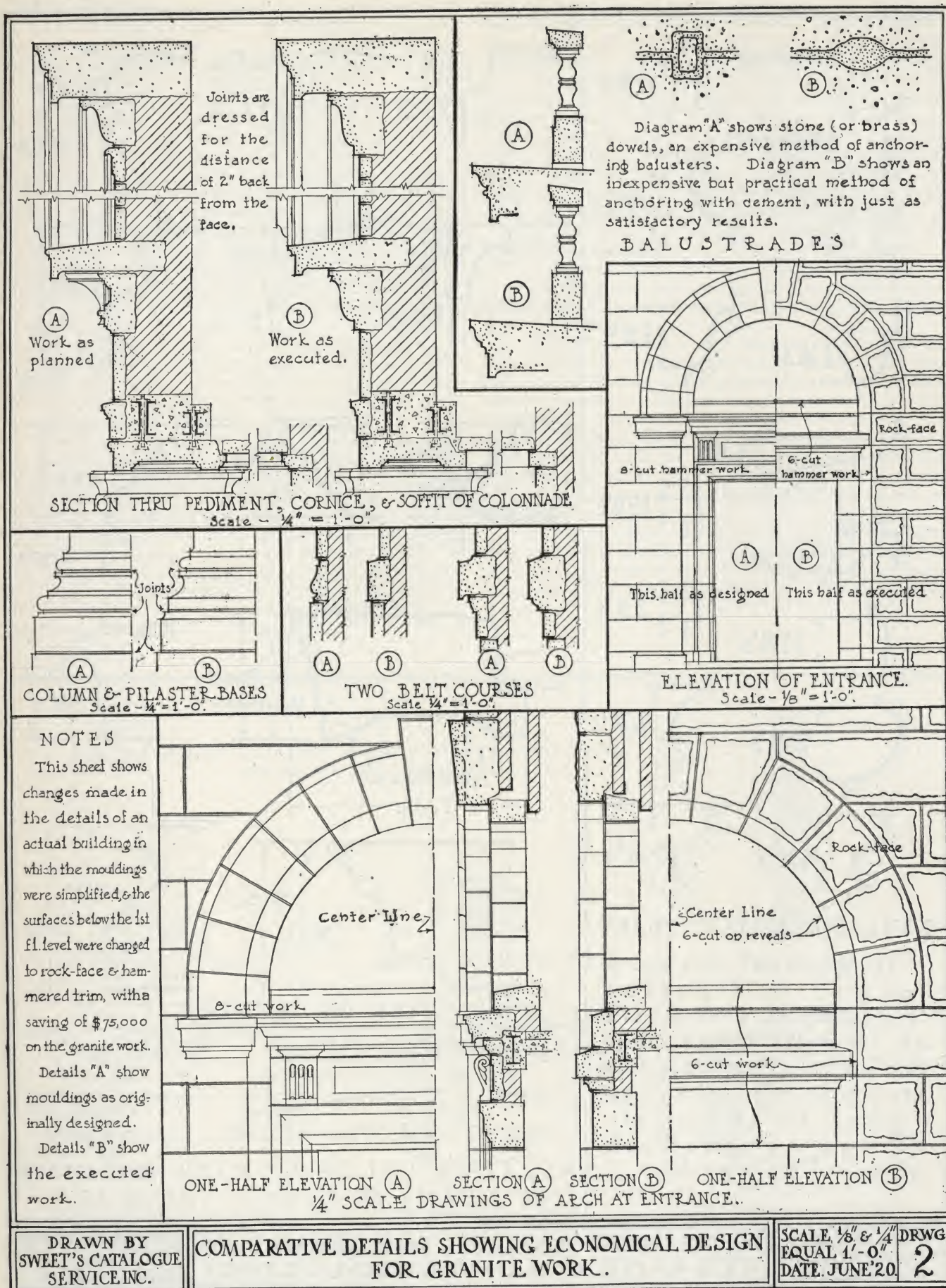
BASIS OF COST UNIT—One lineal foot of moulded member equals one square foot of plain work.

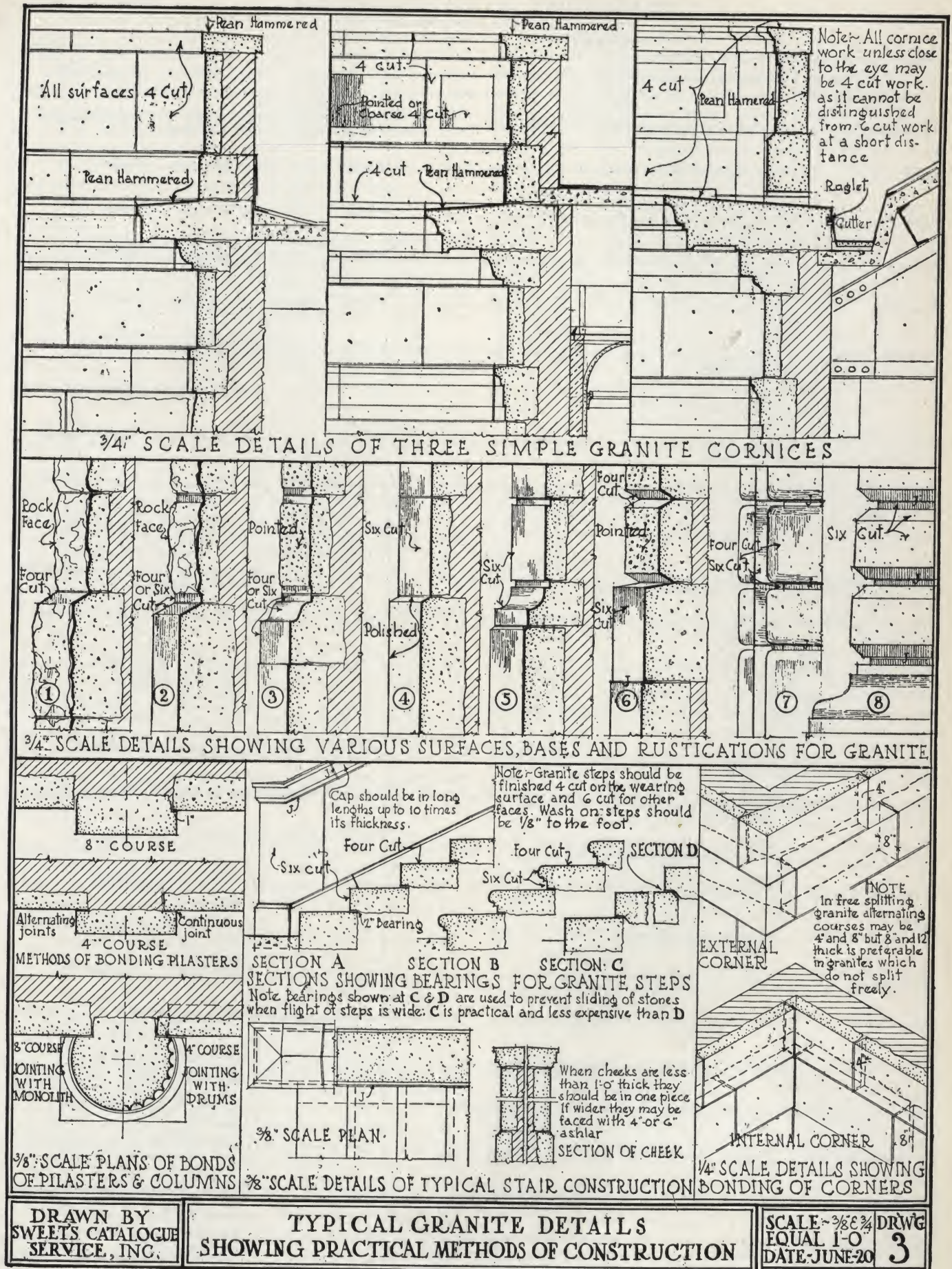


EXAMPLES ILLUSTRATING THE RELATIVE COST IMPORTANCE OF MOULDED MEMBERS IN TERMS OF PLAIN WORK



NOT DRAWN TO SCALE DATE-JUNE-20	DRWG 1
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CLASSIFICATION OF BUILDING GRANITES

Quarried and cut by Association Members
White, Gray, Lavender, Pink, Red, Green, Buff, Brown

Name of granite	Producer and manufacturer	Location of quarry	Grain	Color	Technical classification
Bethel White	Woodbury Granite Co., Hardwick, Vt.	Bethel, Vt.	Coarse inclined to medium	White faintly mottled with gray...	Quartz-monzonite
Mount Airy	North Carolina Granite Corp., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray....	Biotite
Mount Airy	North State Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray....	Biotite
Mount Airy	Mt. Airy Granite Cutting Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray....	Biotite
Mount Airy	J. D. Sargent Granite Co., Mt. Airy, N. C.	Mount Airy, N. C.	Medium	Very light gray....	Biotite
Chelmsford White.....	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Medium	Very light gray....	Muscovite-biotite
North Jay	Maine & New Hampshire Granite Corp., North Jay, Me.	North Jay, Me.	Fine	Very light gray....	Biotite-muscovite
Chelmsford Gray	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass..	Fine	Light gray	Muscovite-biotite
Milford, N. H.	Lovejoy Granite Co., Milford, N. H.	Milford, N. H.	Fine inclined to medium	Light gray	Quartz-monzonite
Concord	John Swenson Granite Co., Concord, N. H.	Concord, N. H.	Fine to medium..	Light to medium gray	Muscovite-biotite
Connecticut White....	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Waterford, Conn.	Fine	Medium buff gray, hammers light....	Quartz-monzonite
Westerly Blue-White..	New England Granite Works, Inc., Westerly, R. I.	Westerly, R. I.	Fine	Bluish gray	Quartz-monzonite
Barre (Light, Medium and Dark).....	Marr & Gordon, Inc., Barre, Vt.	Barre, Vt.	Fine to medium..	Light bluish gray, medium bluish gray and dark bluish gray	Biotite
Woodbury Gray	Woodbury Granite Co., Hardwick, Vt.	Woodbury, Vt.	Medium	Medium gray	Biotite
Rockport Gray	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Medium gray, slight bluish green tinge	Hornblende
Chelmsford "Bulfinch".	H. E. Fletcher Co., West Chelmsford, Mass.	West Chelmsford, Mass.	Fine to medium..	Light grayish buff..	Muscovite-biotite
Somes Sound	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Mt. Desert, Me.	Coarse inclined to medium	Light grayish buff..	Biotite
Goss Pink Deer Isle...	John L. Goss Corp., Stonington, Me.	Crotch Island, Stonington, Me.	Coarse	Pinkish, lavender tinted, medium gray	Biotite
Conway Pink	Maine & New Hampshire Granite Corp., North Jay, Me.	Redstone, N. H.	Coarse	Light pink mottled with large gray and small black spots	Biotite
Jonesboro	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York, N. Y.	Jonesboro, Me.	Coarse inclined to medium	Pinkish gray	Biotite
Red Westerly	New England Granite Works, Inc., Westerly, R. I.	Westerly, R. I.	Medium inclined to coarse.....	Reddish gray, speckled with black...	Biotite
Moose-a-pec Red	Rockport Granite Co., Rockport, Mass.	Jonesport, Me.	Coarse	Dark reddish gray with white and pinkish feldspar..	Biotite
Ausable Mottled-Green.	Marr & Gordon of New York, Barre, Vt.	Ausable Forks, N. Y.	Coarse	Light grayish green, coarsely mottled with black and bluish spottings..	Anorthosite
Rockport Sea-Green...	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium to coarse.	Dark olive-green-gray with black spottings	Hornblende
Conway-Green	Maine & New Hampshire Granite Corp., North Jay, Me.	Redstone, N. H.	Coarse	Dark yellowish-greenish-gray with black spottings...	Biotite-hornblende
Rockport Seam-Face...	Rockport Granite Co., Rockport, Mass.	Rockport, Mass.	Medium	Dark yellow-brown, bright rust-brown, light yellow-brown	Hornblende

Surface Finishes

The surface finishes most frequently used for granite on building work, arranged in the approximate order of their relative cost, are:

Rock-faced, pointed, pean-hammered, four-cut, six-cut, eight-cut, rubbed, honed and polished. These terms are frequently misunderstood and sometimes misapplied.

The following brief description of finishes most generally used is therefore given:

Rock Face—Generally the least expensive finish, but with decorative as well as utilitarian value.

The relative cost varies with the grade of work required.

The grades vary from ordinary split or quarry face ashlar with split or roughly squared beds and joints, to carefully quarried faces having practically uniform projection, and with joints and arrises as carefully and accurately cut as for hammered work, and sometimes with rusticated or tooled margins.

Pointed Work—Coarse, medium, fine and machine pointed are the four general distinctions for pointed work, with many special types for certain texture effects.

Hand pointing and machine pointing differ slightly in general appearance, machine pointing being generally more uniform. Special pointing is generally more expensive than the standard grades. In general the point depressions in fine pointing will be approximately $\frac{3}{8}$ in. apart, medium and machine pointing $\frac{5}{8}$ in. to $\frac{3}{4}$ in., and coarse pointing 1 in. to $1\frac{1}{4}$ in.

Where special pointing is required, a sample should first be prepared under the architect's supervision. Beds, joints, and arrises will conform to the character of use and grade of pointing.

Pean-hammered—Adapted to rougher work such as steps, curbings, house or mill sills and thresholds, or to portions of high class work not exposed to the eye. Pean-hammering is coarser and less regular than four-cut and the point marks are not entirely eradicated by the axing.

Four-cut, Six-cut, and Eight-cut—These finishes are produced by bushing with the patent "bush-hammer." This is a hand-hammer with patent head having two opposite jawlike openings about $\frac{7}{8}$ in. wide, into which are firmly bolted sets of 4, 6 or 8 cutting blades as the case may be.

Four-cut work is frequently and erroneously specified as 4 cuts to the inch. Actually the four-cut hammer leaves nearer five cut marks to the inch, as 4 cutting blades are clamped into a $\frac{7}{8}$ -in. jaw; six-cut and eight-cut are likewise incorrectly specified as 6 cuts to the inch or 8 cuts to the inch.

In bush-hammered finish the resultant surface has the appearance of being uniformly corrugated to the fineness determined by the number of cuts used, but while the bushing is kept parallel and in the required direction the bush marks are not necessarily continuous or mechanically precise.

Six-cut and eight-cut finishes are simply continuations of the four-cut process, each finer hammer being used consecutively until the required finish is reached.

Pneumatic surfacing machines are also used for bushing, especially on all larger surfaces, following practically the same routine as required for hand bushing. Sawed surfaces are also bushed under the surfacing machines, in which case much of the preliminary preparation is avoided.

Ten-cut and Twelve-cut—These finishes are also produced, but less frequently used on regular building work, being more applicable to small memorials or special work.

Texture and character are emphasized by the coarser finishes.

Rubbed and Honed—Produced by grinding a pointed or sawed surface under the polishing wheel. The grade of rubbing is determined by the extent to which this grinding is carried and the abrasive used; from coarse-rubbed, with small surface scratches, adapted to work requiring fine smooth finish but not close to the eye, to honed finish, which is the last stage just before glossing, with velvet smooth surface, practically free from scratches.

Polished Finish—Produced by glossing, under a heavy, felt coated wheel, a surface previously rubbed and honed. A durable and mirrorlike polish requires that the grinding and glossing processes be carried to their extreme stages, leaving a surface free from scratches, dull spots, or indications of "stun marks" from the tooling.

Under modern methods practically every standard granite may be polished to a satisfactory gloss, suitable and durable for most ordinary requirements. Generally the harder granites and those containing the least mica content take the best and most durable polish.

Hand Polishing—Small surfaces and mouldings generally have to be rubbed, honed or polished by hand at considerable extra expense over machine work or cut work of similar character. On work where cost is the dominant factor portions necessitating hand rubbing or polishing should be avoided wherever possible.

Selecting the Finish

The following general suggestions will indicate methods of selection, which depend on the type and design of building, color and texture of the granite, location and atmospheric conditions.

Large scale work: rock-face, pointed and the coarser cuts. Small scale work: the finer cuts.

Rock-face, pointed, pean-hammered, and four-cut for economy, and rock-face and pointed for decorative effect in conjunction with hammered work and other materials.

Six-cut for average work, combining economy with good architectural effect.

Polished for base courses, portions subject to traffic stain, lower stories where exposed to smoky atmosphere, and for decorative effect.

Rubbed or honed where fine finish is required and for softened tone and texture effects.

Polished finish is practically impervious to stain or weather. Fine finishes will keep clean longer than coarser finishes, particularly where subject to atmospheric dirt and dust.

The possibilities of combining different grades of finish are almost unlimited, and combinations of different granites are used extensively with splendid architectural results.

Standard Grades of Surface Finishes

The half-tone reproductions on the next two pages illustrate the standard grades of surface finishes most commonly used on exterior building granite work. The reproductions are full size and have been prepared from a standard light gray granite but are much darker than the actual granite to bring out more clearly the different finishes.

The relative cost of the different finishes runs approximately in the same order as the reproductions are numbered, with rock-face as the less expensive and polished as the most expensive.

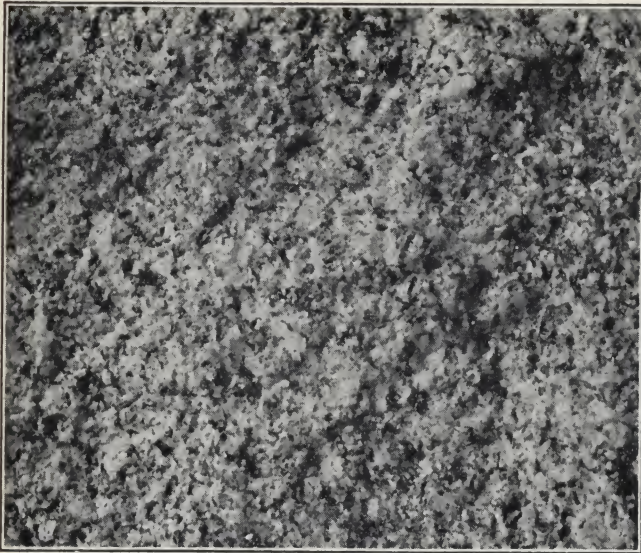


Plate No. 1. Rock-Face



Plate No. 4. Medium Pointed



Plate No. 2. Pean Hammered

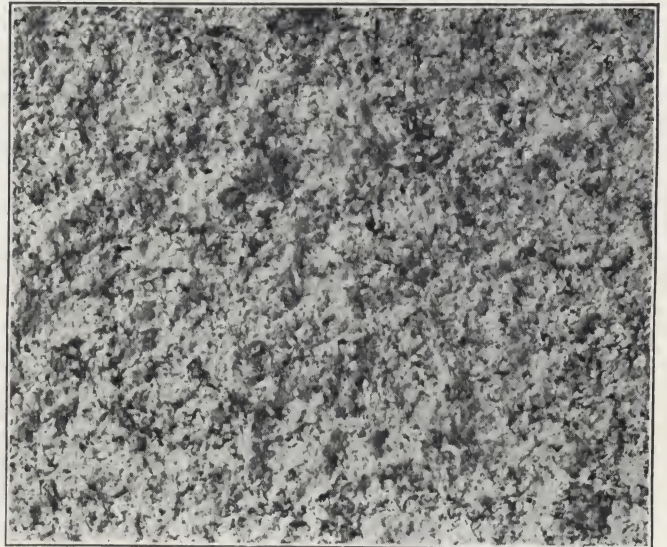


Plate No. 5. Fine Pointed

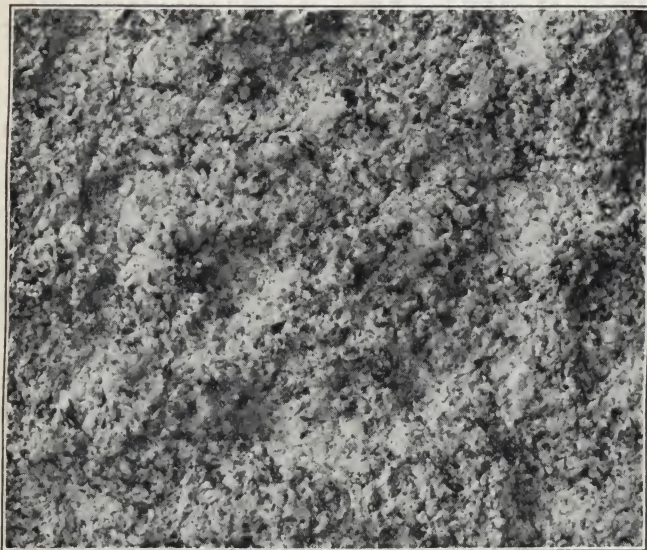


Plate No. 3. Coarse Pointed

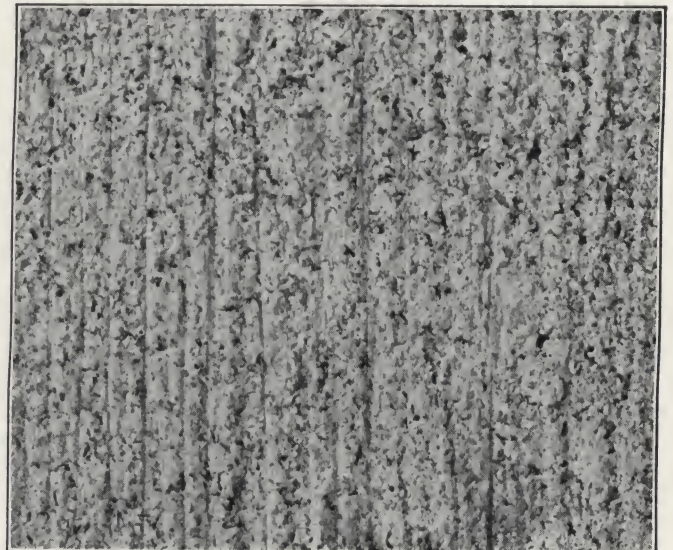


Plate No. 6. Four-Cut

Standard Grades of Finishes for Exterior Building Granite Work

Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

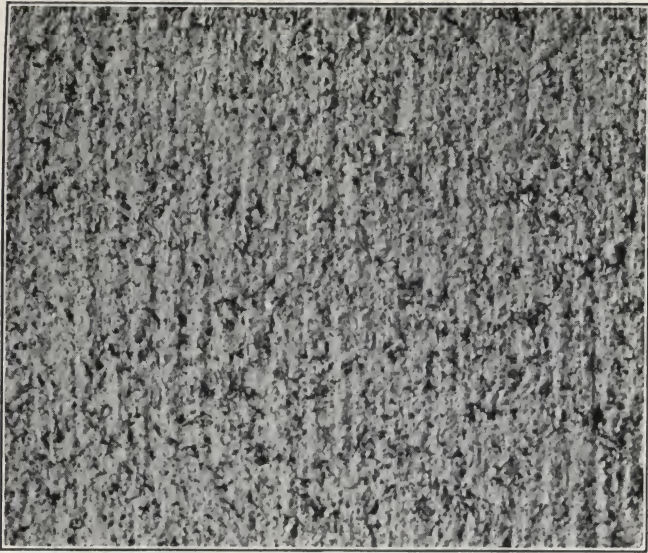


Plate No. 7. Six-Cut

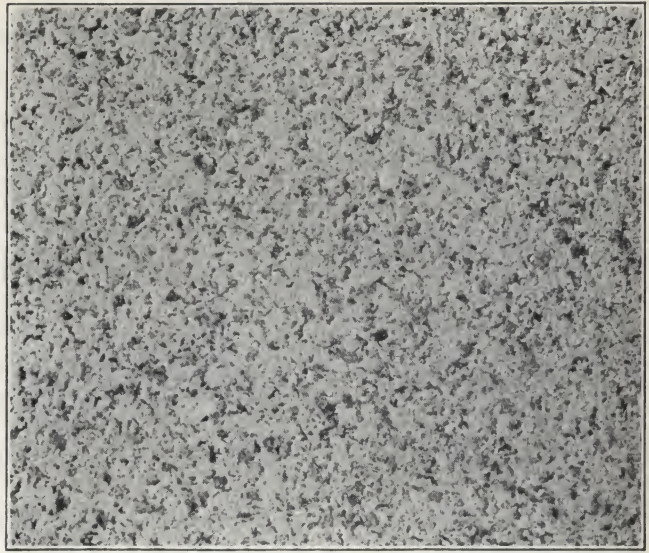


Plate No. 10. Rubbed

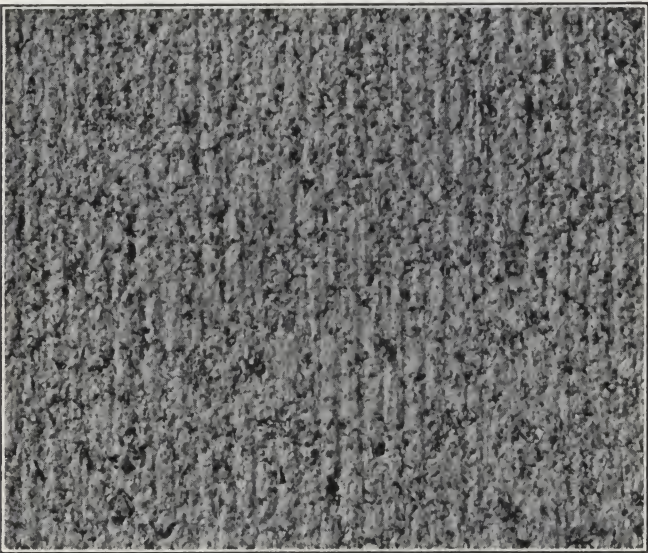


Plate No. 8. Eight-Cut

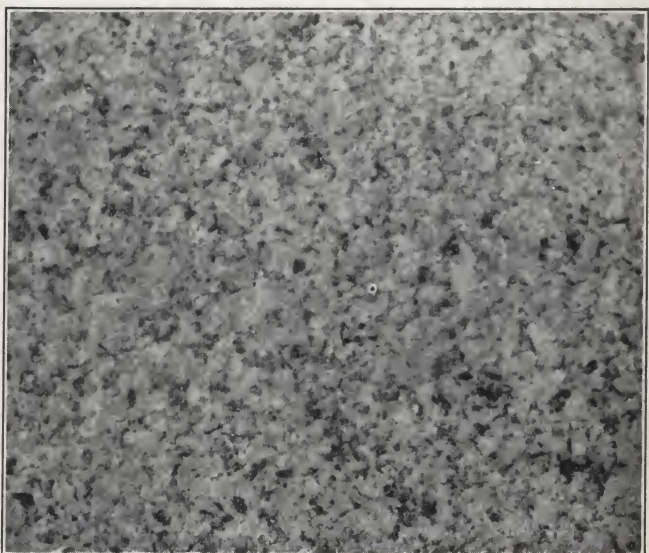


Plate No. 11. Honed

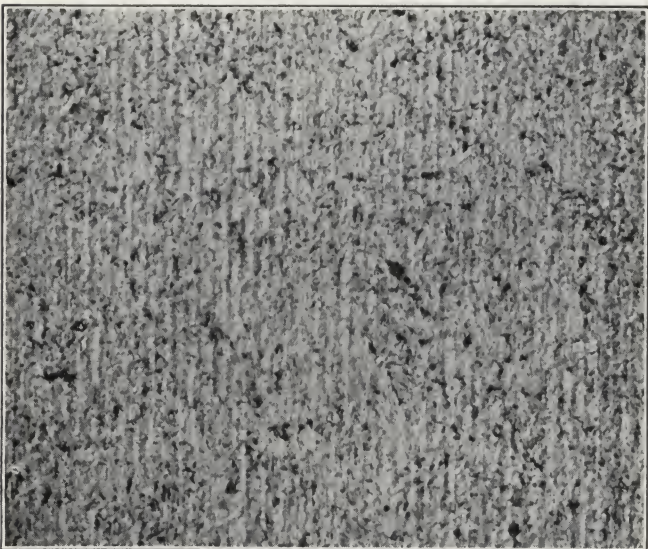


Plate No. 9. Ten-Cut

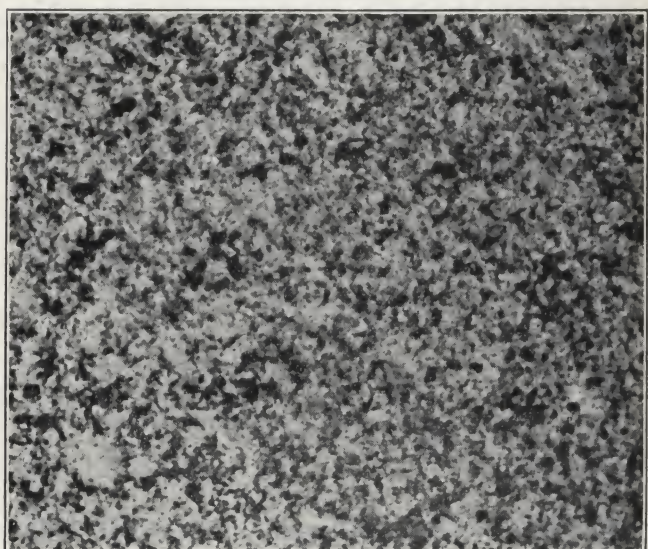


Plate No. 12. Polished

Standard Grades of Finishes for Exterior Building Granite Work

Full-sized reproductions prepared from a standard light to medium granite of fine to medium grain

Granite Specifications (Complete Form)

Section 1. General Conditions—All work included under the specifications for granite is to be subject to the general conditions hereinbefore written for the entire work.

Section 2. Material—All granite shall be of compact structure, hard and practically non-absorbent, and equal in durability and strength to the best granite of the kind required. Granite shall be (mention color, tone and grain) and of the kind designated as (mention name) granite from quarries at (mention location). Granites designated as (mention names and quarries), will also be considered. In submitting estimates, the contractor shall state the name of granite, and quarry, upon which his proposal is based.

Section 3. Quarry and Plant—Granite must be obtained from approved, well-known quarries having capacity and facilities for furnishing the quantity, sizes, and quality of granite required, and the cutting and finishing must be done by firms properly equipped to produce the finished material without causing delay in the progress of the work.

Evidence to this effect must be submitted if required by the architect.

Section 4. Quality—All the granite shall be selected to meet the requirements of these specifications and shall be absolutely sound and free from seams or other defects which would impair its strength.

Exposed surfaces shall be free from spots, stain, discoloration, knot formations, spalls, chips or other defects, which would impair the appearance of the work, except that in inconspicuous places a reasonable number of knot spots or texture variations inherent to the particular granite proposed may be permissible if samples showing the maximum of such characteristics be submitted to, and approved by, the architect.

In quarrying the granite the blocks shall be so selected that any variations in color permitted by the architect will be uniformly distributed throughout the exposed surfaces of the walls and other portions of the work.

If granites from different quarries are used such granites shall be similar in texture and shall satisfactorily match in color and tone throughout the work.

Section 5. Work Included—The work to be done by the contractor under the heading of Granite shall include the furnishing, delivery and setting in place and completion of all granite work as required by the drawings and herein specified.

The work generally shall include (state portions of work to be of granite).

Note: State any portions or special features which are not to be of granite or not to be included in this contract.

Section 6. Shop Drawings—The granite contractor shall prepare all necessary shop drawings, showing the bedding, bonding, and jointing of all the granite work and typical and special anchoring of same. The dimensions and setting number of each granite stone shall be indicated upon the drawing which shall be submitted and approved by the architect as required under general conditions. No cutting shall be done or work completed except from shop drawings which have been approved by the architect.

Section 7. Corner Stone*—The granite contractor shall furnish and set where indicated on the drawing (or as directed) a corner stone of the required dimensions, having an inscription cut thereon in accordance with the drawings and recessed to receive the copper box to be furnished by the (general contractor).

Section 8. Samples—After the award of the contract 2 samples of each kind of granite required 8 by 8 by 2 in., showing the extreme variation in quality, color and texture that will occur in any granite which will be used, shall be submitted to the architect. Upon approval of these samples, one of each shall be returned to the granite contractor for use at the quarry or plant and the other retained by the architect for comparison with work at the building. Samples shall be dressed on the face and one edge to show finish required by the specification; opposite face may be split or dressed to the approximate size called for or may be dressed to another of the specified finishes called for.

Section 9. Finishes—The exposed surfaces of the granite shall be dressed as indicated on the drawings or specified herein.

In general, surface finishes shall be as follows: From 2 in. below grade to level (state level or course) shall be dressed

*If required.

with best (state finish—as polished, six-cut, eight-cut) work; from level (state level) to level (state level) shall be dressed with best (state finish) work; and from level (state level) to top of parapet shall be dressed with best (state finish) work.

Note: State here any exceptions to the above such as "treads of steps or platforms shall be finish"; "back of parapet and coping courses shall be finish," etc.

The cut marks of all bush hammer work shall be vertical except as noted.

Soffits shall be bushed at right angles to the face.

Faces of key blocks and voussoirs shall be bushed (state whether vertical or radial).

Top surfaces of window and door sills, steps, copings, washes and projecting courses shall be bushed at right angles to the nosing.

Moulded surfaces shall be bushed parallel to the direction of the mouldings.

Note: Mention other specific instructions on direction of bushing.

Section 10. Cutting—All exposed surfaces must be out-of-wind, free from waves, projections or depressions and faces of granite in the same plane must be absolutely flush at joints. Arrises must be cut sharp and true to square or pattern and continuous with adjoining arrises.

Slight inequalities which may occur in setting shall be trimmed to the proper surfaces and refinished equal to the original finish.

Section 11. Beds and Joints—Beds shall be horizontal and shall be cut full and square for a distance of at least 2 in. back from the face, from which point they may fall off not to exceed 1 in. in 12 in.; and shall be reasonably free from large depression and cuppings, which might impair the stability of the work.

Joints shall be dressed at right angles to the face for at least 1½ in. back from which point they may fall away, not to exceed 1½ in. in 12 in.

Backs of granite stones shall be scabbled or split to approximate vertical surfaces which shall not vary more than 1 in. in 12 in. from the true vertical, nor vary more than 1 in. either way from the thickness called for on the drawing.

Section 12. Jointing—The jointing of the granite work shall be as shown on the drawings and no additional joints will be permitted except upon written consent of the architect. The joints shall be uniformly ¼ in. in thickness.

Section 13. Bonding—The bonding of various portions of the work shall be as shown on drawings. Alternate courses of granite shall bond at least 4 in. with the backing except where otherwise shown. No granite stone shall have less than 4-in. bed; projecting courses shall have beds equal to the projections unless otherwise shown. Where brick backing is required the granite shall not go closer than 4½ in. to the inside of the brick wall. Where granite facing occurs at grades it shall extend nowhere less than 4 in. below grade unless otherwise shown.

Section 14. Reveals and Returns—Reveals of all openings, unless otherwise shown shall be cut solid without vertical joints. Returns shall be not less than indicated on the drawings.

Mitering of granite stones at corners will not be permitted.

Section 15. Mouldings—Granite stones forming continuous moulded courses shall be of uniform profile on the face with continuous unbroken lines absolutely flush at the joints and with the surfaces free from projections or depressions and out-of-wind.

Section 16. Washes and Drips—All exterior projecting granite stones and all exterior sills, steps, platforms, coping and other stones with exposed top surfaces, shall be cut with a wash on top. Where other work is built upon such granite stones, they shall be cut with raised seats and lugs to form level beds for work built upon them.

All projecting granite stone, such as sills, cornices, copings, etc., shall have a groove drip cut on the underside unless otherwise detailed.

All exterior door sills shall be cut with raised thresholds unless otherwise shown.

Section 17. Miscellaneous—Mouldings and projections must not be subjected to pressure; and granite stones having projecting members which have weight of any kind bearing upon the upper surface shall have seats cut to bear such weights; and in all cases the edges of mouldings or projections must be kept free from pressure.

Specifications (Continued)

Reglets shall be cut for flashing and counterflashings as required.

Section 18. Models—Full size plaster models of all ornamental and carved work, shall be furnished to the granite contractor as hereinbefore specified.

Where necessary for the proper execution of the work, models will be delivered at the plant of the granite contractor free of expense to him, to be used by him for the purpose of roughing and such carving as may be done at the plant, the granite contractor to carefully preserve these models for re-shipment to the building if required. The expense of handling and re-crating for shipment at the plant to be borne by the granite contractor.

Section 19. Roughing for Carving—No roughing for carved work is to be done from drawings but from approved models only. Sufficient stock in all cases shall be left for the carving and the granite shall be roughed to suitable form and condition for the carver. The cutter and carver shall co-operate in the method of securing the proper roughing for ornamental work.

Section 20. Carving*—Carving may be done at the site either before or after the granite is set or the work may be delivered at the site already carved.

In case the carving is done at the plant or at the site before being set in place, this contractor shall do all necessary refinishing or retouching to make the carving conform to the models and to the satisfaction of the architect. All carved ornament shall be executed by hand by skilled carvers in a spirited and artistic manner and in strict accordance with the approved models.

Where carving is done after the work is set all necessary staging and protection shall be furnished by the general contractor, and if required the models shall be hoisted into position and properly secured to the scaffolding for the convenient use of the carvers by the general contractor.

Inscriptions, lettering or numerals if required shall be clean cut and in accordance with the models, if provided, or otherwise with the full sized details of same. The incised surfaces of lettering shall be cut smooth and accurately to the full depth and section shown on the models or drawings.

Section 21. Crating and Shipping—This contractor shall properly crate the finished granite, for shipment, the crating being so constructed as to properly protect the edges and surfaces of the exposed portions of the work during shipment and handling prior to setting same. Due precaution shall be taken to use crating material which will not stain or discolor the exposed surfaces of granite; and especial care shall be used to protect and suitably note any delicate portion where extra care should be observed in handling.

The finished granite properly crated shall be carefully loaded for shipment by this contractor who shall exercise all necessary precautions in loading to withstand the usual hazards in transit.

Section 22. Precaution Against Stain—Special precautions shall be taken in the setting to guard against possible seepage through the joints of moisture from the mortar or material used in backing up the granite work, which will cause discoloration around the face joints or surface of the granite.

At least 12 hours before the granite is set, all surfaces not exposed shall be thoroughly coated with an approved damp-proof compound to within 1 in. of the exposed face. After the granite is set, and before backing up, another coat of the same dampproofing compound shall be applied to the back for the special purpose of covering the backs of the mortar joints.

The painting of the granite may be omitted with the approval of the architect when it is definitely known that the setting mortar will not stain the granite, but the backs of the mortar joints should be dampproofed in any event to guard against seepage.

If the first coat of dampproofing is applied at the mill, the setting numbers must be painted conspicuously over the damp-proofing.

The granite shall at all times be protected from stain and upon delivery at the site shall be kept stacked on timber or platforms at least 4 in. above the ground, until set in place in the wall.

Under no circumstances shall salt be used for thawing out lewis-holes or otherwise in connection with the granite work.

*Note: If carving is to be done by others than the granite contractor same should be noted here—and this specification modified to suit conditions.

Section 23. Setting—Each granite stone shall be brushed clean and drenched immediately before being set. Each piece shall be carefully bedded in a full bed of non-staining mortar and tapped home with a wooden mallet to a full and solid bearing.

The face of the granite work shall be kept free from mortar at all times.

Granite facing shall not in any case be built up more than two courses ahead of the backing and no stone having a greater width of bed than the one below it shall be set until the lower course is backed up.

All surplus mortar shall be immediately raked out to a depth of at least 1 in. and every precaution taken to prevent stones bearing upon the edges.

Sills, etc., subject to pressure, shall be bedded only at the ends.

The cement in the mortar used for setting all granite work where the joint is exposed to the weather shall be made waterproof with a satisfactory waterproofing compound, mixed with the mortar.

The sand used in all setting mortar shall be such as to cause no stain or chemical action with the cement.

Section 24. Anchors, Dowels, etc.—All bolts, expansion bolts, anchors, ties, etc., required in the setting of the granite work, will be furnished to the granite contractor.

All ashlar shall be anchored to the backing with heavily galvanized wrought iron anchors $\frac{3}{4}$ by $1\frac{1}{4}$ in. turned down into the granite $1\frac{1}{4}$ in. and extending into the backing 8 in. if the thickness of wall permits; the end to be turned up $1\frac{1}{2}$ in. into the backing. There shall be at least two anchors to every stone whose length exceeds its height and in general there shall be not less than two anchors to each superficial square yard of ashlar.

Note: Special anchoring for heavy cornices and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, and columns, etc., should be suitably described or shown according to the requirements of the work.

Section 25. Boxing and Protection—All granite work must be protected from damage during the progress of the work and until the completion of the building.

The general contractor shall provide the necessary protection, covering all projections, top surfaces, angles, etc., protective boxing to be securely fastened in position and securely nailed throughout with galvanized iron nails. No lumber or material to be used which would in any way stain or deface the granite work.

All necessary forms, centers, scaffolding, etc., required by the setter or carver to be furnished by the general contractor.

Section 26. Pointing and Cleaning—After the completion of the granite work or at such time thereafter as all liability from stain of other operations on the building is passed, and when there is no danger therefrom, the whole of the granite work shall be carefully cleaned down, removing all dirt, mortar, stains, and other defacements.

The use of wire brushes, acids or solutions which might cause discoloration will not be permitted.

All face joints shall be raked out to a depth of not less than 1 in., brushed clean, thoroughly wetted, and filled with pointing mortar and then carefully jointed. The pointing mortar must be packed solidly into all joints, completely filling the same; and the form of joint shall be as directed by the architect.

Vertical joints in the top courses of uncovered cornices having a projection of 8 in. or more shall be filled with mortar by grouting to within 3 in. of the top of the granite, then calked with picked oakum and filled with molten lead, calked against the edges and slightly convex at the top—taking care that the oakum is kept at least 2 in. away from the face and top of granite.

Joints in the upper surfaces of projecting stones which are not so protected and in all platforms, steps and coping, shall be raked out at least 2 in. deep and thoroughly grouted flush with the surface of the granite.

Pointing and cleaning shall start at the top and be continued until such work is completed.

Section 27. Defective Work—No patching or hiding of defects will be permitted. Defective granite stones shall be replaced with perfect ones, except in extreme cases where a stone has been damaged through no fault of the granite contractor, and where it is possible and practicable to remedy the defect without in any way impairing the appearance, strength or durability of the work—and then only with the approval and under the supervision of the architect—and where a satisfactory allowance has been agreed upon which shall be deducted from the contract price.

Specifications—Short Form

The following short form of Granite Specifications has been prepared by the Association for use where a comparatively small amount of granite is required, but where the standards of workmanship and other essentials should conform to the same requirements set forth in detail in the complete form printed on the two preceding pages.

(1) **Work Included**—The work to be done shall include the furnishing, delivery, and setting of all granite work required by the drawings and specified herein. (State portions of work to be of granite and note any exceptions about which there might be any question.)

(2) **Material**—The granite shall be sound and of good quality, free from defects which would impair the strength, durability, or appearance of the work, and equal to the approved sample. In estimating, the contractor shall state the name of granite and quarry, upon which his proposal is based. The following granites will be considered: (mention color, tone and grain) granite from (mention locality).

(3) **Samples**—Submit in duplicate, for the architect's approval, samples of the granite showing the extreme variation in quality, color and texture to be used under the contract, and showing the specified finishes. (State size of sample required.)

(4) **Shop Drawings**—The granite contractor shall prepare all necessary shop drawings, showing in detail the jointing, bonding, and construction of the granite work, and special anchoring. These shall be submitted to and approved by the architect before any cutting is done.

(5) **Finishes**—The exposed surfaces of the granite shall be finished as indicated on the drawings or specified herein.

Note: State finishes desired.

(6) **Cutting**—All exposed surfaces shall be out-of-wind, free from waves, projections, or depressions, and flush at the joints. Arrises shall be cut sharp and true to square or pattern, and continuous with adjoining arrises.

(7) **Bed and Joints**—Beds shall be cut full and square for at least 2 in. from face, and may fall off not to exceed 1 in. in 12 in., reasonably free from large depressions. Joints to be full and square at least 1½ in. from face, falling off not to exceed 1½ in. in 12.

(8) Backs of granite shall be scabbled or split to approximately vertical surfaces.

(9) Jointing shall be as shown on approved drawings, and ¼ in. in thickness.

(10) **Bonding**—Shall be as shown on approved drawings, with no bed less than 4 in. Projecting course shall have beds at least equal to projection, unless otherwise shown.

(11) **Mouldings**—Shall be cut with uniform profile throughout their lengths, in conformity with full size details, with lines true and straight, and flush at joints.

(12) **Washes and Drips**—Washes shall be cut on stones whose top surfaces are exposed, unless otherwise shown. Projecting stone shall have groove drip cut on underside.

(13) Raised seats or lugs shall be cut where stone work rests on projections or washers, and raised thresholds shall be cut on exterior door sills.

(14) Reglets shall be cut for flashing where shown or required.

(15) **Models**—Full size plaster models of all ornamental and carved work shall be furnished to the granite contractor, who shall preserve these models for re-shipment to the building, if required.

(16) **Roughing**—For carving shall be done from approved models only, leaving the stone in suitable form and condition for the carving.

(17) **Carving**—All carved ornament shall be executed by skilled carvers, in a spirited and artistic manner, and in strict conformity with the approved models.

(18) **Crating and Shipping**—The finished granite shall be properly crated for shipment, to protect the surfaces and edges of all exposed work.

(19) **Precaution Against Stain**—Precaution shall be taken at all times to protect the granite from stain.

(20) Under no circumstances shall salt be used for thawing out lewis-holes, or otherwise in connection with the granite work.

(21) (If dampproof painting is required, specify requirements here.) After setting, the backs of all mortar joints shall be suitably dampproofed to prevent moisture from the backing seeping through the joints.

(22) **Setting**—The setting of the granite work shall be done by competent, experienced stone setters, and in strict accordance with the approved drawings and specifications.

(23) Each granite stone shall be brushed clean and thoroughly drenched immediately before setting and carefully bedded in a full bed of non-staining mortar. The granite facing shall not be built up more than two courses ahead of the backing, and the faces shall be kept free of mortar at all times.

(24) All surplus mortar shall be immediately raked out to a depth of at least 1 in. Sills, etc., subject to pressure shall be bedded only at the ends.

(25) Where a joint is exposed to the weather, it shall be made waterproof by mixing a satisfactory waterproofing compound with the mortar.

(26) The sand used in all setting mortar shall be such as will cause no stain, or chemical action with the cement.

(27) **Anchoring**—The granite shall be anchored to the backing with galvanized iron anchors, ¼ in. by 1¼ in., turned down into the granite 1¼ in., extending 8 in. into the backing if possible, and turned up into the backing 1½ in. There shall be two anchors to each stone whose length exceeds its height and, in general, not less than two anchors to every superficial yard of ashlar. All anchors, bolts, ties, etc., shall be furnished to the granite contractor.

Note: Special anchoring for heavy cornices, and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, columns, etc., should be suitably described or shown according to the requirements of the work.

(28) **Boxing and Protection**—All the granite work shall be protected by the general contractor during the progress of the work and until the completion of the building. No lumber or material shall be used which will in any way stain or deface the granite work.

(29) **Centers and Scaffolding**—All necessary forms, centers, scaffolding, etc., required by the setter or carver, will be furnished by the general contractor.

(30) **Pointing and Cleaning**—After all liability from stain or damage from other operations on the building is passed, the granite work shall be carefully cleaned, removing all dirt, mortar stains and other defacements. The use of wire brushes, acids, and solutions which might cause discoloration, will not be permitted.

(31) All face joints shall be brushed out, thoroughly wet with clean water, and carefully pointed as directed by the architect.

Note: See Long Form for special treatment of vertical joints in uncovered cornices, and joints in upper surfaces of projecting stones.

(32) **Defective Work**—No patching or hiding of defects will be permitted. Defective stones shall be replaced with perfect ones, unless otherwise directed by the architect.

NEW ENGLAND GRANITE WORKS, INC.

WESTERLY, R. I.

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Westerly Granite

Westerly Granite is offered as the finest material for higher class buildings and monumental effects. Adapted to any finish and resisting the ravages of time and weather, it is especially recommended where excellence of workmanship and permanence are desired. Westerly Granite is available in several colors, red, blue, gray and pink. All are capable of hammered or polished finish and are especially desirable where carved ornament or letters are used.

Westerly Granite is wrongly considered high priced. Our facilities allow us to offer this exceptional material at prices comparable with many softer stones. Considering the quality of material and workmanship which Westerly offers, prices are very moderate.

Other Granites

Concord Granite, a light gray, medium fine grained granite, is available where heavy construction or large quantities make the use of Westerly granite inadvisable.

It is low in cost and available in practically unlimited quantities.

Deer Isle Granite is a light pinkish-gray coarse grained granite likewise available in large quantities and at reasonable cost.

Quincy Granite, dark gray, medium grained, is available for polished work where a near-black effect is wanted.

Quarries and Plant

We have ample quarry facilities for procuring all of the above granites, and complete manufacturing plant and equipment for the finishing of building granite of

every description. We are unusually equipped to handle polished work and turned work in large sizes and large volume. Our employees are skilled at their craft and the reputation of Westerly for the highest grade of workmanship is jealously maintained.

The location of our plant, at Westerly, R. I., on the main line of N. Y. N. H. & H. R. R., permits quick freight deliveries to all points and our loading facilities enable cars to be loaded without delay.

Organization

We maintain a complete organization for the planning and supervision of building work. We are always willing to confer with architects on preliminary costs, economical construction and practical specifications and we will gladly furnish samples showing colors and finishes.

We are a member of the National Building Granite Quarries Association and we refer to their display of granite reproductions and typical construction and specification to be found in this catalogue.



South County Public Service Company, Westerly, R. I.
JACKSON, ROBERTSON & ADAMS, Architects
Base, polished red Westerly Granite. First story, hammered gray Westerly Granite

References

Travelers Insurance Co., Hartford, Conn., entire exterior Red Westerly Granite; Donn Barber, Architect
Mutual Trust Co., Philadelphia, Pa., three stories Deer Isle Granite; Heacock & Hokanson, The Ballinger Co., Architects
Harkness Mausoleum, Woodlawn, N. Y., Concord Granite; George B. Post & Son, Architects
Colonial Trust Co., Pittsburgh, Pa., Red Westerly Granite; F. J. Osterling, Architect
Mechanicus Park School, Cranston, R. I., Blue Westerly Granite Trim; Wm. R. Walker & Son, Architects
Shoreland Building, Miami, Fla., Pink Westerly Granite Base Course; F. S. Marlow, Architect
Security Building, Miami, Fla., three stories Deer Isle Granite; Robert Greenfield, Architect
State Office Building, Providence, R. I., Red Westerly Granite basement; Jackson, Robertson & Adams, Architects

GRANITE MANUFACTURERS ASSOCIATION OF MOUNT AIRY

MOUNT AIRY, N. C.

MEMBERS

J. D. SARGENT GRANITE COMPANY

Mount Airy, N. C.

Branch Offices:

30 East 42nd Street, New York, N. Y.

615 Witherspoon Building, Philadelphia, Pa.

127 No. Dearborn Street, Chicago, Ill.

NORTH STATE GRANITE COMPANY

Mount Airy, N. C.

Branch Office, 30 East 42nd Street, New York, N. Y.

THE NORTH CAROLINA GRANITE CORPORATION

Mount Airy, N. C.

Branch Offices:

30 East 42nd Street, New York, N. Y.

127 No. Dearborn Street, Chicago, Ill.

615 Witherspoon Building, Philadelphia, Pa.

MOUNT AIRY GRANITE CUTTING COMPANY

Mount Airy, N. C.

Products

DIMENSION GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

POLISHED and TURNED GRANITE.

GRANITE PAVING BLOCKS, STREET CURBING, CROSS-WALK, RUBBLE, CRUSHED GRANITE and RIP RAP.

The Association and Its Object

The aim of this Association is to jointly promote the use of Mount Airy granite for all purposes where granite is adapted.

The individual members will co-operate with architects, engineers, contractors or owners in matters relating to the use of granite, samples, specifications, estimates, etc.

Quarry Production

The quarries were first opened in 1889, the first shipment being made in July, 1890; the output for that year being 135 carloads and has increased rapidly to a maximum output of 3500 carloads in one year.

Owing to the natural advantages peculiar to the Mount Airy quarries, Dimension Stone of unusual size is easily obtained, the only limit being that of railway transportation.

Facilities

The Mount Airy quarries are located one mile east of the Town of Mount Airy, N. C., and have 70 acres in exposed granite area.

Cutting plants and offices are located at the base of

the Mount Airy quarries and are equipped with the latest improved machinery for the manufacture of granite, including electric traveling cranes, polishing machinery and turning lathes with individual motors, sand blast and carborundum machines, also compressed air for the pneumatic surfacing machines and hand cutting tools.

These plants, taken together with the unlimited supply of rough granite available, enable large contracts to be executed in quick time.



World War Memorial Erected at Tenafly, N. J.

Geographical Location

The Mount Airy quarries are well situated in reference to shipping, being about an equal distance from New York City, New Orleans and Chicago; which fact guarantees a reasonable transportation cost on their material to points throughout the East, South and Middle West. These quarries are served by the Southern Railway and have a nearby connection with the Norfolk & Western Railway.

Moulding and Carving

Owing to the composition of Mount Airy granite, it is especially adapted for fine moulding, carving and sculpture work, as is attested by reference to the following:

Pennsylvania State Monument, Gettysburg, Pa.

Column Capitals of the North Western Life Insurance Building, Milwaukee, Wis.

Column Capitals and Panels of the Municipal Building, New York, N. Y.

Colors and Texture

Mount Airy granite, "*The Granite of Individuality*," is a very light gray, almost white, biotite granite of medium texture. Feldspar, quartz and mica characterize the granite megascopically.

The feldspar is nearly white, while the quartz is a blue gray and the mica black and very evenly distributed, giving an appearance of decided strong character when hammer dressed.

The composition of Mount Airy granite is indicated by the following Chemical Analysis:

SiO ₂	70.70
Al ₂ O ₃	16.50
Fe ₂ O ₃	2.34
MgO	0.29
CaO	2.96
Na ₂ O	4.56
K ₂ O	2.45
FeS ₂	0.09

Total 99.89

Weight per cu. ft.	165 lbs.
Water absorbed per cu. ft.	0.33 lb.
Crushing strength.....	23,068 lbs. per sq. in.

From Bulletin No. 2, page 155; North Carolina Geological Survey, "The building and ornamental stones of North Carolina."

JOSEPH HYDE PRATT, State Geologist.

Estimates and Samples

A complete organization is maintained by each member of this Association for furnishing estimates, setting plans, details, etc., on short time.

Preliminary estimates cheerfully furnished on request of architect or contractor. Samples of Mount Airy granite will be furnished on request, and advice as to grade or style of finish desired.

Complete Information on Granite

For detailed information, including complete granite specifications, see the pages of the National Building Granite Quarries Association in this volume.

References

Buildings

Lincoln Deposit & Trust Company, Altoona, Pa.
Citizens & Southern Bank, Augusta, Ga.
Merchants National Bank, Allentown, Pa.
Winona Savings Bank, Winona, Minn.
Isherwood Hall, U. S. Naval Academy, Annapolis, Md.
State Office Building, Richmond, Va.
Agriculture Extension Building, Raleigh, N. C.
Dry Dock No. 3, Navy Yard, Philadelphia, Pa.
Courthouse, Washington, D. C.

Bridges

Fall Creek Bridge, Indianapolis, Ind.
Rock Creek Bridge, Washington, D. C.
Delaware River Bridge, Philadelphia, Pa.
Arlington Memorial Bridge, Washington, D. C. (under construction)

Public Mausoleums

Rose Hill Mausoleum, Chicago, Ill.
Valhalla Mausoleum, St. Louis, Mo.
The Memorial Mausoleum, Reading, Pa.
Rose Hill Mausoleum, Hagerstown, Md.
Lakeland Mausoleum, Lakeland, Fla.
Wheeling Mausoleum, Elm Grove, W. Va.

Private Mausoleums

Sharer Mausoleum, Alliance, Ohio
Stadelman-Grant Mausoleum, Akron, Ohio
Cone Mausoleum, Greensboro, N. C.
Hoerner Mausoleum, New Orleans, La.
Ward Mausoleum, Brooklyn, N. Y.
Myer Cohen Mausoleum, Nashville, Tenn.
Dodge Mausoleum, Detroit, Mich.
Packard Mausoleum, Columbus, Ohio
Studebaker Chapel, South Bend, Ind.
Warden Mausoleum, Fredericksburg, Va.
Geist Mausoleum, Ravenswood, Ill.
S. Z. Poli Mausoleum, New Haven, Conn.
Wege Mausoleum, Columbus, Ohio
O'Brien Mausoleum, Cincinnati, Ohio

Monuments

McConnell Shaft, Carthage, N. C.
General Julian S. Carr, Durham, N. C.
General Nathaniel Greene, Guilford Battle Ground, N. C.
Victory Monument, Danville, Ill.
Oak Park and River Forest Monument, Illinois
Galbraith Memorial, Cincinnati, Ohio
Acacia Spire, Masonic Cemetery, Chicago, Ill.
Masonic Monument, North Shore Cemetery, Chicago, Ill.



Guilford Courthouse, Greensboro, N. C.

HARRY BARTON, Architect

JOHN L. GOSS CORPORATION

Producers of "Goss Pink Deer Isle Granite"

QUARRIES AND HOME OFFICE
STONINGTON, MAINE

SALES OFFICE, 77 Summer Street, BOSTON, MASS.

SALES AGENTS

NEW YORK, N. Y., A. LE POIDEVIN & Co., Inc., 286 Fifth Avenue
MIDDLE WESTERN TERRITORY, Wm. H. MITCHELL,

PHILADELPHIA, PA., FRANK WILLIAMSON, 2302 Spruce Street
30 Church Street, NEW YORK, N. Y.

Product

GOSS PINK DEER ISLE GRANITE, for polished, tooled, hammered, pointed or rock-faced work, in buildings, memorials, mausoleums and monuments.

Trade-name

Deer Isle granite has been used for many years under that name and various others, such as Greens Landing, Stonington Pink, Maine Pink, Crotch Island, Deer Island, and many more, and has been produced by a number of quarries operating in the Deer Isle district from time to time.



A Blast in the Quarry

This moved the 2000-ton block shown about 6 in. from its natural bed. It is now ready to be cut into convenient sizes for shipment.

The Crotch Island quarry of JOHN L. GOSS CORPORATION was opened in 1870, and has been operated continuously to this day. Thorough development insures the same high quality of stock for years to come. To distinguish the product of this one quarry from that of all others, the name "Goss Pink Deer Isle" was adopted.

Service Available

The rough granite is shipped to finishing plants in all parts of the country, which are equipped to furnish all classes of work. Any responsible dealer or cutting yard can give quotations on work to be executed in this material. A large number of plants carry stocks on hand, and the quarry always stands ready to supplement these with prompt shipments of any sizes, shapes or quantities. We will be pleased to assist architects and builders to get in touch with the finishing plants best situated to handle any particular project.

Facilities for Production

The natural advantages of the quarry site—a free working formation, so located that the product travels the short distance to our tidewater dock by gravity—are supplemented by the best of modern equipment, derricks, compressors, air tools, etc., which are being constantly improved, replaced and kept up-to-date.

This makes it possible to give prompt deliveries on large or small orders, and to furnish monoliths of any size that may be desired. We ship by water directly

from our own dock to seaport cities, or deliver to the railroads at Rockland or Portland, Me.; Boston, Mass.; Philadelphia, Pa., or Wilmington, Del.

Color and Texture

Natural scale color plates are shown on following page. Polished surfaces when used in a building appear somewhat darker than as reproduced, while hammered work appears lighter. Polishing brings out all the colors of the various mineral constituents, and produces a surface not readily stained or soiled. Hence it is especially adapted to use in base courses adjacent to the sidewalk. The polish is permanent. Hammering blends and softens the coloring, and tones down the striking character of the natural markings.

Compressive Strength

Tests by the United States Ordnance Department give a compressive strength of 23,620 pounds per square inch. This is well above all structural or code requirements.

Advantages

Goss Pink Deer Isle granite can be specified "flat" without losing the advantages of competition. The rough granite represents only a small part of the cost of the finished work. It is not difficult to obtain as many figures as may be desired from manufacturers who compete with each other.

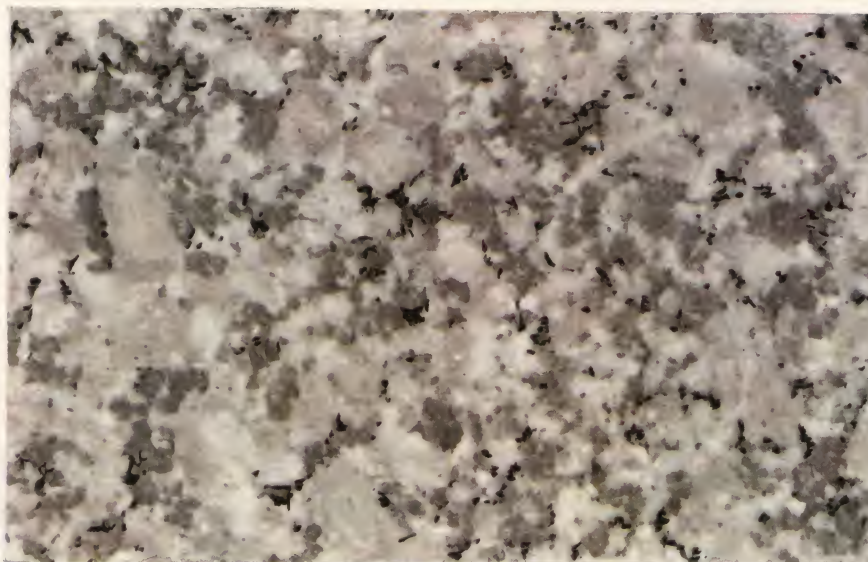
Goss Pink Deer Isle Granite is especially desirable for use in combination with other materials. The warm delicate shade harmonizes with almost all other building materials, such as brick and limestone. It lends itself equally well to bold rock-face work or tooled and carved details.

It is a peculiar characteristic of this granite that it retains its freshness for a long while, and does not readily become soiled or discolored. This is a very useful factor in and around cities where there is an excess of soot and smoke.



**Memorial Fountain Dedicated to Pilgrim Women,
Plymouth, Mass.**

McKIM, MEAD & WHITE, Architects



Goss Pink Deer Isle Granite (Polished Finish)



Goss Pink Deer Isle Granite (Hammered Finish)

References

Building	Architect	Building	Architect
Federal Reserve Bank, Boston, Mass.	R. Clipston Sturgess	South Office Building, State Capitol, Harrisburg, Pa.	Arnold W. Brunner
Penn Mutual Life Insurance Building, Philadelphia, Pa.	Horace V. Seiler	Salem Fields Entrance, Brooklyn, N. Y.	Percy W. Darbyshire
Lafayette Building, Philadelphia, Pa.	John T. Windrim	Hotel Stevens, Chicago, Ill.	Holabird & Roche
Evans Memorial Galleries, Boston, Mass.	Guy Lowell	Tompkins County War Memorial, Ithaca, N. Y.	LeRoy P. Burnham
Insurance Co. of North America, Philadelphia, Pa.	Stewardson & Page	Fountain of Oceanus, Estate of John D. Rockefeller, Pocantico Hills, N. Y.	Welles Bosworth
Neils Esperson Building, Houston, Texas	Eberson & Eberson	Drexel Bank Building, Philadelphia, Pa.	Day & Klauder
Security Trust Co., Los Angeles, Cal.	John Parkinson	Security Building, Miami, Fla.	Robert Greenfield
Public Ledger Building, Philadelphia, Pa.	Horace Trumbauer	Mutual Trust Co., Philadelphia, Pa.	Heacock & Hokanson and The Ballinger Co.
East Boston (Mass.) Savings Bank	Thomas James		
Beacon Trust Co., Boston, Mass.	Arthur H. Bowditch		
Pilgrim Memorial Tower, Provincetown, Mass.	Willard T. Sears	New York State Office Building, Albany, N. Y.	Sullivan W. Jones

H. E. FLETCHER COMPANY

Producers of Granite
WEST CHELMSFORD, MASS.

Products

CHELMSFORD WHITE GRANITE.
CHELMSFORD GRAY GRANITE.
CHELMSFORD "BULFINCH" GRANITE.
MILFORD (N. H.) GRANITE.

DIMENSION, CUT, RUBBLE and CRUSHED GRANITE for buildings, bridges, roadways, sea-walls, docks and dams.

DIMENSION GRANITE, in carloads for mausoleum and monumental work.

PAVING BLOCKS, CURBING, SEWER INLETS and CRUSHED GRANITE for municipal work and for "FLETCHERMIGHT" pavement.

Chelmsford White Granite

A grayish-white granite which weathers well and is widely used for building and bridge work.

Chelmsford Gray Granite

A well-known standard light gray granite for building and memorial work.

Weathers equally as well and is finer grained than Chelmsford White.

Both granites, when bush-hammered, are almost unequalled in retaining their light, almost white color even after years of exposure.

Chelmsford "Bulfinch" Granite

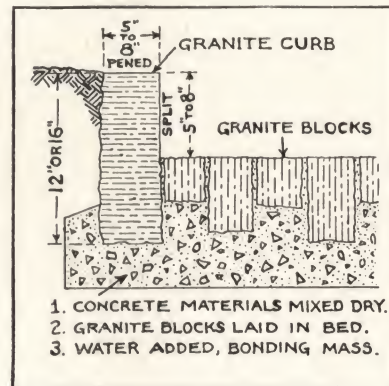
A varied light grayish-buff colored granite used for many years in Colonial structures. A notable example is University Hall, of the Harvard University group at Cambridge, Mass., designed by Bulfinch and built in 1813. This famous building stands today, an example of the splendid weathering qualities of Chelmsford Granite. Chelmsford "Bulfinch" Granite has been used in recent additions to this group.

Paving Blocks and Curbing

We are one of the principal producers of paving blocks and curbing, and make a specialty of delivering curbing on the street in correct position for setting and in the shortest possible time.

"Fletchermight" Pavement

We are presenting to the attention of the public a new pavement, called "Fletchermight" after a vote by the road builders of America. This is designed for heavy motor traffic on main trunk highways, and is protected by patent No. 1,573,923, Feb. 23, 1926. The sketch at right shows the general construction and use of granite curbing with this pavement.



Facilities

Nearly fifty years of expert quarry development has produced free quarry faces containing millions of feet of clear granite, all available for immediate quarrying under numerous derricks. With unexcelled railway facilities, and adequate cutting plant, this means that the largest contracts can be easily and promptly handled. We do no polishing work at this plant, but are in a position to furnish saw blocks to polishing plants for quick delivery.

Organization and Service

Our organization has been built up of men having long experience in granite production and includes business, traffic and technical experts who have made intensive study of the requirements for giving satisfaction and service to purchasers of our products.

Recent Contracts

Camden Anchorage and Plaza, Philadelphia and Camden Bridge Soldiers and Sailors Memorial Bridge, Harrisburg, Pa. Market Street Bridge, Wilkesbarre, Pa. New York Port Authority Bridges, New York and New Jersey Hartford County Building, Hartford, Conn.



The H. E. Fletcher Quarry at West Chelmsford

THE SMITH GRANITE COMPANY

WESTERLY, R. I.

NEW YORK OFFICE, 12 East 41st Street

Product

WESTERLY GRANITE in all shades, rough and finished for public and private memorials, mausoleums and monumental work of every kind.

Westerly Granite

For eighty years Westerly Granite has been quarried and worked by this organization. Throughout this period it has been recognized as one of the best granites in the world where monumental effects are desired. Its hardness, strength and imperviousness to weather give it a permanence of construction and appearance greater than obtainable with any other building material. Westerly granite is obtained in several shades, all of which are well adapted to regular or special hammered finish or to rubbed, honed or polished finish.

Blue-White Westerly Granite

—Is fine grained bluish white granite enlivened by very fine grains of black mica. It is especially adapted to fine hammered work and well executed lettering and ornament.

Pink Westerly and Cream-White Westerly Granites—Differ only in shade of coloring, a medium pink and a delicate creamy white not obtained in any other granite. Both are especially fine grained and very hard, and are used mainly where fine detail and finish are desired in lasting effect. They can be worked practically to the perfection obtainable in marble, and yet they give to

the memorial that fundamental requirement, permanence.

Red Westerly Granite—Is a medium grained granite reddish-gray when hammered and medium red when polished. It is adapted to the larger types of monumental work and bolder ornament. There is no better material for special finishes and antique tooling such as may be used in Celtic work.

Facilities

THE SMITH GRANITE COMPANY owns and operates at Westerly, R. I., quarries producing all colors of Westerly granite, and a modern cutting plant equipped with all types of machines and manned by craftsmen skilled in the production of the finest in granite work. Quarries and plant on the same property permit operation at highest efficiency.

Extensive setting equipment and expert setters are available for the erection of work in cemeteries or public grounds.



Fenwick L. Peck Mausoleum, Dunmore Cemetery, Scranton, Pa.

Service

THE SMITH GRANITE COMPANY offers a complete organization to handle the memorial, monumental and mausoleum work of the highest quality—unexcelled material, adequate quarries, careful execution, expert erection, unified control and supervision.

Estimates and samples are gladly furnished and correspondence or consultation on preliminary work is invited.

References

Public Memorials

Pierce Memorial, Bangor, Me.
Crowell & Lancaster, Architects
Declaration of Independence Monument, Boston, Mass.
John F. Paramino, Sculptor
Maine World War Memorial, Kittery, Me.
J. Sterling Morton Memorial, Nebraska City, Neb.
Rudolph Evans, Sculptor
Noah Webster Memorial, Amherst, Mass.
Willard D. Paddock, Sculptor
Medicine Man Pedestal, Philadelphia, Pa.
Cyrus E. Dallin, Sculptor

Private Memorials and Mausoleums

Jeppson Family Memorial, Worcester, Mass.
Grosvenor Atterbury, Architect
Benjamin Altman Memorial, Brooklyn, N. Y.
Trowbridge & Livingston, Architects
Woodward Mausoleum, LeRoy, N. Y.
Otto Block, Architect
George Nellis Crouse Mausoleum, Syracuse, N. Y.
Henry W. Wilkenson, Architect
R. H. White Mausoleum, Cambridge, Mass.
Willard T. Sears, Architect
Alexander Walker Mausoleum, Woodlawn, N. Y.
Charles L. Fraser, Architect

ROCKPORT GRANITE COMPANY

ROCKPORT, MASS.

BRANCH OFFICE: 31 State Street, BOSTON, MASS.

REPRESENTATIVES

PHILADELPHIA, PA., FRANK H. SCHILLING, 614 Penfield Building
NEW YORK, N. Y., A. G. MACINNIS, 21 Park Row
CLEVELAND, OHIO, R. L. QUEISSER & Co., Schofield Building

CHICAGO, ILL., J. D. DUFFY, Chamber of Commerce Building
DETROIT, MICH., JOHN D. STEGE & Co., 420 U. S. Mortgage Building
NEW ORLEANS, LA., JOHN C. BARTLEY, 509 Canal-Commercial Building

QUARRIES: ROCKPORT, BAY VIEW AND PIGEON COVE, MASS.; JONESPORT, ME.

Products

ROCKPORT GRAY (Light, Medium and Dark), ROCKPORT SEA GREEN and MOOSE-A-BEC RED GRANITES for the better class of buildings and memorials.

SEAM FACE GRANITE for residences and churches. Also Granite for bridges and sea-walls; Granite Paving Blocks and Crushed Stone.

Rockport Granite

Rockport Granite—"The Granite of Character"—is a true hornblende granite, resembling in composition the Egyptian granite of which the ancient obelisks and sarcophagi were built. It is strong beyond all possible requirements, and is decidedly hard and tough. It is remarkably free from impurities, is practically impervious to moisture or stain, and will withstand indefinitely the action of frost and weather.

One of the outstanding qualities of Rockport Gray and Rockport Sea Green Granites is the exceptionally high and durable polish which they take, due largely to the hornblende in their mineral composition.

Rockport Gray Granite—Is available in light, medium and dark gray shades, with a medium to coarse and even grained texture.

Rockport Sea Green Granite—Has practically the same physical properties as the gray. In color it is dark olive green, spotted with black. It is especially beautiful in polished finish, although used extensively for hammered work as well.

Moose-A-Bec Red Granite—Is a beautiful dark reddish gray, biotite granite, with a mixture of white and pinkish feldspars. It has a coarse, even grained texture, and takes a beautiful polish. While slightly more expensive than the gray or green, its coloring makes it very desirable where a richly colored granite is wanted.

Rockport Seam Face Granite—Is available in a mixture of light to very dark reddish, rusty browns, and makes wonderfully attractive ashlar work for residences, churches, etc. Unlike most seam face granites, the color runs deep into the stone and it can therefore be used for headers, sills, steps, etc., as well as for ashlar surfaces.

Facilities

The plants and quarries, comprising more than 800 acres, are located at Rockport, Bay View and Pigeon Cove, Mass., and Jonesport, Me. The company also owns its own docks, and a fleet of vessels, including sloops, schooners, barges, towboats, and lighters. With facilities for both rail and water shipment, the company is in an exceptional position to render first class service, both to seacoast and inland points.

In the several quarries are located forty large power derricks, many of which are of 75-ton capacity and over. Drilling is done with modern appliances using compressed air or steam. The quarries and plants at Rockport, Bay View, and Pigeon Cove are interconnected by rail and heavy capacity motor trucks.

The cutting plants are well equipped with modern tools and appliances, pneumatic tools and drills, pneumatic surfacing machines, lathes, etc. The large modern polishing plant is completely equipped with polishing wheels, polishing lathes and pendulum polishers.

In normal operation, from 600 to 800 men are employed by the Company.

Color Reproductions, Samples and Estimates

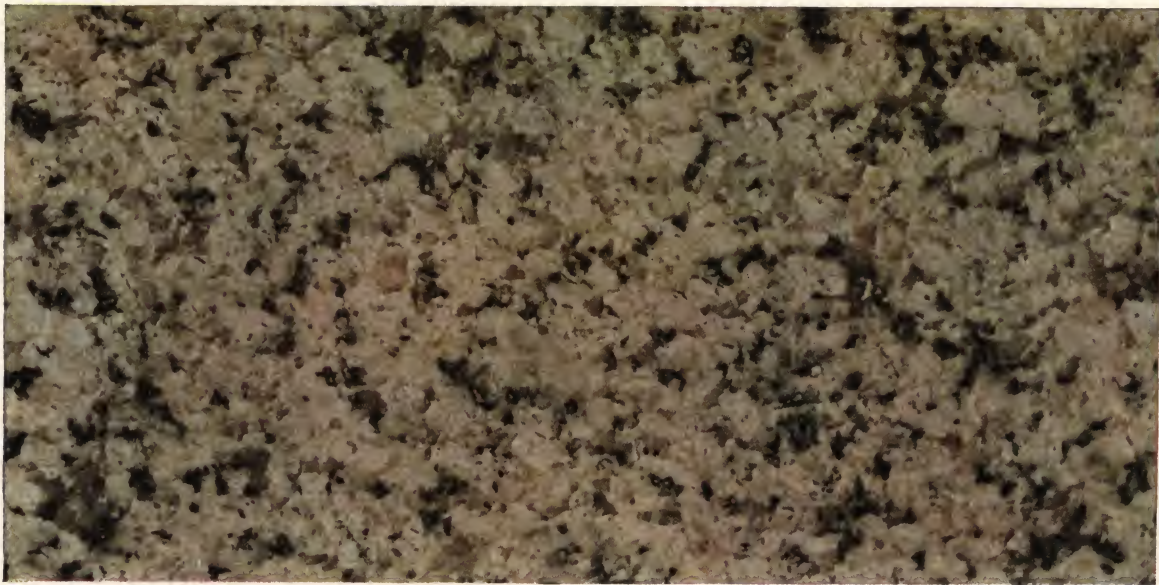
The color reproductions of our granites, on the following page, are submitted for preliminary selections. They are full size as to texture, and approximate as to color. Samples will be furnished to architects on request. Opportunity is solicited to submit prompt and reliable estimates from plans and specifications.

References

The following are a few typical buildings in which Rockport granites have been used:
Winters National Bank, Dayton, Ohio, Frank Hill Smith, Inc., Architects—Rockport Sea Green Granite
Seaboard National Bank, New York, N. Y., Alfred C. Bossom, Architect—Rockport Gray base and Sea Green columns
Old State National Bank, Evansville, Ind., Adolf Sherrer, Architect—Polished Moose-a-bee Granite
Soldiers and Sailors World War Memorial, Pittsfield, Mass., Augustus Lukeman, Sculptor—Rockport Sea Green Granite
Mellon National Bank, Pittsburgh, Pa., Trowbridge & Livingston, Architects—Rockport Gray Granite
Scott County Savings Bank, Davenport, Iowa, Clausen & Kruse, Architects—Rockport Light Gray Granite
Federal Reserve Bank, New Orleans, La., Rathbone DeBuys, Architect—Story-high Base, Rockport Light Gray, Polished



Carved Detail, Scott County Savings Bank, Davenport, Iowa
CLAUSEN & KRUSE, Architects



Rockport Sea-Green Polished



Rockport Gray Hammered



Rockport Gray Polished



Moose-A-Bec Red Polished

THE JOHN SWENSON GRANITE CO.

Concord Granite

CONCORD, N. H.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue

CHICAGO, ILL., Marquette Building

Products

SWENSON'S CONCORD GRANITE.

SWENSON'S ANTIQUE GRANITE.

ROUGH OR FINISHED GRANITE for buildings and memorials.

Swenson's Concord Granite

Our Concord Granite is a warm toned, light gray granite of fine to medium grain. It is technically known as "muscovite-biotite" granite, and the soft, brownish color of the small muscovite particles adds warmth to the general tone of the finished granite.

According to Geo. P. Merrill, Curator of Geology, U. S. National Museum, one of the remarkable features of Concord Granite "aside from its color, texture, and freedom from flaws, pyrite and other injurious constituents, is the remarkable ease with which it can be worked."

Swenson's Antique Granite

This variety of our Concord Granite is a blending of buff and gray, giving that warm antique appearance one associates with old ivory. It is available in reasonable quantities and architects who have used it are enthusiastic about it.

Strength and Durability

Watertown Arsenal tests give Concord Granite a crushing strength of 30,830 lb. square to the rift and 23,860 lb. parallel to the rift.

Geo. P. Merrill, referring to the Concord State House and Old State's Prison, erected of Concord Granite in 1816-1819 and 1812, respectively, states that "both buildings are in admirable state of preservation, and evidently, so far as the stone is concerned, good for centuries to come."

Facilities

Our quarries have been in active operation for over 60 years and have been developed and equipped for large scale production.

Our cutting plant is one of the most up-to-date in the country; modern machinery, the pick of skilled workmen, due to exceptionally healthy working conditions, and a fast working granite ensure prompt and economical production.

Prices and Service

Reasonable prices, good workmanship and service to our customers have been the policy on which our business was founded and built up. Our offices at Concord, New York and Chicago are always prepared to render every possible service. Samples, showing finishes desired, will be furnished on request. Estimates and consultations upon economical use of granite furnished without obligation.



New Hampshire Savings Bank Building,
Concord, N. H.

J. D. LELAND Co., Architects
Exterior of Concord Gray Granite

Recommended Finishes

For general building work we recommend our Concord Granite in six-cut finish for lower portions and four-cut for upper work. For base courses, subject to traffic stain, polished finish is most practical. All the standard finishes, including rock-face, are adapted to this granite.

Sand Blast Carving

We are experienced and equipped for sand blast work. For a general description of this recently developed process and its architectural possibilities, see the catalogue of the National Building Granite Quarries Association in this section of Sweet's.

References

A partial list of typical projects for which we have furnished the granite work.

Office Buildings

Rust Building, Washington, D. C., George N. Ray, Architect
Granite State Fire Insurance Building, Manchester, N. H., C. R. Whitcher, Architect
Hudson Observers Building, Jersey City, N. J., John T. Rowland, Jr., Architect
Mutual Benefit Life Insurance Building, Newark, N. J., John H. & Wilson C. Ely, Architect

Bank Buildings

New Hampshire Savings Bank, Concord, N. H., J. D. Leland Co.
Flatbush Savings Bank, Brooklyn, N. Y., Halsey, McCormack & Helmer
Addition, Manufacturers & Traders Trust Co. Building, Buffalo, N. Y., Halsey, McCormack & Helmer and Esenwein & Johnson
Addition, Bethlehem Trust Co., Bethlehem, Pa., Wiegner & Snyder

Public Buildings

Monroe County Courthouse, Rochester, N. Y., John F. Strobel
Hudson County Jail, Jersey City, N. J., John T. Rowland, Jr.
Essex County Hall of Records, Newark, N. J., Guilbert & Betelle
Post Office and Courthouse, Dayton, Ohio, J. Knox Taylor

Churches

Church of the Sacred Heart, Newark, N. J., Neil J. Convery
St. Anne's Church, Hoboken, N. J., Anton L. Vegliante

Memorials

Bayside War Memorial, Bayside, L. I., N. Y., W. W. Knowles
Astoria War Memorial, Astoria, L. I., N. Y., Paul P. Ruehl
James Purroy Mitchell Memorial, New York, N. Y., Thomas Hastings
New York State Monument, Gettysburg, Pa., Edward P. Casey

S. HASKEL & SONS, INC.

Producers of "Shastone" Special Granites

97-115 Harrison Place and 96-114 Ingraham Street

BROOKLYN, N. Y.

Products and Services

"SHASTONE" GRANITES for building exterior work, memorials, mausoleums and monuments.

FOREIGN GRANITES from Norway, Sweden, Finland and Labrador.

GRANITE CUTTING and SHAPING.

POLISHING, a specialty.



"Shastone"

The world's selected granites, foreign or domestic, noted for their beautiful colors, flawlessness, durability and all other fine qualities which make their use adaptable for highest grades of monumental and architectural purposes.

The illustration is a reproduction of the famous American Radiator Building, situated in the heart of New York. The use of "Shastone Black" at the base and first three stories, added so much to the external beauty of this modern cathedral of commerce.

"Shastone" polished granites have demonstrated their ability to resist the action of the elements in any climatical condition, are non-absorptive and non-staining. They are therefore specially commendable for all exterior decorative work and memorials, which are subject to dust and dirt.

The trade-mark shown above is a guarantee for quality and genuineness. Every stone that leaves the firm's yards bears the "Shastone" trade-mark.

Polishing

"Polish Expresses the Beauty of Granite."

It is the genuine polished surface of granite that is the effective means of preservation and preventive of surface deterioration against the action

of the elements and staining from dust and dirt.

Shastone Polishing Plant—Our polishing plant is one of the largest in the world. It is equipped with every imaginable device for the production of a high class polish. Our polishing machines, singularly devised by our engineering department, cannot be surpassed by any other polishing machines in the world and have made it possible for us to bring down the cost of polishing equal to that of ordinary hammering.

The cost of polished granites for exterior decorative purposes which hitherto has been almost preventive has now been decidedly moderated and has therefore popularized their use.

The cost of polished granites for exterior decorative purposes which hitherto has been almost preventive has now been decidedly moderated and has therefore popularized their use.

Colored Granites

We carry in stock both foreign and domestic granites of a large variety of colors (white, black, gray, red, green, etc.).

We are prepared to furnish all details, descriptions, prices and recommendations on the special requirements of any architect or contractor.

Location and Shipments

Conveniently located in Brooklyn, we are able to make prompt deliveries in any quantities, as required. We are also prepared to make shipments to any part of the country. We furnished the granite for numerous buildings all over the United States and Canada.

Architect's Service

We are at all times prepared to co-operate with the architect in his problems and will cheerfully furnish estimates on work contemplated or in construction.



American Radiator Building

RAYMOND M. HOOD, Architect

The exterior work at the base and first three stories of this modern cathedral of commerce is "Shastone" Black Swedish Granite as specified by the architect. It harmonizes and is an integral part of this example of modern structural design

THE DOLBEN QUARRIES

Weymouth Seam Face Granite

DOLBEN & COMPANY

7 Water Street, BOSTON, MASS.

QUARRIES AT WEYMOUTH, MASS.

Products

SEAM FACE GRANITE ASHLAR.

SPLIT FACE GRANITE ASHLAR.

Also, Seam Face Flagging and Stepping Stones; Special Stones for Arches, Lintels and Sills, cut according to drawings; Jambs, Quoins, Steps, Copings, etc., of special sizes for trimming walls faced with ashlar.

Facilities

The facilities of this company are adequate to handle operations of any kind.

Nature of Stone

A true granite of great strength, found in nearly upright sheets of various thicknesses. Seams between these sheets provide faces for the blocks into which the stone is cut. Permanent in texture and color.

Split face granite is produced by splitting blocks after quarrying. Surface is generally a little rougher than seam face. Splits evenly and requires no dressing or pointing.

Colors of Stone

The range of colors is large, with a wonderfully beautiful golden gray predominating.

Colors range from light gray to dark brown and purples. Color of split face granite is warm gray.

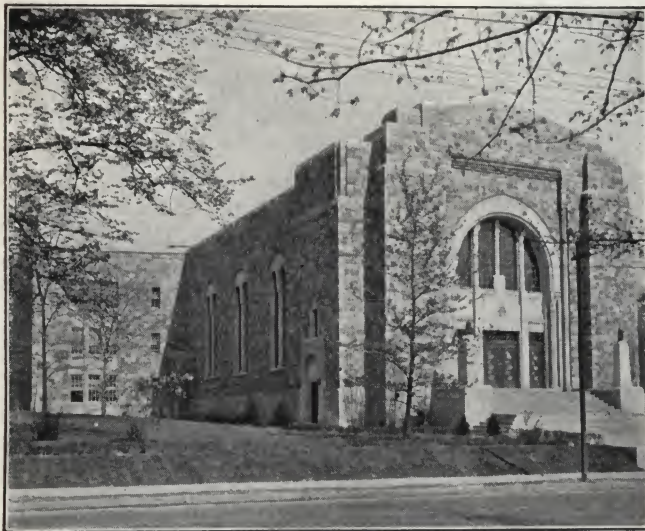
Sizes

The blocks are produced in varying sizes.

The faces range from 5½ to 14½ inches in height, from 8 to 36 inches in length, and from 4 to 8 inches in thickness.

Uses and Cost

The natural stone for churches, country residences and public buildings, it can be obtained in whatever texture and color desired at moderate prices.



Wise Centre Building, Cincinnati, Ohio
FECHHEIMER & IHORST, Architects

Method of Laying

Reference to the illustrations on the following page shows that our seam face granite is especially adapted to three and four-head ashlar work, and equally well to coursed ashlar.

The quarry cost per square foot is the same for either method of laying, but laying cost is lowest for coursed ashlar and highest for three-head.

Estimates and Samples

Estimates and samples are gladly given to architects, owners and contractors, as well as advice regarding style of finish.

Sample walls in seam face and split face ashlar are shown and described on the following page.

Reference Buildings

First Swedish Lutheran Church, Brockton, Mass., Charles C. Coveney, Boston, Mass., Architect

Vincent Astor Residence, Port Washington, N. Y., Delano & Aldrich, New York, N. Y., Architects

First Unitarian Church, Reading, Mass., Adden & Parker, Boston, Mass., Architects

St. Joseph's Church, Bridgeport, Conn., Joseph Jackson, New Haven, Conn., Architect

Blessed Sacrament Church, Worcester, Mass., John W. Donahue, Architect

St. Anthony's Church, Revere, Mass., Edward T. Graham, Architect

St. Mary's Church, Uxbridge, Mass., John W. Donahue, Architect

Holy Cross Cathedral, Holyoke, Mass., John W. Donahue, Architect

Immaculate Conception Church, Holyoke, Mass., D. R. Barbault, Architect

Rectory, Our Lady of Victory, Jersey City, N. J., McKenna & Irving, Architects

First Methodist Church, Rutland, Vt., Woodbury & Stuart, Architects

Church of Our Lady of Angels, Worcester, Mass., George Haynes, Architect

Wise Centre Building, Cincinnati, Ohio, Fechheimer & Ihorst, Architects

Severance Hall, Wellesley College, Wellesley, Mass., Day & Klauder, Architects and Coolidge & Carlson, Associates



First Unitarian Church, Reading, Mass.
ADDEN & PARKER, Architects



Gray Ashlar

With mixture of gray split face ashlar. Any desired color combination can be obtained by apportioning the various shades of seam face and adding a percentage of split face. Gray is the predominating color of the split face granite

Quarry Run Ashlar

Full range of seam face colors, including gray, buff, tan, brown, green and purple



Corner Work

Combination of various colors in seam face and split face granite with limestone

Coursed Ashlar

Selected gray split face granite work



COLD SPRING GRANITE COMPANY, INC.

FORMERLY ROCKVILLE GRANITE COMPANY

Quarriers and Producers of Granite

COLD SPRING, MINN.

QUARRIES: ST. CLOUD GRANITE DISTRICT and MORTON, MINN.

Products

MINNESOTA PEARL PINK GRANITE.
COLD SPRING RAINBOW GRANITE.

Uses

Building facings, doorways, window trim, stairways, sills, flagging, columns, abutments, mantels, fountains and other structural and memorial purposes.

Minnesota Pearl Pink Granite

Pleasing color tones run from black through gray to light shell pink and work well into most color schemes. Hammered finishes produce a warm gray tone.

Physical Properties—Weight, 175 lb. per cu. ft. Crushing strength, 20,000 lb. Modulus of rupture, 2000 lb.

ABSORPTION TEST MINNESOTA PEARL PINK GRANITE
4-23-24 to 4-30-24

Weight air dry, grains	Weight after immersion of one hour, grains	Weight after immersion of one day, grains	Weight after immersion of one week, grains	Total gain in weight, grains	Per cent gain
1944	1945.5	1945.5	1945.5	1.5	.07

The weight is the same after a week as it is after an hour. Gain in weight appears to be due to surface moisture only; no moisture being absorbed.

CHEMICAL ANALYSIS OF MINNESOTA PEARL PINK GRANITE

Silica	62.15%	Lime	2.27%
Alumina	19.41%	Phosphorus .....	.13%
Iron oxide	2.99%	Magnesia	trace

Cold Spring Rainbow Granite

A warm general tone running from dark gray through deep green to flesh pink—an unusually beautiful color combination. No striking contrasts but a perfect blend of varying tones. Exceptional for columns.

Physical Properties—Weight, 185 lb. per cu. ft. Crushing strength, 23,000 lb. Modulus of rupture, 3042 lb.

Qualities

Both granites are extremely hard and take beautiful high polish or rough finishes. Readily decorated and beautiful effects are secured by carving, sand blasting and other methods of ornamentation.

Because of the peculiar natural properties, modern facilities can produce unusually thin slabs for facings. Slabs 1 to 2 in. thick are as durable and as effective as thicker slabs, and reduce freight and handling costs. The 2-in. polished granite show window bases for store fronts originated with this concern.

Both granites endure for ages without losing luster, beauty or finish, and grow more beautiful as time passes. There is no disintegration, scaling or splitting.

Production

Quarries using efficient modern equipment operate the year around. The drilling and broaching system is used instead of blasting, to prevent shattering of stock.

Sizes possible are only limited by the restrictions of railroad transportation.

The plant, largest in the Mississippi Valley, is one of the best equipped in the industry.

Granite is sawed, instead of chiseled or hammered, to prevent disturbance of the crystalline formation.

Step, flagging and base course material can be produced at lower prices with a sawed finish. The result is similar to that of a 4-cut hammer and is more suitable for steps than the slippery finer finishes.

Delivery

Located in the central part of the United States on the Great Northern Railway, shipments can be readily made to any part of the country.

A supply of polished slabs from 1 in. thick up is kept on hand at all times for immediate shipment.

Service

The organization combines men of lifelong experience in the granite and cut stone field with men trained in engineering and architecture. This assures rapid assimilation of the architect's ideas and prompt preparation of setting plans and details.

Sales offices are maintained at Chicago, Cleveland, St. Louis and Minneapolis by direct representatives trained in granite construction work.

Inquiries and requests for estimates, quotations, references and samples are welcomed. A new 26-page folder containing architectural sketches, installations and product information will be sent on request.

Some of the Cold Spring Granite Installations

BUILDING

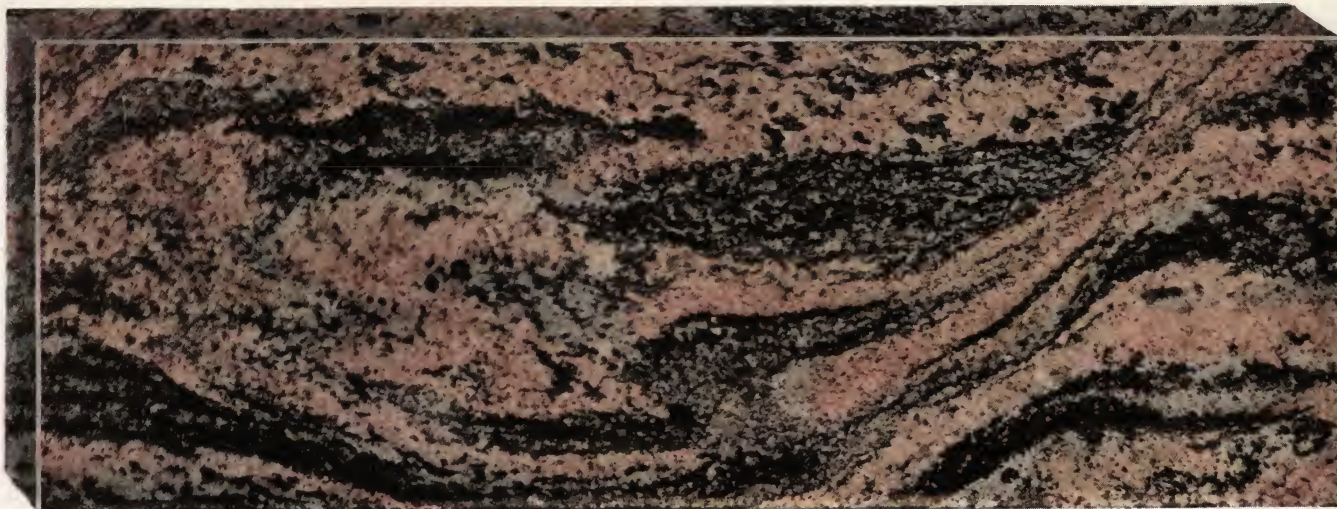
American Insurance Union Building
Commodore Perry Hotel
Baker Building
Builders Building
F. W. Woolworth Co. Store Fronts
McLellan Store Co. Fronts
New Bismarck Hotel
Illinois Market Realty Co.
S. S. Kresge Store Fronts
Young's Market Co. Building
Columbus City Hall
Stearns County Courthouse
Cathedral Rectory Building
Kansas City Life Building
Land Bank Building
Oklahoma State Capitol
Union Central Life Building Annex
Mayo Hotel
Louisiana National Bank
Maccabees Building
Roosevelt Hotel
Federal Reserve Bank
Nebraska State Capitol

LOCATION

Columbus, Ohio
Toledo, Ohio
Minneapolis, Minn.
Chicago, Ill.
84 in United States
35 in United States
Chicago, Ill.
Indianapolis, Ind.
134 in United States
Los Angeles, Cal.
Columbus, Ohio
St. Cloud, Minn.
St. Paul, Minn.
Kansas City, Mo.
Kansas City, Mo.
Oklahoma City, Okla.
Cincinnati, Ohio
Tulsa, Okla.
Baton Rouge, La.
Detroit, Mich.
New Orleans, La.
St. Louis, Mo.
Lincoln, Neb.

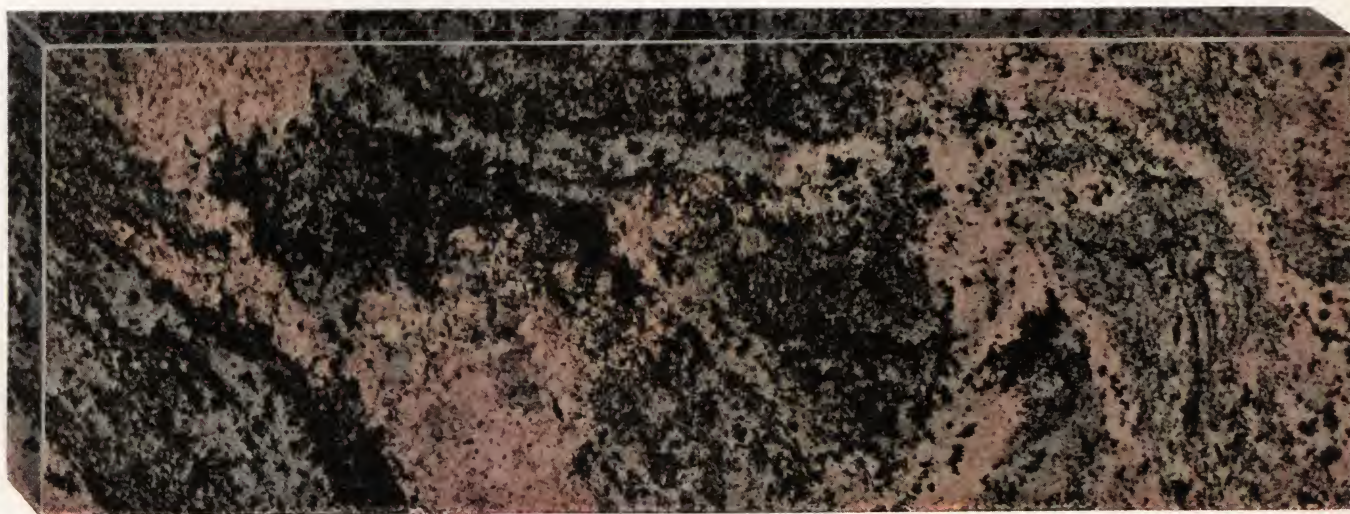
ARCHITECT

C. Howard Crane, Detroit, Mich.
Mills-Rhines, Bellman & Nordhoff, Toledo, Ohio
Larson & McLaren, Minneapolis, Minn.
Graham, Anderson, Probst & White, Chicago, Ill.
Various
Rapp & Rapp, Chicago, Ill.
Rubush & Hunter, Indianapolis, Ind.
S. S. Kresge Co., Detroit, Mich.
C. F. Plummer, Los Angeles, Cal.
Allied Architects Assn., Columbus, Ohio
Toltz, King & Day, St. Paul, Minn.
Maginnis & Walsh, Boston, Mass.
Wight & Wight, Kansas City, Mo.
Keene & Simpson, Kansas City, Mo.
Layton, Smith & Forsythe, Oklahoma City, Okla.
Garber & Woodward, Cincinnati, Ohio
George Winkler, Tulsa, Okla.
Sanguinett, Staats & Hedrick, Fort Worth, Tex.
Albert Kahn, Detroit, Mich.
Favrot & Livaudias, New Orleans, La.
Mauran, Russell & Crowell, St. Louis, Mo.
Bertram G. Goodhue, New York, N. Y.



Polished Finish Rainbow Granite

Showing the beautiful natural colors and veining, reduced to one third the dimension



Polished Finish Rainbow Granite

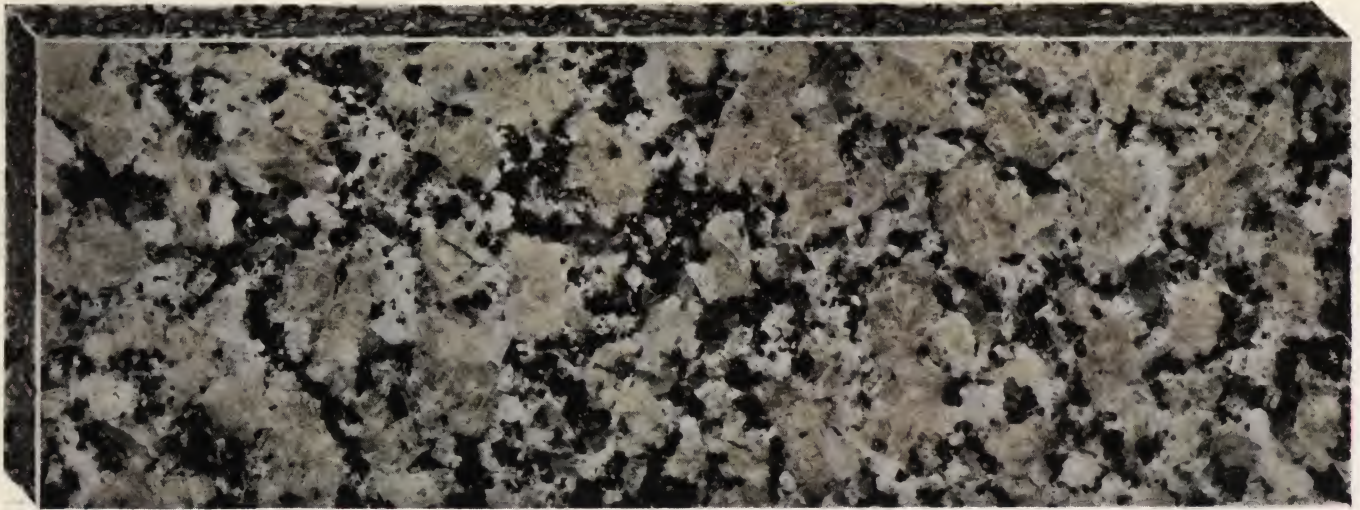
Showing the variety possible in color and pattern, reduced to one third the dimension



Sanded Finish Rainbow Granite

This finish subdues the natural color tones and pattern but still retains the beauty, reduced to one third the dimension

Rainbow Building Granite



Polished Finish Pearl Pink Granite

This finish brings out the detail of coloring, ranging from white to almost dead black through pearl pink with every variety of shading



Sawed Finish Pearl Pink Granite

The subdued color tones and rough finish are preferred by many architects



Sanded Finish Pearl Pink Granite

Smoother than sawed finish and showing slightly more in detail the natural coloring and pattern of the granite

Pearl Pink Building Granite

HARRISON GRANITE COMPANY, INC.

4 East 43rd Street, NEW YORK, N. Y.

WORKS, BARRE, VT.

STUDIOS

CHICAGO, ILL., 809 Fine Arts Building

DETROIT, MICH., 1212 Majestic Building

PITTSBURGH, PA., 6663 Aylesboro Avenue

MINNEAPOLIS, MINN., 3529 Hennepin Avenue

SYRACUSE, N. Y., Syracuse Hotel

Products

MEMORIALS of all kinds in GRANITE, MARBLE and BRONZE, ranging from monumental pieces of public interest to the simplest of private tributes.

Mortuary Art

Individual tastes are as diversified as the art itself but, whether the desired effect is dignified elegance or impressive simplicity, we are truly prepared to serve the best interests of our clients in an efficient and able manner.

Design and Architectural Departments

Wide experience in our field has fitted us to offer design suggestions, sketch studies, etc., and we are glad to co-operate with the architect by placing the facilities of these departments at his disposal.

Construction and Erection Facilities

Eighty years of "knowing how," careful personal supervision, and our complete and extensive cutting facilities enable us to set and maintain a high standard of workmanship and design.

The Harrison plant is electrically equipped and contains all the modern tools and appliances necessary to the production of well-finished, artistic monuments.

Our erection facilities are of the best and this work is entrusted only to those who have demonstrated their ability to grasp and execute the lofty concept of the architect who designed the monument they are to build.



Tribute to the Hon. W. Murray Crane, Former Senator and Governor of Massachusetts
R. H. DANA, Architect



Leeds Mausoleum
JOHN RUSSELL POPE, Architect

PLYMOUTH QUARRIES INCORPORATED

Specialists in Ashlar

755 Boylston Street
BOSTON, MASS.

SHIPPING POINT: EAST WEYMOUTH, MASS.

Products

ASHLAR, in Seam Face and Split Face Granite.

FLAGGING and STEPPING STONES, in Seam Face Granite.

Seam Face Ashlar

The geological formation of our material is unique in that the rock mass has been sheared and tipped, so that it now stands in vertical sheets. The seepage of vegetable and mineral solutions through the seams between sheets has produced a wide range of coloring on the faces of the seams ranging from the natural gray through buffs, tans, yellows, greens and browns to a very dark brown and dusty purple.

By using the face of the seams as the exposed face of the stone in the building, a very interesting texture and coloring is obtained, and since these are the result of natural causes, a permanent and natural effect of age is immediately obtained on new construction together with the feeling of strength characteristic of granite.

The seams in the quarry have in no way affected the strength of the granite, which together with the fact that our granite is practically non-absorptive, make it an ideal building material.

Split Face Ashlar

Our Split Face Ashlar is obtained by splitting the blocks and using the split face as the exposed surface. The texture is somewhat rougher than Seam Face, but is not a rock face in any sense.

Although the variation in color is not as wide as

in Seam Face, the Split Face colorings, ranging from the grays through the light tans and buffs to the light browns, give life and warmth to this material.

Where Seam Face and Split Face Granite Can Be Used

Plymouth Quarries product, both Seam Face and Split Face, can be used for all purposes for which ashlar is suitable: walls, both exterior and interior; jambs; lintels (if not too large); slip sills; steps, etc. See detail drawings on third page following.

Flagging for Indoors and Out and Stepping Stones

Flagging and stepping stones can be obtained only in Seam Face. The surface is sufficiently smooth to be very suitable for both interior flooring and for garden walks, etc., and has all the variety of color of the ashlar.

Allow at least 5 in. for bed and flagging.

Thickness and Height of Ashlar

The beds of the Seam Face and Split Face ashlar are from 4 to 8 in. thick. In height it is generally used from 4 in. to 1 ft. 1 in. rises, though higher rises can be obtained, if desired, in limited quantities.

Cost of Ashlar

The natural seams in this formation together with our organization and equipment enable us to produce a granite ashlar at a minimum cost, so that we can compete with local stone over a very extended area.



Chapel for Mercersburg Academy, Mercersburg, Pa.

CRAM & FERGUSON, Architects
JACOB & YOUNGS, Builders
Setting of ashlar and trim by PLYMOUTH QUARRIES INCORPORATED



Harkness Quadrangle, Yale University, New Haven, Conn.

JAMES GAMBLE ROGERS, Architect
MARC EIDLITZ & SON, Builders

No. 15 Seam Face and Split Face

Three and four-head work with splay joints using about half small stones; half split face and half seam face, with a wide variety of color if desired

**No. 6 Seam Face Ashlar of a Rough Face with 15% Split Face**

Replica of Harkness Memorial, Yale University. Interrupted course ashlar. James Gamble Rogers, Architect.

Colors: gray, tan, buff, dull purple, brown, yellow

No. 2 Seam Face Ashlar of a Very Smooth Surface

Three-head work with splay joints.

Colors: gray, tan, buff, dull purple, brown, yellow. Can be restricted if desired

**No. 3 Coursed Ashlar with a Few Interruptions**

A very wide range of color which may be restricted if desired



**No. 5 Sappy Split Face Laid
in Interrupted Course
Ashlar**

Of a true surface, no projections over 1 in.

Replica of St. Vincent Ferrer Church, New York, N. Y., Bertram G. Goodhue, Architect.

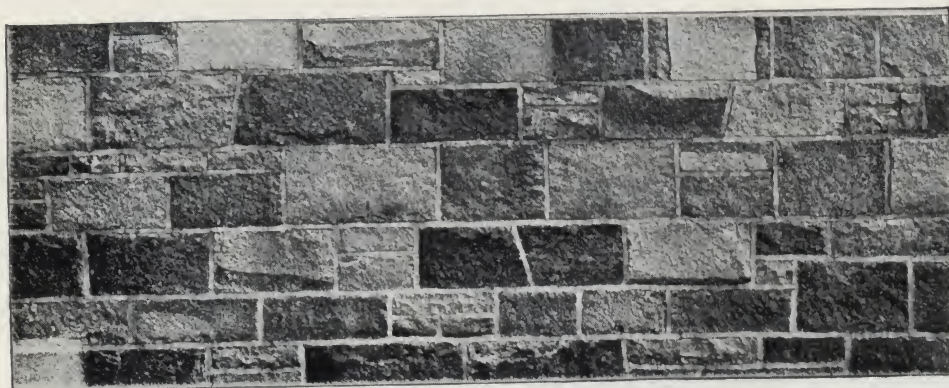
Colors: Several shades of brown

**No. 7 Split Face Sappy,
Gray and Sappy and
Gray Mixed**

Coursed with occasional interruptions. True split face, projections not over 1 in.

Replica of Church of the Sacred Heart, Jersey City, N. J., Cram & Ferguson, Architects.

Colors: gray and several shades of brown



**No. 10 Split Face in Varied
Courses of a Rough
Texture**

Projections to 1½ in.

Colors: gray and various shades of brown

References

The following are a few of the buildings where our material has been used:

Harkness Quadrangle, Yale University, New Haven, Conn., James Gamble Rogers, Architect

Lawyers' Club and Dormitory, Ann Arbor, Mich., York & Sawyer, Architects

Jefferson Avenue Presbyterian Church, Detroit, Mich., Smith, Hinchman & Grylls, Architects

Swedenborgian Church, Bryn Athyn, Pa., Bryn Athyn Studio, Architects

Temple Beth-El of Borough Park, Brooklyn, N. Y., Shampman & Shampman, Architects

St. Mary's Church, Stamford, Conn., O'Connell & Shaw, Architects

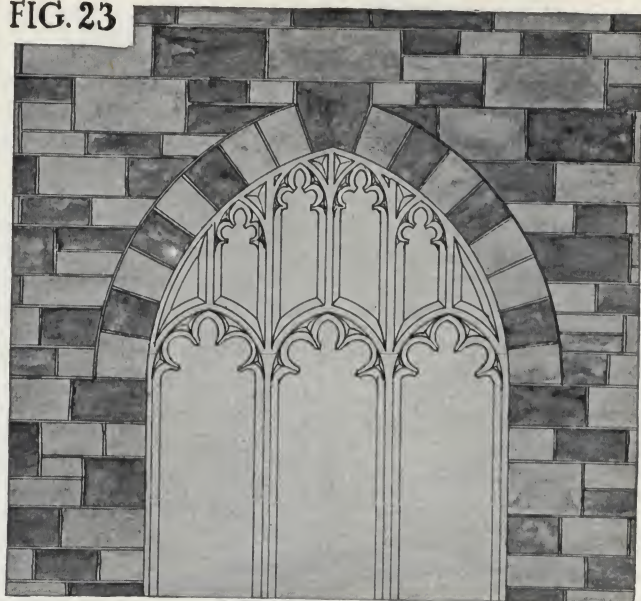
Queen of the Holy Rosary Cathedral, Toledo, Ohio, Comes, Perry & McMullen, Architects

Epworth-Euclid Methodist Episcopal Church, Cleveland, Ohio, Bertram Grosvenor Goodhue Associates, Architects

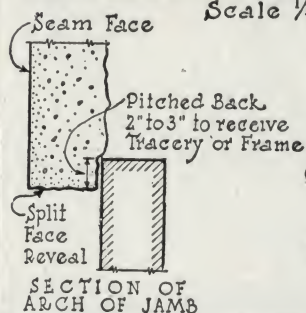


**Split and Rock Face. Colors: Gray to Sappy.
Three and Four-head Work
with Splay Joints**

FIG. 23

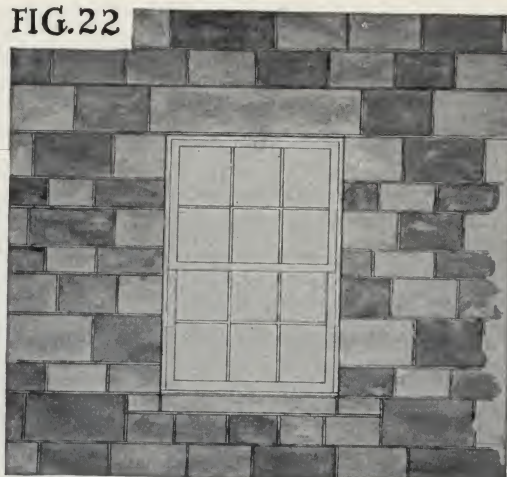


Scale $\frac{1}{4}$ " equals 1 Ft.

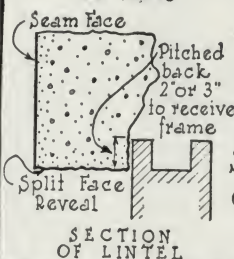
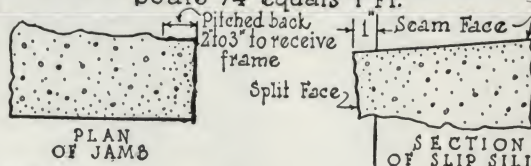


SHOWING USE OF
PLYMOUTH SEAM
GRANITE FOR JAMBS
AND ARCHES.
ASHLAR COURSES OF
VARIOUS RISES

FIG. 22

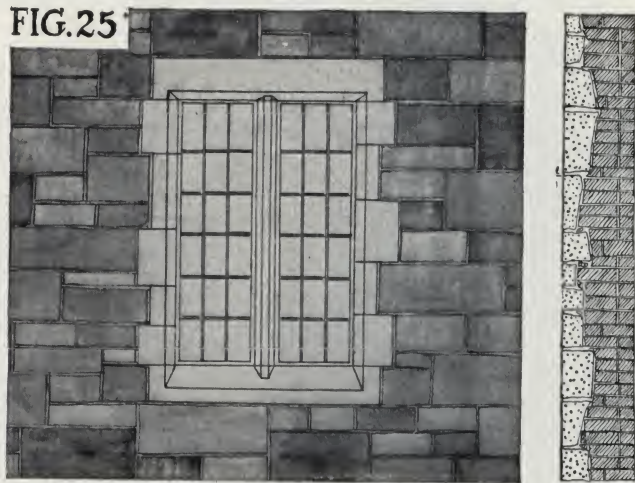


Scale $\frac{1}{4}$ " equals 1 Ft.



SHOWING USE OF
PLYMOUTH SEAM
FACE GRANITE FOR
SILLS JAMBS & LINTELS.
COURSES OF VARIOUS
RISES

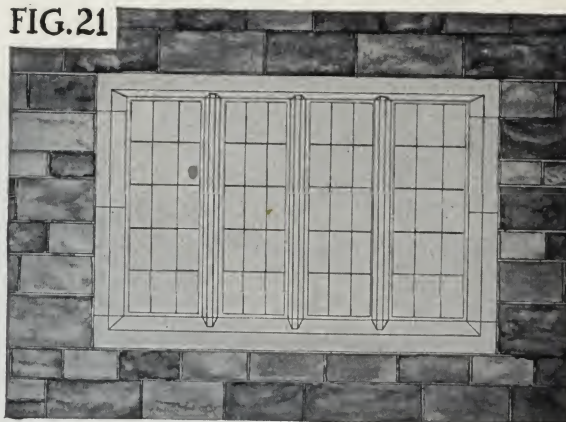
FIG. 25



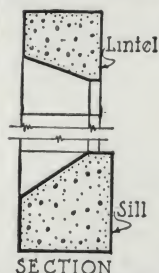
Scale $\frac{1}{4}$ " equals 1 Ft.

SHOWING USE OF PLYMOUTH
SEAM FACE GRANITE FOR
THREE AND FOUR HEAD WORK
BEDS FROM 4 IN. TO 8 IN. - NOT 4
IN. AND 8 IN.

FIG. 21



Scale $\frac{1}{4}$ " equals 1 Ft.



TYPE OF CUT STONE
TRIM SOMETIMES USED
WITH PLYMOUTH SEAM
FACED GRANITE.
COURSES OF VARIOUS
RISES

PLYMOUTH
QUARRIES
INCORPORATED

VARIOUS TREATMENTS OF WINDOWS IN WALLS OF
PLYMOUTH QUARRIES SEAM & SPLIT FACE ASHLAR

SCALE $\frac{1}{4}$, $\frac{3}{4}$ & DRWG
 $\frac{3}{8}$ IN. = 1 FT.
DATE AUG 24 1

DUNCAN RUSK CORP.

Quarriers, Producers and Setters of Granite

WEST TOWNSEND, MASS.

Products

SPLIT FACE GRANITE ASHLAR.

WEST TOWNSEND PINK GRANITE for all building work of any size.

Also Seam Face Granite Ashlar.

Split Face Granite Ashlar

This material, specially suited for exteriors of churches and residential work, is produced in a variety of colors from gray to pink and brown, and when set in the building bears a warm tone. This material taken as the run of the quarry makes a very fine color combination.

West Townsend Pink Granite for Building Work

Takes a fine hammer and finish with a slight pink cast. It is specially suitable for all work where a warm toned granite is desired.

The quarries have been under continuous operation since 1900 and an unlimited supply is in sight, with a complete and efficient plant for the production of any size job.

Special Service for Architects

We are equipped to serve architects who desire special designs and color combinations in their work.

An efficient corps of stone masons is continually in our employ for setting our products complete in the job. These men are trained in the setting of West Townsend granite. In furnishing and setting our own materials direct in the job we can produce more nearly the architect's ideas and, at the same time, save on outside costs. We will be ready to furnish prices and consult with architects at any time.

Properties

An analysis of West Townsend granite as made by the United States Department of Agriculture is:

Silicate of alumina and potash	45.6%
Silica	24.0%
Silicate of alumina, lime and soda	16.0%
Hydrous silicate of alumina, iron, magnesia and potash	7.4%
Hydrous silicate of alumina	7.0%

Crushing strength, 25,500 lb. per sq. in.

100.0%



Park Avenue Baptist Church, New York, N. Y.

ALLEN & COLLENS, Architects

A List of Some Important Buildings in Which West Townsend Granite Was Used

Cut Granite

Massachusetts Institute of Technology Group, Cambridge, Mass.
 Thames National Bank Building, Norwich, Conn.
 Post Office, Rumford, Me.
 Teachers College Library, New York, N. Y.
 Paterson High School, Paterson, N. J.
 Stuyvesant Monument, Jersey City, N. J.
 Junior High School, Albany, N. Y.

Split Face Ashlar

Methodist Episcopal Church, Upper Montclair, N. J.
 St. Paul's Church, Newburyport, Mass.
 Tabernacle Church, Salem, Mass.
 Our Lady of Sorrows Church, Hartford, Conn.
 Second Universalist Church, Boston, Mass.
 Glendale M. E. Church, Everett, Mass.
 St. Thomas's Church, Hartford, Conn.



Second Congregational Church, West Newton, Mass.
 ALLEN & COLLENS, Architects



Thames National Bank, Norwich, Conn.
 ROWE & KEYES, Architects



Andover Theological Seminary at Harvard University, Cambridge, Mass.
 ALLEN & COLLENS, Architects

ESTABLISHED 1874

PERRY BROS. GRANITE CO.

Designers, Quarry Operators and Cutters of Concord Granite

CONCORD, N. H.

BOSTON, MASS., Little Building
 CHICAGO, ILL., 155 No. Clark Street
 WASHINGTON, D. C., P. O. Box 4013

DETROIT, MICH., 2539 Woodward Avenue
 NEW YORK, N. Y., Room 2843-A, Grand Central Terminal Building
 PHILADELPHIA, PA., 1121 Fillmore Street

CINCINNATI, OHIO, 602 Mercantile Library Building
 CLEVELAND, OHIO, Hunkin-Conkey Building

Concord Granite

Composition—A holocrystalline, granular rock composed of quartz, a potash feldspar, and muscovite-biotite (potassium and magnesium iron mica). The feldspar crystals being very small, the granite is of very fine grain.

Color—The color of the granite is blue gray, the shade being determined by feldspars in the quarry.

Quality and Usage—Being of a very fine grain and of especially high quality, Concord granite is primarily used for buildings of artistic merit and imposing design, such as memorials, public buildings, mausoleums and other structures of a permanent character.

Production—The cutting plant—one of the largest and best equipped in the United States—is located near our quarries at Concord, N. H., enabling us to turn out large quantities of polished, dressed and rough granite in a comparatively short length of time.

Shipping Facilities—We are located on the Boston & Maine R. R., with connections with the Boston & Albany R. R., the Central Vermont Ry., and the New York, New Haven and Hartford R. R., thus making possible the shipping of our granite to any part of the United States and Canada.

Advice on Proposed Work

Our designers will be glad to consult with you regarding the cutting of designs and the reduction of cost.

Unnecessary expense may be avoided by considering the finish of the stone for different parts of a building and the adaptability of design to cutting methods generally employed, depending on the location and the exposure of the granite to smoke and dirt, and its position as regards visibility to the public eye.

Estimates and samples gladly submitted on request.



One of the Largest Granite Contracts Furnished in 1926—Drexel Bank Building, 15th and Walnut Streets, Philadelphia, Pa.

PERRY BROS. GRANITE CO., Granite Manufacturers
 DAY & KLAUDER, Architects, and DOYLE & Co., General Contractors, Philadelphia, Pa.

AMERICAN BLUE STONE COMPANY

Producers of Genesee Valley Blue Stone

101 Park Avenue
NEW YORK, N. Y.

QUARRIES AND MILLS: AMBLUCO, WYOMING CO., N. Y.

Products

GENESEE VALLEY BLUE STONE, a New York State blue stone for architectural exterior and interior building construction.

For AMBLUCO Non-slip Treads, Landings, Flooring, Thresholds and Wall Base for interior and semi-interior uses, see pages A677-679.

Facilities

This company was organized and opened its first quarry in 1899, now having well developed quarries on its own property of about 200 acres located at Ambluco, Wyoming County, N. Y. The blue stone is taken out to a depth of 100 ft. from the top of the ground.

Mills and yards are equipped with the most modern machinery so that large volumes of business can be shipped without delay. This blue stone is handled by dealers in principal cities east of the Mississippi River. Samples are displayed with the Architects Samples Corporation, 101 Park Ave., New York.

Genesee Valley Blue Stone

Color and Texture—A distinctive uniform shade of light blue, blending well with adjacent light colored surfaces, or giving a sharp clean contrast with dark materials. It is of a fine grain and even texture, being made up mostly of pure hard quartz as shown below.

MINERALOGICALLY CONSIDERED

Fine hard sand, mostly quartz.....	70%
Clay, as binding material.....	28%
Water	2%

In this blue stone, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface, which makes the stone slip-proof and very durable. Besides the rust-proof, non-porous, dustless and sanitary qualifications, it is quiet to walk on.

Strength, Weight and Fire Resistance—Few, if any, stones have a greater crushing and transverse strength than this blue stone. Likewise, the stone has high tensile and shearing strengths.

The following table gives its crushing strength, as compiled from tests made by the United States Ordnance Department:

CRUSHING STRENGTH

Rockport granite (Kidder's Hand Book) ..	17,750 lb. per sq. in.
Vermont marble	Average 13,500 lb. per sq. in.
Genesee Valley blue stone	19,970 lb. per sq. in.

Although of great density it weighs only approximately 150 lb. per cu. ft. when cut ready to set.

It offers great resistance to extreme heat, and the dielectric strength test is among the highest of all natural stones.

Durability—Specimens of this blue stone have been critically and carefully analyzed by eminent mineralogists and pronounced one of the most durable of all stones. In abrasive tests it excels most other stones. Like all stones, it should be cut to set on its natural bed.

It is said by one who has been in the business all of his life and who has made careful study of the stone

edifices in Europe, that this Genesee Valley Blue Stone is very much the same as the stone in the architecturally famous stairway of the court in the Bargello Palace, Florence, Italy.

CHEMICAL ANALYSIS

Silica	76.50%
Alumina	14.75%
Oxide of iron	6.35%
Water	2.00%
	99.60%

Adaptability—This blue stone has substantially all the good qualifications of the old genuine North River blue stone which has practically been out of the market since 1912, and has several advantages over such blue stones of the reedy rock character. Genesee Valley Blue Stone is a liver rock and does not produce natural split flagging and curbing. The sheets of stone in these AMBLUCO quarries, being of unusually low levels, represent early deposits and are, therefore, much harder and more compact than stone quarried from higher levels. The quarry blocks are from 2 to 4 ft. thick, permitting ashlar and base courses to be set on the natural bed with face against the grain, which condition rarely or never exists with other blue stones.

Cutter and Sawed Face Ashlar

Even more artistically effective than seam face granite, cutter face (vertical seam face) blue stone ashlar has been worked into buildings of the early American farm house and English Tudor styles. The cutter faces are permanently and beautifully stained many colors and soft shades, producing an old tapestry design when laid random. Also the combination of sand sawed and shot sawed faces furnishes a pleasing relief from the smooth planed and rubbed finishes.

Foundation Beds, etc.

Genesee Valley Blue Stone is unexcelled for engine, motor, pump, etc., foundation caps.

It is also especially good for shelves and uprights of underground vaults. Garden seats and sundials are frequently made of it.

Specification Suggestions for Exterior Use

It is essential that Genesee Valley Blue Stone be specified, and better to guard against the substitution of inferior blue stones, mention this company's name and address as producers.

Specifications should require all blue stone (as well as most other stones) to be thoroughly seasoned and to be cut so as to set on its natural bed, especially when used for grade courses.

The practical finishes, in order of their costs are: Sand sawed; shot sawed; rock face; wet sand rubbed; fine axed (6-cut); horizontally (machined) tooled; and vertically (hand) tooled. This blue stone also takes most any finish applied to a natural stone. The sand sawed finish, showing no saw marks, is very uniform and brings out the character of the stone. This is produced by a slow process and does not burn or bruise the surface of a stone as does planing and axing.

Co-operative Service

Our organization, through its members' lifelong experience with blue stone, offers its knowledge in an impartial manner, unbiased by thought of personal profit.

THE BRIAR HILL STONE CO.

Producers of Golden Buff and Variegated Sandstone
GLENMONT, OHIO

Briar Hill Golden Tone Sandstone

Briar Hill Golden Tone Sandstone—rough blocks, semi-finished, or cut and carved ready to set in accordance with plans and specifications.

Readily available in practically every locality.

Varieties—Golden Buff, Light Variegated and Dark Variegated, or in any desired combination.

A wonderful range of colors, all tinged with a beautiful subdued golden tone.

Adaptability—Suitable for all classes of buildings, both for interiors and exteriors; effective as trim for seam face granite, field stone, brick or stucco, and especially adapted to gothic architecture, because of its easy working qualities.

Durability—Briar Hill Sandstone is permanent in texture and color. Positive proof of this is offered by an old church at Glenmont, illustrated below. Built of stone from this quarry in 1857, the original tool marks remain clean cut and sound. Age merely mellows the beauty of this colorful stone.

Physical and Chemical Properties—Results of physical and chemical analyses, compression, freezing and absorption tests gladly furnished on request.

Quarry—Our vast quarry holdings insure a practically unlimited supply of this stone. Production is 50% golden buff, 30% light variegated, 20% dark variegated. It can be furnished in any height for column drums, etc.

Facilities—Our quarry and mill are thoroughly equipped with modern machinery, capable of handling



any size project. Prompt, efficient execution of contracts assured at all times.

Price—Although distinctive and yielding infinite color resources to the architect's skill, Briar Hill is reasonable in cost. It is, therefore, economically available for all classes of buildings.

References

Some representative buildings (with architects) in which Briar Hill Sandstone has been used:

Harkness Memorial Quadrangle, Yale University, James Gamble Rogers Washington Loan & Trust Co., West End Branch, Washington, D. C., Arthur B. Heaton
Mecca Temple, New York, N. Y., J. K. Knowles Estate and Clinton & Russell
Robert Law, Jr., Residence, Port Chester, N. Y., James Dwight Baum
First National Bank, Boston, Mass., York & Sawyer
Leonard Hall, Kenyon College, Gambier, Ohio, Abram Garfield
Trinity College, University of Toronto, Toronto, Ont., Darling & Pearson
Seaboard Airline Railway Office Building, Norfolk, Va., Neff & Thompson
President's Residence, Ohio State University, Columbus, Ohio, Jos. N. Bradford
Sacred Heart Church, Pittsburgh, Pa., Carlton Strong
St. Paul's Cathedral, St. Paul, Minn., Maginnis & Walsh
M. M. Van Beuren Residence, Middletown, R. I., H. T. Lindeberg
First National Bank Building, Charlotte, N. C., Lockwood, Greene & Co.
Olivet Institute, Chicago, Ill., Perkins, Fellows & Hamilton
Central Farmers Trust Co. Bank, West Palm Beach, Fla., Arthur Loomis Harmon
University of Detroit, all buildings on new campus, Malcomson & Higginbotham
Edsel Ford Residence, Detroit, Mich., Albert Kahn
Alfred G. Wilson Residence, Rochester, Mich., Smith, Hinchman & Grylls
Harkness Hall, Yale University, Delano & Aldrich
W. E. Scripps Residence, Randall Beach, Mich., Clarence E. Day
Immaculate Conception Church, Waterbury, Conn., Maginnis & Walsh
Fordson High School, Fordson, Mich., H. J. Keough
Temple Beth Israel, Portland, Ore., Herman Brookman & Morris H. Whitehouse
Wardman, Shannon & Luchs Office Building, Washington, D. C., Arthur B. Heaton
Academy of Medicine, New York, N. Y., York & Sawyer
Stuart Duncan Residence, Newport, R. I., John Russell Pope

Herbruck Residence, Canton, Ohio

MEADE & HAMILTON
Architects



Corner Stone
Old Church,
Glenmont, Ohio



Cataract National Bank, Niagara Falls, N. Y.

SIMON & RUSSELL LARKE
Architects



Chevy Chase Savings Bank, Washington, D. C.
ARTHUR B. HEATON, Architect



Edward F. Fisher Residence, Detroit, Mich.
RICHARD H. MARR, Architect

The Briar Hill Stone Company



Sewickley Library, Sewickley, Pa.
H. D. GILCHRIST, Architect



Residence of Bishop Michael J. Gallagher, Detroit, Mich.
MAGINNIS & WALSH, Architects



Entrance Detail—Harkness Quadrangle, Yale University
JAMES GAMBLE ROGERS, Architect



Trinity Chapel, Washington, D. C.
MAGINNIS & WALSH, Architects



Madison Hotel, New York, N. Y.
ROUSE & GOLDSTONE, Architects



Federal Reserve Bank, New York, N. Y.
YORK & SAWYER, Architects



Briar Hill Golden Buff
Color Illustrations about 1/6 actual size



Mecca Temple, New York, N. Y.
CLINTON & RUSSELL, Architects



Briar Hill Dark Variegated



Briar Hill Light Variegated

A. BRAZOS & SONS, INC.

SUCCESSORS TO THE BRAINERD, SHALER & HALL QUARRY COMPANY

Quarriers of Portland Brown Stone

OFFICE

MIDDLETOWN, CONN.

QUARRIES: PORTLAND, CONN.

Time Has Tested Portland Brown Stone

Contrary to the generally accepted belief, Connecticut Brown Stone is a very enduring stone. When laid on its natural bed its life is equal to that of any building stone. It is infinitely more durable than most of the so-called monumental stone.

The old Connecticut State House at Hartford, Conn., now used as the city hall, was designed by the illustrious Bulfinch and erected in 1794. Portland Brown Stone was used for the first story and as trim for the rest of the building. The stone in this building after withstanding the elements for 130 years, is in excellent condition, even the tool marks are clearly apparent.

Fire Resisting Qualities of Portland Brown Stone

Portland Brown Stone, in common with sandstone generally, is very little affected by extreme heat. Heat that would spall and check the surface of other stones does not affect Brown Stone.

The Flood residence on Nob Hill, San Francisco, Cal., one of the most imposing of the older San Francisco mansions was erected in 1884 of Portland Brown Stone. During the fire following the great earthquake this building was completely gutted, only the walls remained standing. How well the Portland Brown Stone walls withstood the extreme heat of this conflagration is demonstrated by the fact that in rebuilding it was only necessary to clean down the walls—the stone itself was not in any way damaged by the extreme heat of the fire. The building is now occupied by the Pacific Union Club.

With the Proper Use of Portland Brown Stone Fine Architectural Effects Can Be Obtained

Brown Stone can be used very effectively with the better grades of common brick and any face brick of the proper color, to obtain exteriors of character, beauty and refinement.

By mixing a small percentage of white stone with Portland Brown Stone rubble walls of striking beauty have been obtained. Fine examples of walls of this character can be seen in several attractive residences recently erected in Hartford, Conn.

For college buildings, schools, institutions and other permanent buildings erected in the country or suburbs where there can be effective floral treatment, buildings faced entirely of Brown Stone can be used with excellent effect. The light reddish brown tone of Portland Stone blends well with colors found in nature.

Physical Properties of Portland Brown Stone

Portland Brown Stone is a sandstone of uniform reddish brown color. The texture is medium to fine.

Its crushing strength as determined by U. S. Government Tests is from 13,980 to 15,020 lb. per sq. in. Its specific gravity is 2.35 and its ratio of absorption 1 to 40.

CHEMICAL ANALYSIS

Silica	70.11
Aluminum	13.49
Iron Oxide.....	4.85
Manganese .....	.35
Lime	2.39
Magnesia	1.44
Soda, Potash, etc.....	7.37

Facilities

Ample stocks of thoroughly seasoned Brown Stone are always kept on hand. Stone is not quarried after October—winter orders being cared for by stone quarried in the summer.

There is a large mill located at the quarry, where stone may be sawed, planed, rubbed, etc., or it may be cut ready to set in the building.

Shipments can be made by rail or water.



One of a Group of Buildings at Wesleyan University, Middletown, Conn., Built of Portland Brown Stone

BOSTON ACOUSTICAL ENGINEERING COMPANY

46 Cornhill
BOSTON, MASS.

Products

Materials for Acoustic Correction and Sound Insulation:

"SILEN-STONE"—a decorative Artificial Stone Tile or Slab with a high coefficient of sound absorption.

For "Acoustex"—a sound absorbing slab for acoustic correction, see page A15; for "Trimount" Sound Proof Doors and Folding Partitions, see page B1131.



Baeco Products

Silen-Stone—A Decorative Tile for Acoustical Treatment

Silen-Stone is a decorative artificial stone with a high coefficient of sound absorption. It is a handsome material that can be used not as an imitation of some natural stone but because of its own inherent beauty.

Composition—Silen-Stone is a lightweight, fireproof masonry material composed of sand and portland cement, and because of its very porous nature, possesses high sound absorbing value. Due to an unique process, Silen-Stone contains globular cells of various sizes. These cells make up 60% of the volume of the material.

Texture—In appearance Silen-Stone is absolutely new and different. The accompanying illustration shows the texture of Silen-Stone much better than it can be described by words. The texture may be varied somewhat by increasing or decreasing the size and number of cells, also by the method of dressing the surface. One of the most desirable features of Silen-Stone is the ease with which it can be cleaned, without destroying or altering its acoustic efficiency in the slightest degree.

Color—Silen-Stone is furnished in any color or degree of color obtained by the use of mineral coloring matter. Colors are varied to meet architect's individual requirements.

Sizes—Silen-Stone is furnished in tiles or slabs $1\frac{1}{8}$ in. in thickness and in various sizes up to 22x30 in. to meet the architectural requirements of any particular installation. The tiles are easily cut to any required shape or size.

Reinforcement—Silen-Stone is reinforced by heavy wire mesh, preventing damage by handling, and eliminating danger of cracking of the tile after it is in place.

Application—Silen-Stone is set in the same manner as any other tile. Special care is used in its manufacture to assure a satisfactory bonding surface.

For application to masonry it should be bedded in portland cement mortar.

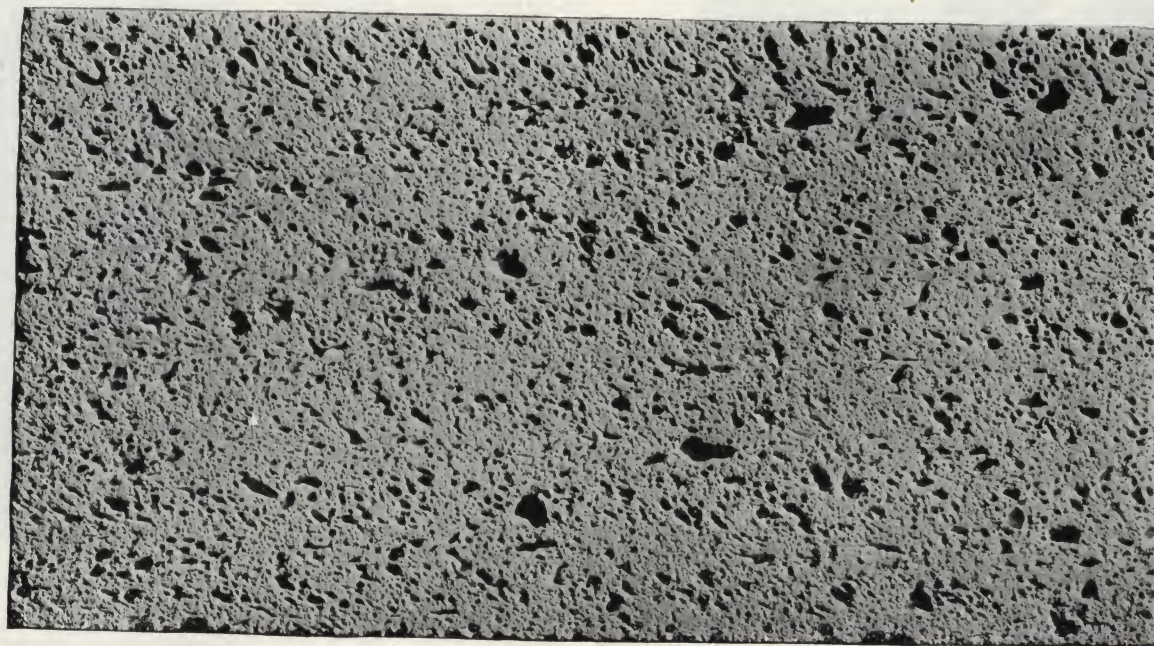
Acoustics

The following excerpt from "Acoustics of Buildings," by F. R. Watson, Professor of Experimental Physics, University of Illinois, adequately describes "Silen-Stone" an "acoustic tile," now at the disposal of architects, after several years of research and experimentation:

"Masonry material with acoustic absorption is very desirable because of its fireproof and verminproof qualities."

"To be effective, any such material must have pores open to the sound, in which the energy is damped out, by friction into heat."

"There appears to be a need for a presentable, fireproof material that has considerable sound absorption, is no more expensive than other building materials, can be installed easily, and can be cleaned without greatly impairing its acoustic efficiency."



An Unretouched Photograph of Silen-Stone

THE DECORATIVE STONE CO.

Producers of Highest Quality Cut Cast Stone

PLANT

Chapel Street and Blatchley Avenue
NEW HAVEN, CONN.

Product

DEXTONE—a manufactured Building Stone of great strength and durability. It possesses many individual characteristics which make it a preferred stone either for trim in conjunction with brick or rough stone, or for entire buildings. It has been extensively used in this manner for bank buildings.

Experience and Capacity

This company has been a pioneer in the development of cast stone, employing original methods and specially devised machinery to insure high quality.



Entrance of Roosevelt High School, Yonkers, N. Y.

G. HOWARD CHAMBERLIN, Architect
Executed in Dextone Hudson gray buff

The personnel of the management is rich in practical experience and commands the facilities and an organization ample to handle orders of any size or importance. A private railroad siding expedites carload shipments.

Scientific Methods

There are two most vital elements in the making of cast stone:

- (1) The selection of the ingredients and the exact proportioning of them.
- (2) The finish or cutting of the stone.

This company has invested no small amount of time and money in devising equipment designed to control the quality and the proportioning of the ingredients used.

Marble aggregate, portland and white cement and a high grade integral waterproofing are the principal ingredients. The marble is carefully selected for its

DEXTONE

TRADE-MARK

hardness and transparent whiteness. It is crushed in the company's own crushing plant and screened to various sizes by means of electric vibrator screens.

In this costly, but vitally important step, all dust particles are removed. This of course is not accomplished when marble direct from the crusher is used. A stone in which dust has been used loses the cleancut rocklike appearance which is an outstanding characteristic of Dextone.

Careful screening of aggregate and accurate proportioning of sizes is the only effective guarantee against crazing or surface checking.

In line with the most advanced practice, the water content is controlled automatically.

The mass is mixed for not less than five minutes and then kept constantly agitated until poured in the moulds. This is essential in the wet-poured process.

A minimum of two weeks time is allowed for curing under conditions which prevent too rapid evaporation of water.

All pieces are cast oversized and then cut to exact profile and dimension by carborundum cutting planers and rubbing machines. This method, although more costly than other methods, is absolutely necessary in the production of high gradecast stone. Otherwise the sharp arrises, true profile, exposure of aggregate, and other characteristics of cut stone work are lost.

These same cutting operations are necessary regardless of the ultimate surface treatment.

Drawings and Models

Upon receiving an order, setting drawings at large scale, correctly interpreting the architect's plans and showing the jointing and relative position of the units, are submitted for approval. Suggestions are often made for the better use of the material but no liberties are taken without securing special permission.

Models for ornamental work are made in the company's own studio and can be approved at the plant in conjunction with the modeler or by photograph.



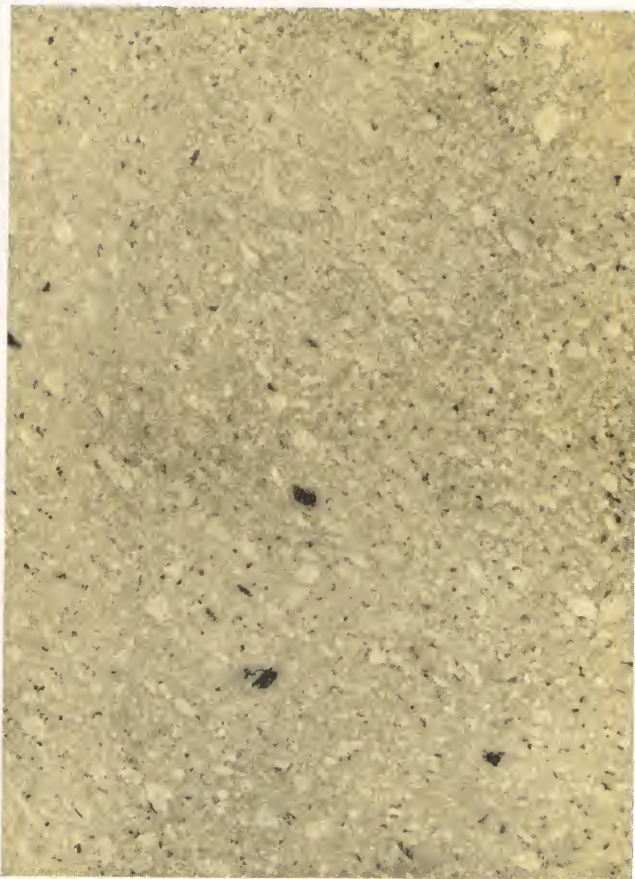
Memorial Tower, Hartford Seminary Foundation

ALLEN & COLLENS, Architects
Showing use of Dextone Indiana buff for intricate Gothic details

Finishes

Dextone is finished in the same way as any quarried product, such as planer rubbed, honed, machine groove tooled, bush hammered or axed, crandalled, pointed, etc.

Rubbed and honed finishes and machine groove tooling are machine operations and are less expensive than the hand finishes, such as bush hammered, crandalled, etc. The selection and suitability of each is largely a matter of taste and cost.



Dextone—Ohio Variegated

Color

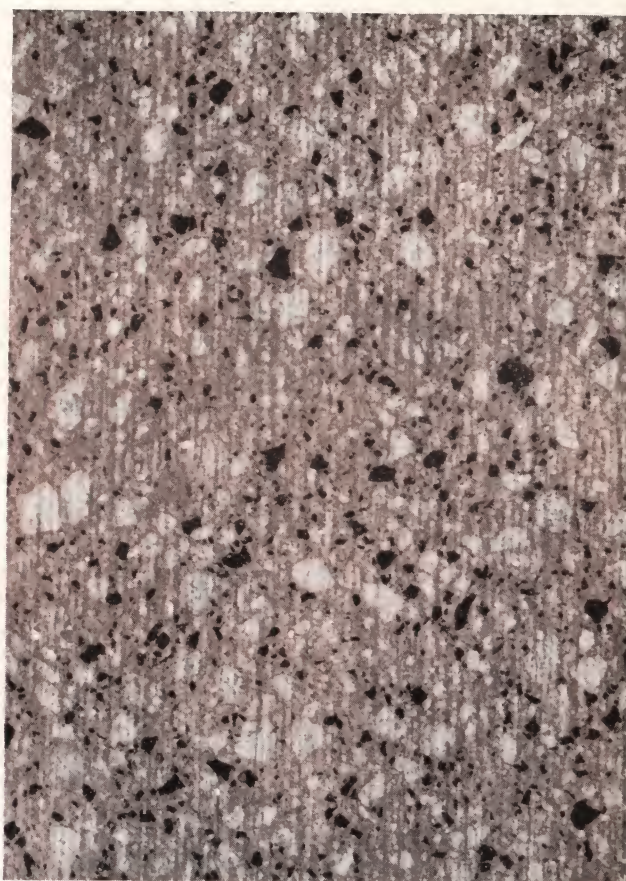
Color effects are produced in Dextone by the use of non-fading mineral color pigments. Brilliant colors are impracticable, but in all the softer colors, especially buffs and reds, the range is practically unlimited. Two samples of Dextone are here shown: Ohio variegated and Connecticut pink.

Other varieties of Dextone now in demand are Vermont white, Kentucky light gray, Hudson gray buff, Indiana buff, and Pennsylvania black.

Specifications for Dextone

The essential points to cover in a specification for cut cast stone are as follows:

- (1) Aggregates must be sized by screening and proportioned to produce maximum density. Crusher run aggregate not allowed.
- (2) Must be made by the wet-poured process and in sand moulds.
- (3) Stone must be of the same composition throughout and not faced.
- (4) Mixed materials must be constantly agitated until placed.
- (5) All stone must be made at least $\frac{1}{4}$ in. oversize on exposed surfaces, and then cut to correct size.



Dextone—Connecticut Pink

(6) Cover setting thoroughly as poor setting will ruin any stone job.

(7) Quotation to be based on Dextone Vermont White with hand bush hammered finish, manufactured by THE DECORATIVE STONE CO. (Substitute here other color or finish if desired.)

State amount added or deducted and name of manufacturer in case other make is estimated.

Note: In this specification no mention has been made of sand finish, acid treated, brushed or any other finish which cannot be properly classified as cut cast stone. Buyers should be aware that these finishes are often sold in competition with cut cast stone.

A member of this company's technical staff will be glad to assist architects and builders with any problems relative to cost or construction.

Dextone Is Good Cast Stone Because

It is made by the method recommended in the essential points of the cut cast stone specifications:

- (1) Screened and graded aggregate.
- (2) Wet poured process in sand moulds.
- (3) Made oversized and machine cut.
- (4) Cured for not less than two weeks.

Representative Work, Location and Architect

Hartford Seminary Foundation, 6 buildings, Hartford, Conn., Allen & Collens, Architects
Isolation Building, Municipal Hospital, Waterbury, Conn., Cross & Cross, Architects
Stratfield Hotel, Bridgeport, Conn., Monks & Johnson, Architects
Montauk Beach Office Building, Montauk, N. Y., Schultz & Weaver, Architects
Roosevelt High School, Yonkers, N. Y., G. Howard Chamberlin, Architect
St. Mathew's Lutheran Church, White Plains, N. Y., Cherry & Matz, Architects
Seaside Bank, Seaside, L. I., N. Y., Holmes & Winslow, Architects

PLASTIC PRODUCTS CO.

Manufacturers of Cast Stone and Ornamental Plaster Work
1991 Port Washington Road
MILWAUKEE, WIS.

Products

CAST STONE, PLASTER STAFF, RELIEF WORK, CAST STONE MANTELS, FIREPLACES, FOUNTAINS, BIRD BATHS, BENCHES, VASES, GARDEN DECORATIONS, RAILINGS and BALUSTRADES for Bridges, Terraces, etc., COMPO CARVINGS for Woodwork.

Also Contractors for Interior Ornamental Plaster Work, Sculpture and Modeling; Dealers in Imitation Caen Stone, Travertine, Portland Cements, Keene's Cements, Plasters, Fibres, etc.

Uses of Cast Stone

Cast stone is a scientifically prepared concrete which is especially adaptable for exterior trim and decoration. It replaces terra cotta and cut stone for durability and is often preferred because of the ease with which it can be set and the architectural effects obtained.

Cast stone is not limited to exterior use alone; it can be very effectively used for interior decorations for window trim, arches, wainscots, stairways, mantels and columns. It can be produced in shades to harmonize with certain color schemes thus obtaining beautiful results by using the natural colored aggregates of various sizes in order to obtain the right degree of shade and effect.

Advantages of Cast Stone for Building Purposes

Cast stone offers many advantages which other materials lack. The possibilities of reinforcing are such that many intricate designs can be carried out in cast stone which prove impractical with other materials. This is especially true where delicate artistic designs must be combined with strength.

Different Finishes Available in Cast Stone

Some architects prefer a finer grained surface in cast stone for interior decoration than for exterior use. Others have secured beautiful results by using the same texture for both interior and exterior ornamentation. Either tooled or smooth finishes can be produced, but the most satisfactory finish for resisting wear and the action of the elements has been found to be one composed of materials which present a slightly rough finish resembling bedford stone in color and texture.

Co-operation with Architects

The Plastic Products Co. has always taken pride in maintaining close co-operation with the architect. To carry out with exactness the ideas of the designer of the building is their constant endeavor and so it is always preferable that the architect give complete information on all points involved.

Consultations with architects on cast stone are always welcomed, no matter whether the question refers to an estimate, to the qualities of the material as tested by experience or to its adaptability to certain designs the architect has in mind.

Specifications

For cast stone specifications write us direct and complete data for filing will be sent to you.

Garden Decorations in Cast Stone

A garden, like a room, demands characteristic furnishings. That garden lovers and designers may find the ornaments and furniture which each individual garden needs, we gladly offer furnishing suggestions if landscape plans are sent to us for that purpose.

Catalog

We issue catalogs on all of our products which will be supplied free to the trade upon request.



Eagles Club, Milwaukee, Wis.—All Cast Trim Stone by Plastic Products Co.

ESTABLISHED 1870

THE GEO. RACKLE & SONS CO.

Originators of Artstone
CLEVELAND, OHIO

Products

ASHLAR, SILLS, LINTELS, CORNICE, BALUSTRADES, and all kinds of BUILDING TRIM for exterior and interior work; GOTHIC WINDOWS. FLAT SLAB CONCRETE ROOFING TILE.



TRADE-MARK

shipping facilities are such as to make for promptness in the fulfillment of contracts.

Artstone

Being the first in its particular field, Rackle Artstone has the advantages which experience in manufacturing brings. Thus, while made of concrete, the Rackle product has points which distinguish it from other materials of a similar nature. Further than this is the constant effort, throughout the different processes of manufacture, to turn out as perfect a product as possible.

Setting of Rackle Artstone is accomplished by means of diagrams furnished, wherein each piece is lettered and numbered to correspond with similar markings on the Artstone.

The Company and Its Facilities

This firm originated Artstone over fifty years ago, and has produced it in steadily increasing quantities ever since. A strong organization has been developed which is qualified to handle the best class of work, including that which is ornamental in character.

The plant being located on the Pennsylvania Railroad and in a section where the greater share of the materials used are close at hand, manufacturing and



Mt. Olive Lutheran Church, Milwaukee, Wis.
KIRCHHOFF & ROSE, Architects

Advantages of Artstone

In these days of high building costs the low price of Rackle Artstone, as compared with other materials of equal value, is a strong point in its favor, as is also its attractive appearance.

The possibilities of reinforcing are such that certain designs can be carried out in Artstone which are not practicable otherwise. Especially is this true where delicacy of detail must be combined with strength.

Rackle Artstone is a permanent material. There are still standing buildings in which it was used over fifty years ago, a fact which expresses more than words.

Uses of Artstone

Rackle Artstone is suitable for all exterior work, such as ashlar, water table, sills, lintels, cornice, belts, quoins, and for any place where a medium is required for the proper expression of architectural design. Balustrades are successful in Artstone, as are relief ornamentation and statuary.

For interiors, Rackle Artstone is used for door and window trim, arches, wainscots, stairways, mantels and columns.

It is often desirable to have Artstone made of a shade to harmonize with a certain color scheme. This idea is carried out very successfully, so that beautiful results are obtained.

Gothic Windows in Artstone

For Gothic window tracery, Rackle Artstone has certain superior and individual qualities. It is thoroughly reinforced; it is strong, straight and true, and it is ideal for holding glass. Furthermore, it has no grain or strata to cause splits at curves and angles.

Rackle Artstone Gothic windows have been a special line with this firm for many years, and it is worth noting that architects often prefer these windows even when using other materials for their regular building trim.

Artstone Colors

Regular colors include white, buff, red, brown, limestone and granite, besides many combinations of these.

The buff, red and brown may be made either lighter or darker, and the limestone and granite may be varied in shade or combined with the buff, red or brown.

Special colors, to meet unusual conditions or to match other work, are made as required by the architect's specifications.

Artstone Finishes

Smooth and tooled finishes are both produced. The most satisfactory surface for resisting wear and the action of the elements has been found to be one which is composed of such material as to present a slightly rough surface. This gives a rich, artistic effect when appearing in masses, as in exterior work. Many architects like the same texture for interior work as for exterior, while others prefer a finer grained surface, such as Caen stone or smooth white, either of which has been found satisfactory for inside use.

Co-operation and Service

The manufacturers of Rackle Artstone have always taken pride in maintaining close co-operation with the architect. To carry out with exactness the ideas of the designer of the building is the constant endeavor, and so it is always preferable when the architect can give complete information on all points involved. However, there are occasions when the architect desires consultation with those who make a special product, and it is at such times that the services of the Rackle organization may be called on freely, no matter whether the question raised refers to an estimate, to the qualities of the material as tested, by experience, or to its adaptability to a certain design the architect has in mind.



Entrance to the Fine Arts Building, Cleveland, Ohio
BRIGGS & NELSON, Architects

Artstone References**Churches**

Epworth-Euclid M. E. Church, Cleveland, Ohio
 Church of the Beloved Disciple, Erie, Pa.
 St. John's Lutheran Church, Pekin, Ill.
 First Lutheran Church, Galesburg, Ill.
 Crescent Hill Baptist Church, Louisville, Ky.
 St. Paul's Lutheran Church, Massillon, Ohio
 Grace Episcopal Church, Cincinnati, Ohio
 Cookman M. E. Church, Philadelphia, Pa.
 Grace Lutheran Church, Washington, D. C.
 St. Mark's M. E. Church, Baltimore, Md.

Apartments and Hotels

Webster Hall Hotel, Pittsburgh, Pa.
 Gen. Brodhead Hotel, Beaver Falls, Pa.
 Auditorium Hotel, Cleveland, Ohio
 Rackliffe Apartments, New Britain, Conn.
 Envoy Apartments, Chicago, Ill.
 Community Hotel, Pottsville, Pa.
 Hotel Cavalier, Virginia Beach, Va.

Schools and Hospitals

Abraham Lincoln High School, Council Bluffs, Iowa
 Clairton High School, Clairton, Pa.
 Berea High School, Berea, Ohio
 Cathedral School, Laramie, Wyo.
 Virginia Military Institute, Lexington, Va.
 U. S. Veteran's Hospital, Northport, L. I., N. Y.
 U. S. Veteran's Hospital, Aspinwall, Pa.
 Torrance State Hospital, Torrance, Pa.
 Nurses' Home, Children's Hospital, Cincinnati, Ohio

Business Buildings

H. J. Heinz Co., Pittsburgh, Pa., Chambersburg, Pa., Salem, N. J.
 Gulf Refining Co., Pittsburgh, Pa.
 Standard Oil Co. of N. J., Washington, D. C.
 S. S. Kresge Co., Cleveland, Ohio
 J. G. McCrory Co., Connellsville, Pa.
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 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Flat Slab Roofing Tile

Rackle reinforced concrete flat roofing tile form a light, strong and economical roof which is fireproof, and meets every requirement of first class building construction.

For foundries, shops, warehouses, garages, schools and theaters they are well adapted. They are laid rapidly in place on steel purlins, no forms or centering being required, and are suitable for either flat or pitched roofs.

A booklet, which is sent free on application, gives information regarding these tile, sizes of purlins for different spans, methods for meeting special conditions, etc.

Roofing Tile References

Meadville School, Meadville, Pa.
 Union Trust Co., Cleveland, Ohio
 Lake Erie College for Women, Painesville, Ohio
 St. Elizabeth's Hospital, Youngstown, Ohio
 St. Marys Sewer Pipe Co., St. Marys, Pa.
 Brotherhood of Locomotive Engineers Building, Cleveland, Ohio
 American Malleables Co., Owosso, Mich.
 Senior High School, Mansfield, Ohio
 Lima Locomotive Co., Lima, Ohio
 Cleveland Twist Drill Co., Cleveland, Ohio
 Canton Sheet Steel Co., Canton, Ohio
 Republic Iron & Steel Co., Youngstown, Ohio
 Willard Storage Battery Co., Cleveland, Ohio
 Fisher Body Corporation, Cleveland, Ohio
 American Shipbuilding Co., Lorain, Ohio
 Bakelite Corporation, Painesville, Ohio



Rackle Tile Roof Under Construction, The Eclipse Stove Company, Mansfield, Ohio

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Zenitherm, the Material and Its Uses

Zenitherm has all the dignity and massiveness, without the coldness, of stone, and all of the convenience of wood since it can be nailed, sawed, drilled and screwed.

Zenitherm is made of a combination of selected wood fibre and highest quality calcined magnesium oxide. This is treated with a weatherproofing binder and subjected to hydraulic pressure in steel moulds. The pressure is maintained until the mass sets into a dense slab, which is not only highly fire resistant but is exceptionally low in absorption. It does not distort or shrink. The process is covered by patents and its production is under factory control. There is no substitute having the specific advantages of Zenitherm.

Qualities and Properties

Zenitherm is impervious to frost or any climatic conditions. Constant physical characteristics together with low thermal conductivity make Zenitherm preferable as a permanent material insuring comfort, beauty, durability, weather resistance and safety in its fireproof qualities.

Zenitherm becomes tougher with age. It wears better than many grades of marble. It is kept clean by washing with soap and water. Zenitherm is odorless and verminproof. It contains nothing to decay or rot. It costs less than stone. Zenitherm is usually installed by carpenters.

Uses

Zenitherm is used for interior or exterior walls, floors, fireplace facings, wainscot, arches, panels, sills, stair treads, risers, string, base, walks, etc.

Standard Colors

Zenitherm is made in 14 standard colors: red, black, blue, light brown, dark brown, green, pink, olive, buff, gold, drab, light gray, stone gray and natural.

The fact that Zenitherm is available in different shades gives the architect ample opportunity to secure beautiful and permanent effects.

Standard Sizes

Zenitherm is made in sixteen standard sizes. Other sizes can be furnished according to specifications. Prices on application. All



wall material is $\frac{5}{8}$ in. in thickness. Floor material $\frac{3}{4}$ in. Cove base measures $4\frac{3}{4}$ in. from top of base to finish floor. Straight plain base, any height desired. Stair treads $1\frac{1}{4}$ in. in thickness. Risers $\frac{3}{4}$ in. in thickness.

STANDARD SIZES

Width, in.	Length, in.	Width, in.	Length, in.	Width, in.	Length, in.	Width, in.	Length, in.
$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	$47\frac{1}{2}$	$8\frac{1}{2}$	$23\frac{1}{2}$	$15\frac{1}{2}$	$15\frac{1}{2}$
$5\frac{1}{2}$	$11\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	$47\frac{1}{2}$	$15\frac{1}{2}$	$17\frac{1}{2}$
$5\frac{1}{2}$	$17\frac{1}{2}$	$8\frac{1}{2}$	$11\frac{1}{2}$	$11\frac{1}{2}$	$11\frac{1}{2}$	$17\frac{1}{2}$	$23\frac{1}{2}$
$5\frac{1}{2}$	$23\frac{1}{2}$	$8\frac{1}{2}$	$15\frac{1}{2}$	$11\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$	$47\frac{1}{2}$

Standard Mouldings and Trim

Zenitherm standard mouldings are made for use in conjunction with Zenitherm walls. There are twelve different designs available. Zenitherm mouldings and trim to match ashlar surfaces afford a wide range in style, and assure a finish correct in design and effective in treatment.

Corner Pieces

Zenitherm solid corners are manufactured to eliminate the appearance of joining and edge mitering. They carry out completely the effect of solid stone for columns, pilasters, beams, returns, reveals, quoins, et cetera. Where Zenitherm corner pieces are used, all edge mitering or joining is eliminated and installation costs reduced to a minimum.

Installation

Zenitherm presents no difficulties of installation. The slabs, cut into stock sizes at the factory, are simply nailed with galvanized finishing nails, countersunk and pointed, to furring for ashlar surfaces. Zenitherm floors follow the standard methods of installing floor materials. Any carpenter can lay Zenitherm floors and erect Zenitherm walls if a reasonable amount of care in working with it is used.

Our "Contractors Handbook" gives full information, and helpful suggestions to make the erecting of Zenitherm a simple task. A copy furnished on application.

Literature for Architects, Their Clients and Contractors

We have several folders available which we will be glad to mail on request. Included among these are "Zenitherm Walls"; "Zenitherm Floors"; "Contractors' Handbook"; "Architects' Manual"; "Color Chart"; "Folio of Floor Patterns"; "Folder of Mouldings."



Zenitherm Walls, McFarlin Memorial Auditorium
Southern Methodist University, Dallas, Texas
R. H. HUNT COMPANY, Architects

Specifications for the Proper Installation of Zenitherm

The following specifications are suggested for architects' use. They are designed to cover all possible uses of Zenitherm.

Specification for Zenitherm Interior Walls

To be written under Carpenter's Specifications.

Backing—The backing to which Zenitherm is to be applied shall be true to line, level and plumb.

Joints—Zenitherm slabs shall have $\frac{1}{8}$ -in. chamfer on surface edge, all around, to form "V" joint when laid up close.

Note: Alternate: Zenitherm slabs shall have straight edges to form $\frac{1}{8}$ in. [$\frac{1}{4}$ in.] open joint when laid up.

Nails—Zenitherm shall be nailed to furring strips or wood sheathing with 6d galvanized finishing nails. Nails are to be driven in at an angle, countersunk $\frac{1}{8}$ in. and nailholes pointed with Zenitherm Pointing Compound.

Note: We strongly recommend that the edges of the set slab coming in contact with the next slab to be set, be buttered with Zenitherm Pointing Compound. Nail next slab into place, wiping off the pointing compound which oozes up between the joints.

On Wood Sheathing—Zenitherm shall be nailed to wood sheathing as specified above.

On Wood Studding—Provide wood sheathing 1x6 in. laid diagonally or provide $\frac{7}{8}$ x3-in. furring strips laid horizontally at each coursing joint of the Zenitherm ashlar.

On Brick, Masonry, Hollow Tile or Gypsum Block Grounds—Allow $2\frac{3}{4}$ in. from face of rough wall for double furring strips and the Zenitherm $\frac{3}{4}$ -in. thick slab.

Note: If Zenitherm is specified $\frac{3}{4}$ in. thick, allow $2\frac{1}{2}$ in. Double-furr rough wall with $\frac{7}{8}$ x3-in. spruce furring and cross furring to provide plumb and true surface for Zenitherm slabs. Nail Zenitherm to furring through face of slab with galvanized finishing nails, to be countersunk and nailholes pointed with Zenitherm Pointing Compound.

Specification for Zenitherm Exterior Walls

To be written under Carpenter's Specifications.

Frame Construction—Cover sheathing with waterproof building paper, nail Zenitherm slabs to sheathing with 6d galvanized finishing nails, countersunk $\frac{1}{8}$ in., nailholes to be pointed with Zenitherm Pointing Compound.

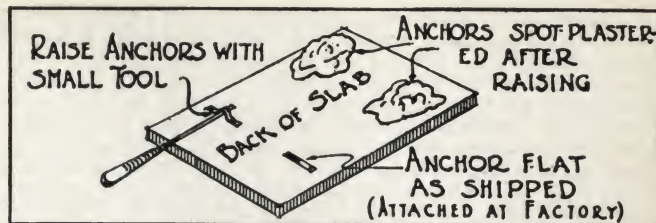
Note: If close joint is specified, butter edge of slab with Zenitherm Pointing Compound and squeeze into place before nailing, wiping off excess compound. If open joint, use Zenitherm Pointing Compound.

Masonry Construction—Nail $\frac{7}{8}$ x3-in. furring strips to wood plugs, or metal wall plugs, set in masonry wall. Nail Zenitherm slabs to furring strips with 6d galvanized finishing nails, countersunk $\frac{1}{8}$ in., nailholes to be pointed with Zenitherm Pointing Compound. Center all vertical joints of Zenitherm ashlar on furring strips where single furring only is used; center horizontal joints on horizontal furring strips where double furring is used.

Note: (a) If close joint is specified, butter edges of slab with Zenitherm Pointing Compound. Point open joints as specified under frame construction.

(b) Alternate: Secure furring for Zenitherm with expansion bolts.

(c) Alternate: On hollow tile walls, secure furring with toggle bolts about 18 in. on centers vertically.



Specifications for Erecting Zenitherm Walls Where Building Codes Enforce Stringent Fireproof Regulations

For erecting without furring strips, brass spot anchors are secured to block at factory. Raise loop on anchor and spot over anchor with Acme or any other slow setting plaster. Set block same as marble block but omit brass dowels. For either gypsum block or hollow tile partitions on walls, it is essential to wet the areas thoroughly before applying Zenitherm with spot anchors, in order that the plaster shall receive its proper set.

Specifications for Zenitherm Floors

The following group of specifications are for Zenitherm floors over subfloors of wood and masonry.

Zenitherm Floor on Wood Underfloor—

To be written under Carpenter's Specifications. Face nail Zenitherm directly to wood floor. Butter edges of slabs with Zenitherm Compound and squeeze up tight, wiping surplus compound that oozes out off the face immediately. Use 6d galvanized finishing nails, countersinking heads and pointing with Zenitherm Compound.

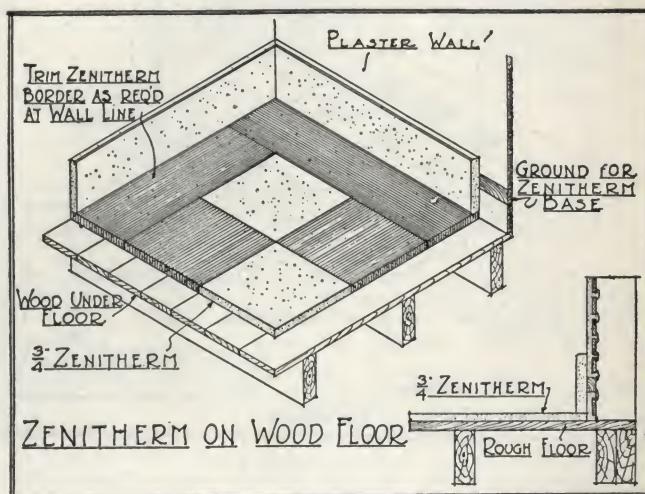
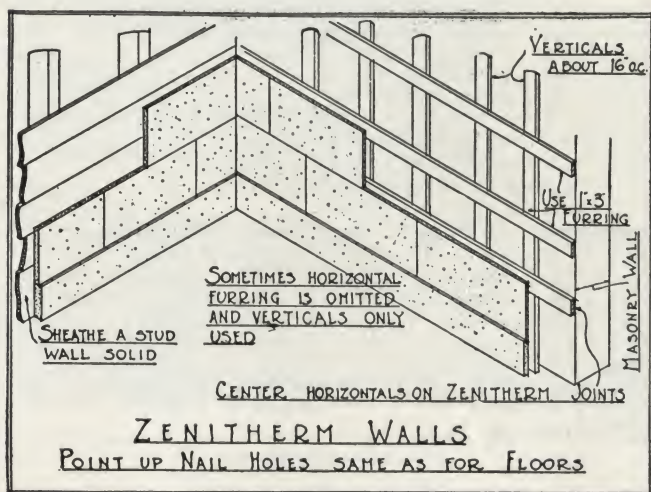
Note: If wood underfloor is not true and level, use thin bed of Zenitherm Bed Compound to bring to desired level. Allow this to set for 24 hours and nail blocks as above.

Zenitherm Border—Lay border same as specified for floor work.

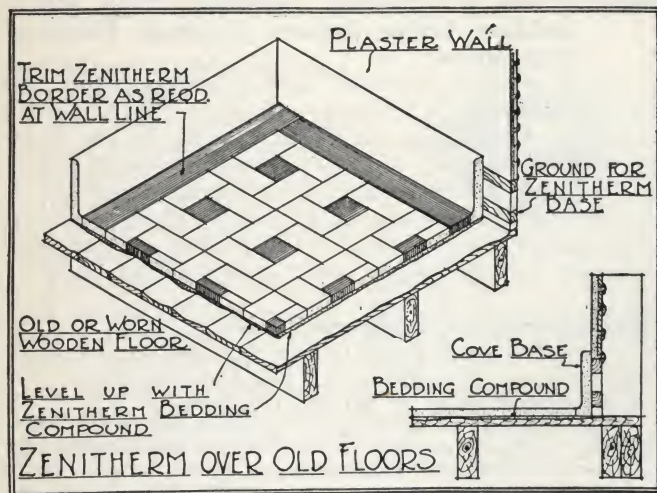
Zenitherm Base—Install Zenitherm cove (straight) base in $47\frac{1}{2}$ -in. lengths, $\frac{3}{4}$ in. thick. Secure to wall same as specified for wall material.

Zenitherm Floor Over Level Wood Subfloor—Before starting to lay the floor, take out the field pieces and lay them down in proper position without nailing, to determine correct measurements and pattern. Cut border to fit, if necessary. In starting to lay the Zenitherm floor, first lay any two sides of the border which meet to form an angle. This will insure a perfectly squared and symmetrical pattern. To lay a Zenitherm slab on a level wood floor, butter two edges of the slab and lay in proper position. Then nail the slab in place using 6d finish galvanized nails. From 4 to 6 nails are usually sufficient to keep the slab in place properly, depending upon the size of the slab. Countersink the nails $\frac{1}{8}$ in. and fill the nailholes with pointing compound. Wipe off any excess pointing compound with a putty knife. Be sure to keep the surface of the slab as clean as possible. Proceed with other slabs in like manner.

Note: Where Zenitherm cove base is specified, nail to furring before laying floor.



Zenitherm Floor Over Subfloor Out of Level—Determine the highest point of the wood subfloor and mark points lower than this by driving nails at intervals into the lower points of the wood floor. Bring heads of these nails even with the highest point. Fill low parts of floor with bedding compound up to nailheads. Level can be maintained by pulling a straightedge across the compound over the level points, the same as in laying portland cement. If slope is small, proceed to lay floor according to instructions for laying Zenitherm over level wood floor. If slope is very pronounced, lay Zenitherm according to instructions given for laying over concrete.

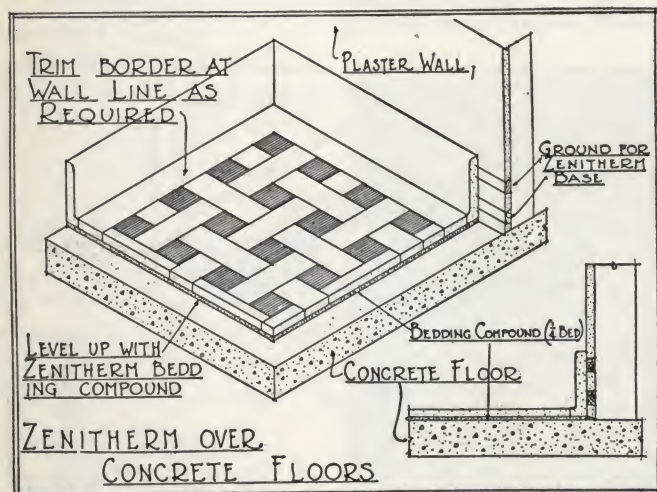


Zenitherm Floor Over Rough or Finished Concrete and Similar Subfloor—

Note: General Contractor must see that the concrete floor is brought to level one inch below finished floor surface by Concrete Contractor.

To be written under *Tile Setter's Specifications*. Before starting to lay floor, lay down the field pieces to determine the correct measurements and pattern. Start actual laying of floor by laying two sides of the border which meet to form an angle. This will insure a perfectly squared and symmetrical pattern. Lay corner slab of border by spreading bedding compound to about ¼-in. thickness on a small portion of the subfloor. Butter Zenitherm slab on two edges with pointing compound. Care should be taken to keep compound off of the finished face of the Zenitherm slab. It is customary to gently tap the surface of the slab to bring it to the proper level. This allows the compound to ooze into the crevices in back of the slab and give a firm setting. Make sure that each slab is set at proper level as the job goes along. Proceed with other slabs in like manner. Zenitherm floors laid in bedding compound should be allowed to lay 24 hours without usage.

Zenitherm Base—Install Zenitherm cove (straight) base in 47½-in. lengths, ¾ in. thick. Secure to wall same as specified for wall material.



Specification for Zenitherm Stair Treads, Risers and Bases

Note: Before proceeding to lay Zenitherm, take off nosing of old step so that step is flush with riser.

Wood Stairs—Lay Zenitherm Stair Tread and Riser on wood stairs in same manner as in laying Zenitherm over wood floor, by nailing to wood undertread and under riser.

Concrete or Cement Stairs—Lay Zenitherm Stair Tread and Riser on concrete or similar stairs in same manner as in laying Zenitherm over concrete underfloor by cementing to concrete undertread and in back of riser. It is a good point to provide nailing blocks in the concrete for extra security in nailing tread and riser.

Iron Stairs—Insert toggle bolt through hole in iron step; countersink it and fill hole to surface of tread or riser with pointing compound. If it is possible to get under the stairs, drill holes through the iron, and insert screws. Screw Zenitherm on tightly from under stairs. Where impossible to get under iron stairs, drill ½-in. hole big enough for tumbler of toggle bolt to drop through. Also drill hole through Zenitherm step diameter of bolt. Countersink head, screw toggle and fill hole with pointing compound.



Crane Company Showroom, San Diego, Cal.

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WILLIAM J. CLARK, Vice President Crane Company, Architect
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E. T. Stotesbury, El Mirasol, Palm Beach, Fla.
Frank I. Cooper, Wayland, Mass.
Conde Nast Apartment, New York, N. Y.
William W. White, Pelham, N. Y.
Jesse L. Livermore, Great Neck, L. I., N. Y.

Public Buildings

Chelsea Hotel, Atlantic City, N. J.
Hollywood Memorial Church, Hollywood, Cal.
Holy Name Church, Toronto, Ont.
Crane Company, Chicago, Ill.
Wrigley Building, Chicago, Ill.
Pullman Trust & Savings Bank, Chicago, Ill.
Kaufman-Straus Company, Louisville, Ky.
Harry J. Dean Company, Detroit, Mich.
Memorial Art Gallery, Rochester, N. Y.

Prominent Architects Specifying Zenitherm

Fred T. Ackerman	Hoggson Brothers
Walter Ahlschlager	Voorhees, Gmelin & Walker
George W. Backoff	McKim, Mead & White
Dwight James Baum	Robert J. Reiley
Alfred C. Bossom	James Gamble Rogers
Frank Irving Cooper	Starrett & VanVleck
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As one of the largest terra cotta concerns in the country, the Conkling-Armstrong organization is in an exceptional position to execute, from sketch drawings if necessary, work of any description, however artistic, complex or technically difficult, and of any magnitude whatever. Information, specific or general, covering any matter relative to terra cotta and its use gladly supplied on request and without obligation.

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Conkling-Armstrong material has long represented the best in terra cotta both as to satisfactory appearance and permanence. This has been the result of studied investigation, not only of the material, but allied facts such as support, mortar, setting, pointing, etc.

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Schools, colleges, churches, theaters, office buildings, banks, store buildings, garages and factory buildings, trimmed with Architectural Terra Cotta, become neighborhood beautifiers. This material which has stood the test of time and the elements with all its color and surface treatment possibilities, is the logical building material where durability, decorative qualities and color are required to make a complete and permanent design.

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Thirty-nine years' experience, more than 10,000 contracts, a maintained standard of excellence during this period, are our credentials for soliciting your business.

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Benjamin Franklin Hotel, Horace Trumbauer, Architect
Wesley Building and Robert Morris Hotel, Ballinger Co., Architects

Scottish Rites Temple, Horace W. Castor, Architect
Atlas Storage Warehouse, George S. Kinsley, New York, Architect

Atlantic Refining Company's Filling Station, Broad Street and Roosevelt Boulevard, Joseph F. Kuntz, Pittsburgh, Architect
Home Office Building, Fidelity Mutual Life Insurance Co., Zantzing, Borie & Medary, Architects

Boston, Mass.

Filene Building, D. H. Burnham & Co., Architects

Richmond, Va.

Colonial Theater, Carneal & Johnston, Architects

Wilmington, N. C.

Cape Fear Hotel, G. Lloyd Preacher, Inc., Architects

Atlantic City, N. J.

Hotel Blenheim and Central Pier, Price and McLanahan, now McLanahan & Bencker, Architects

New Stanley Theater, Hoffman-Henon Co., Architects

Tampa, Fla.

First Baptist Church, Chas. M. Hart, New York, Architect

Jacksonville, Fla.

St. James Building, H. J. Klutho, Architect

New York, N. Y.

Broadway Tabernacle, Barney & Chapman, Architects
Wanamaker's Store, D. H. Burnham & Co., Architects
Bowling Green Building, Audsley Bros., Architects

Harrisburg, Pa.

Doutrich's Store Building, Clayton J. Lappley, Architect
Office Building, Charles H. Lloyd, Architect

Trenton, N. J.

Stacy-Trent Hotel, Esenwein & Johnson, Buffalo, N. Y., Architects

Lancaster, Pa.

Brunswick Hotel, C. Emlen Urban, Architect

Miami, Fla.

Security Building, Robert Greenfield, Architect

Pittsburgh, Pa.

Clark Building and Stanley Theater, Hoffman-Henon Co., Architects



Main Cornice on New Scottish Rites Temple, Broad and Race Streets, Philadelphia, Pa.

HORACE W. CASTOR, Architect

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Printed Information

Monthly Magazine "Atlantic Terra Cotta"—Illustrating ancient and modern Terra Cotta.

"Stock Designs"—A catalog of stock sizes.

Garden Pottery Catalog—Reproductions of Florentine originals.

Chimney Pot Catalog—Thirty designs in usual and unusual colors; many flue sizes.

Uses of Terra Cotta

For entire facades; for entrances, window trim, mouldings, cornices and panels.

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For important rooms in hotels and banks, and for rotundas of public buildings.

For exterior or interior construction and decoration with masonry, steel or reinforced concrete frame.

Colors

Many shades of gray, buff, brown and red in unglazed, vitreous surface.

White, creams and ivories in matt or lustrous glaze.

Conglomerate colors; combinations and textures that occur in natural geological formations.

A practically unrestricted range of blues, greens, sienna, purple, yellow, lavender, etc., in matt glaze, and special fire scarlet vermilion and burnished gold.

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To determine the cost of Atlantic Terra Cotta the architect should submit the following drawings:

Floor plan, and elevations drawn to scale.

Sections showing projections, and sketch details.

When specifications have been prepared, they should be sent with the drawings.

Details such as the amount and character of the modeling, and the color or colors should be indicated.

Stock Designs

Our Stock Design Catalog shows name panels, jambs, mullions, lintels, belt courses, coping, modeled inserts, cornices, pilaster and column capitals, architraves, arches, piers, cartouches, consoles, brackets, balustrades, sidewall fountains, etc.

Stock Design Catalog obtainable from either the Atlantic or the Atlanta Company. (Mention "Stock Designs" when writing.)

Atlantic Terra Cotta in stock designs permits a convenient, economical and effective use of Terra Cotta. The sizes and forms are varied, the choice of colors wide and the quality of the best.

The architect has little trouble in adapting stock designs to his design, for either the entire elevation or trim—particularly stores, small banks, apartment houses, garages, filling stations, theaters, and in general buildings of moderate size.



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In New York and vicinity the ATLANTIC TERRA COTTA COMPANY will contract to clean the exterior of any masonry building—Terra Cotta, stone or brick. If desired, this service includes repointing and minor repairs.

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WALKER & WEEKS, Architects DEVAULT & DEITRICK, Builders

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This four-acre roof is covered with handmade tiles of Atlantic Terra Cotta. The surface is turquoise and the edges dark blue. The Terra Cotta cresting is in dark blue, black and gold. Atlantic Terra Cotta serves for a beautiful roof as well as a roof that is watertight



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Clay, being plastic, enables the production of rich ornamentation at moderate cost, especially if there is repetition of ornament.

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Portion of Polychrome Frieze Feature, Natural Science Museum, Buffalo, N. Y.
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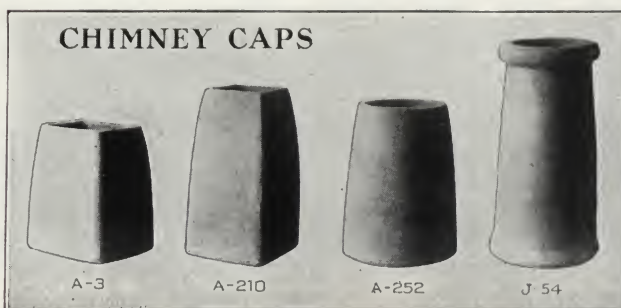
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Services of the Society

The NATIONAL TERRA COTTA SOCIETY is a bureau operated by the manufacturers of terra cotta in the United States for the technical and artistic improvement of product, the dissemination of authentic information relating to it and the assistance of the architectural and engineering professions in the proper and effective employment of this material. In addition to the Standard Specifications printed below the Society issues other

helpful literature relating to the proper construction of terra cotta and the use of color in architectural design; also illustrated brochures pertaining to various classes of buildings.

Its individual member companies are also prepared to assist architects with counsel and recommendation upon the use of terra cotta in specific instances of application, and to furnish samples of their product when desired.

Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta

These Specifications were prepared with the assistance of representatives of the Structural Service Committee of the American Institute of Architects and of the National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.

Note: The Architect or Specification Writer will find it convenient to follow the Short Form Specifications beginning with Section 63.

The Short Form incorporates all the provisions of the Standard Terra Cotta Specification, but eliminates the necessity of mentioning them in detail.

Reference to the Glossary, Sections 50-62, will supply the surface finish, ceramic finish, and color data necessary to specify surface and color correctly.

The Corollary Clauses, Sections 85, 86, explain the setting option between mason and manufacturer.

Sections 87-91 under Corollary Clauses explain the specifications for flashing, sheet metal, structural steel, structural concrete and rough carpentry. These specifications form a part of the Terra Cotta Specification, although the materials are supplied and set in place by different contracting parties.

A—General Information

Drawings and Schedules

1. The Terra Cotta manufacturer shall be furnished with all drawings, details and other information necessary for the manufacture of Terra Cotta, including drawings for all classes of work with which the Terra Cotta engages.

2. Wherever Terra Cotta is required to match in contour, color, finish and surface treatment, existing Terra Cotta, as for example in connection with alterations or additions to existing work, the Terra Cotta manufacturer shall be furnished with the required profiles and samples of the original work, and other needed information.

3. The Terra Cotta manufacturer shall, before proceeding with manufacture, submit to the architect for his correction and approval, shop drawings showing jointing and construction of the Terra Cotta and provision made for all flashing and counter flashing. These drawings must conform as nearly as practicable to the architect's drawings, but shall be in accordance with good Terra Cotta structural practice.

4. All pieces of Terra Cotta shall be numbered. The Terra Cotta manufacturer shall provide two copies of the completed scale shop drawings to be used for setting and showing the piece numbering of the Terra Cotta, and the size of the joints to be used for setting the various portions of the work clearly indicated. These drawings shall be designated as the setting drawings.

5. The Terra Cotta manufacturer shall furnish, as promptly as possible, a schedule of all special anchors, hangers, etc., necessary to secure and support the Terra Cotta in a manner approved by the architect.

B—Material

Quality, Tests

6. *Note:* In view of the researches now being conducted by the National Bureau of Standards at the instance of the NATIONAL TERRA COTTA SOCIETY, it seems inadvisable to attempt, at this time, to write either quality clauses in terms of crushing strengths, densities and elasticity, or specifications for tests. Clauses descriptive of the desirable physical characteristics and of tests to prove compliance of the material with such physical requirements will be prepared as soon as the necessary data are available and inserted in a later edition of this standard specification.

Modeling

7. All ornament shall be artistically modeled by the Terra Cotta manufacturer's staff artists. (Or, models made to Terra Cotta shrinkage scale will be furnished to Terra Cotta manufacturer, without cost to him, securely crated for shipment f.o.b. modellers' studio at .)

8. Photographs in duplicate of all ornament shall be submitted to the architect for his approval or correction, or, if he so desires, he may inspect all modeling at the factory. Such approval or inspection by the architect shall be made promptly. No ornamental work shall be burned until modeling has been approved.

Surface Finish, Ceramic Finish and Color

9. The surface finish, ceramic finish and color of all exposed surfaces of Terra Cotta shall be as indicated by the architect's drawings or as specified. For surface and ceramic treatments, see Glossary of Terms relating to Terra Cotta, which is hereby made a part of this specification.

10. The ceramic finish shall be applied to the Terra Cotta in such a manner as thoroughly to coat the exposed surfaces.

Samples

11. The Terra Cotta manufacturer shall submit samples of the color or colors of the ceramic finish to the architect for his approval, and all Terra Cotta shall conform without marked variation to the sample or samples so approved.

C—Design and Structure

Ends, Walls and Partitions

12. Walls shall not be less than one inch thick and partitions shall be of such thickness and so spaced as to perform their proper functions with regard to form and structure. Each piece of Terra Cotta shall be provided with the necessary anchor holes and hand holes and shall be so formed as properly to engage the structure. Beds generally shall be not less than 4 in. deep.

Washes, Weep Holes and Drips

13. Projecting courses, cornices and heavy ornamental detail may have washes, drips and weep holes, where shown on the approved shop drawings.

Preparation for Flashing

14. Where so shown the washes of all projecting cornices and other exposed horizontal surfaces shall have provision made for flashing. All surfaces where the wash pitches inward toward the structure and stops against superimposed work; all balcony floors, and all gutter grades shall have provision made for flashing.

15. Raggles shall be provided to receive gutter linings and flashings when the joints can not be used for the purpose. Raggles shall be not less than $\frac{3}{4}$ in. deep.

16. All capping courses, copings and sills except of the "slip" type, shall have stools and lugs at intersections with vertical surfaces.

Joints

17. All joints shall be straight and true and of an approximate uniform width of $\frac{1}{4}$ in. All Terra Cotta shall be laid out at the factory to test it for uniformity of joint widths and over-all dimensions. Where necessary to secure accurate dimensions and uniform joint widths, the material shall be sized straight and true.

D—Transportation, Storage and Protection

Shipment, Delivery and Care

18. Unless otherwise specifically agreed, all Terra Cotta shall be furnished by the manufacturer f.o.b. cars factory, with freight allowed to destination. All Terra Cotta shall be carefully packed in hay, straw, excelsior or other suitable material.

Replacements

19. If any pieces of Terra Cotta are damaged in transit, the manufacturer shall be immediately notified in writing by the setting contractor and proceed with the remaking of the pieces. The responsibility for the cost of such replacements shall be determined by the point of delivery fixed by the contract under which the Terra Cotta is delivered. If the point of delivery is beyond the immediate control of the manufacturer, the setting contractor shall assume responsibility for the necessary proof of damage.

E—Erection

Handling

20. The setting contractor shall receive the Terra Cotta on arrival at the freight yards and shall transfer it without damage from the cars to the building. When the Terra Cotta manufacturer delivers on trucks at the building the setting contractor shall unload and store the Terra Cotta. Terra Cotta shall be stored under cover not in contact with the ground, stacked without inflammable packing on wood laths or strips, so as to protect it from injury.

Mechanics

21. All Terra Cotta shall be set by mechanics experienced in the handling and setting of the material.

Cutting and Fitting at the Building

22. Notice of errors in the manufacture of the Terra Cotta shall be given to the manufacturer immediately upon discovery. Cutting or fitting due to such errors shall be done by the Terra Cotta manufacturer or shall be paid for by him if he fails to do the necessary cutting or fitting promptly upon receipt of notice.

23. Other necessary cutting and fitting of the Terra Cotta that may be required at the building, including all fitting around anchors, steel and iron work and reinforced concrete, shall be done by the contractor for setting Terra Cotta.

Supporting Metal Work and Anchors

24. *In Connection with Structural Steel*—Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta and which are not secured to the structural steel by rivets or short bolts, as shown on the architect's drawings, together with all anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta, shall be furnished and set by the contractor for setting Terra Cotta.

25. *In Connection with Structural Concrete*—The contractor for structural concrete shall furnish and set all supporting metal work imbedded in the concrete and all shelf angles and continuous rods. All such metal work shall conform to the requirements of the setting drawings prepared by the Terra Cotta manufacturer.

26. All other loose iron such as clamps, hangers, clips, straps, and pins shall be furnished and set by the Contractor for setting Terra Cotta.

27. All anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta shall be of wrought iron or non-corroding soft steel.

28. Anchors, hangers, bolts, clips, straps, rods and pins for securing the Terra Cotta, except where otherwise shown or specified, shall be of the following minimum sizes:

29. Anchors:—(a) For ashlar or courses balanced on the wall, shall be $\frac{1}{4} \times \frac{1}{4}$ in. or $\frac{1}{8} \times \frac{5}{8}$ in., or No. 6 gauge galvanized wire.

30. (b) For projecting courses not balanced on the wall, shall be not less than $\frac{5}{8}$ -in. round or square bars or equal cross section.

31. Hangers shall be $\frac{5}{8}$ -in. diameter round bars or other shapes of equal cross section area.

32. Clips and straps shall be $\frac{3}{8} \times 2$ in.

33. Pins shall be $\frac{1}{2}$ -in. diameter round bars.

34. Continuous rods on concrete wall faces to which Terra Cotta ashlar is clipped, shall be $\frac{5}{8}$ -in. diameter round bars which shall be secured to the masonry with $\frac{1}{2}$ -in. diameter round anchors placed not more than 2 ft. 0 in. on centers.

35. All steel or iron supporting metal work shall be clean and thoroughly protected with two coats of pure red lead and linseed oil paint, asphaltum applied hot, or other approved protective compound.

Protection of Supporting Metal Work

36. Metal work of every description, supporting Terra Cotta, shall be imbedded thoroughly in the masonry backing and when not so imbedded, metal work shall be protected against corrosion by encasing with cement mortar or in cement mortar masonry.

37. When the back of a Terra Cotta course comes in con-

tact with iron or structural concrete in such manner as to prevent the encasing of supporting iron from the rear, an opening shall be made in the top to admit of the placing of the encasing mortar as required above.

Mortar

38. All cement used for setting mortar shall be a standard brand of Portland cement fulfilling the requirements both physical and chemical of the standard specifications for Portland cement adopted by the American Society for Testing Materials.

39. All sand used for setting mortar shall be clean, sharp and well graded in size.

40. All mortar for setting and pointing shall be composed of one volume of Portland cement to three volumes of sand. Hydrated lime, not to exceed 9 pounds to the sack of cement, shall be added.

41. The sand and cement and lime, if any, shall be thoroughly mixed dry before any water is added. The use of retempered mortar shall not be permitted.

Setting

42. All Terra Cotta shall be set true to a line and carefully laid in a solid bed of mortar. All rebates in bed and cross joints from front to back and top to bottom, shall be filled solid with mortar leaving no voids. Each piece of Terra Cotta shall be tamped into place, excess mortar cut off and struck with a jointer or trowel. All sills, wall copings and other capping courses, shall be set in a thick bed of mortar and well pounded down so that the mortar fills all spaces around bottom of webs of Terra Cotta.

43. All Terra Cotta projecting courses shall be so set that the arris casting a shadow shall be true to line.

44. When the Terra Cotta work is of such scope or character that the proper handling and setting of the Terra Cotta require special skill and knowledge, the Terra Cotta manufacturer shall, if required by the contract, furnish a competent Terra Cotta setter to assist in the sorting, selecting and handling of the Terra Cotta, to co-operate with the setting contractor, to assist him when cutting or fitting of the Terra Cotta is necessary, to advise as to interpretation of setting drawings, and to help generally in securing rapid, efficient progress during the setting of the Terra Cotta. For such service the setting contractor shall pay such setter full time at his regular wage rate. When the furnishing of such a competent setter involves traveling expenses, the setting contractor shall pay the same and also make an allowance for his board.

45. When the services of such a competent setter are not required under the contract, the Terra Cotta manufacturer may, at his own option and expense, send such a representative to the work who shall perform the above services, and the setting contractor shall co-operate with and aid and facilitate the performance of such services by such representative.

Pointing

46. All joints in Terra Cotta shall be pointed and struck as the setting progresses except in freezing weather. In freezing weather and when re-pointing is necessary, all joints shall be raked or cut out to a depth of $\frac{1}{2}$ in. and the pointing mortar driven into the joint and struck with a jointing tool.

47. All joints in overhanging Terra Cotta, balustrades, parapets and free standing features shall have joints raked out one-half ($\frac{1}{2}$) inch, and pointed with an approved elastic cement.

Protection

48. All uncompleted walls including Terra Cotta and backing shall be protected by waterproof covering at night and at any time when liable to injury from storms or freezing.

(Note: All other protection required for projecting courses, jambs of openings, etc., is provided for under the work of other trades.)

Cleaning Down

49. Upon completion of the work, mason's wedges, shoring, supports and centering and all other false work and protections shall be removed and the Terra Cotta cleaned down. If satisfactory results can not be obtained by the use of abrasive soap or washing powder, a solution consisting of $1\frac{1}{2}$ pints of muriatic acid to a gallon of water may be used. In the use of acid solutions only wooden pails and fibre brushes shall be employed.

Glossary of Terms Relating to Terra Cotta

Surface Finish

50. Surface Finish designates the texture of the surface of the clay body prior to application of Ceramic Finish.

51. It may be:

- (a) *Smooth.*

- (b) *Tooled or Drove.*

(b1) Eight lines to the inch.

(b2) Six lines to the inch.

- (c) *Light irregular drag or combing.*

- (d) *Heavy irregular drag or combing.*

- (e) *Special.*

52. A special Surface Finish like "bush-hammered," "pitted," "vermiculated," etc., involves extra expense and, if required, should be clearly specified.

53. *Surface Finish for unglazed surfaces* may be smooth or may be tooled with a light or heavy drag. Flat surfaces of sufficient width may be tooled, while the curved surfaces of mouldings may be left smooth.

Surface Finish for glazed Ceramic Finish (whether lustrous or mat) is usually made smooth.

54. *Granite Colors*, if unglazed, may be made smooth or with irregular drag, or pitted. A bush-hammered or special surface involves extra expense, and if required should be clearly specified. If glazed Ceramic Finish is used for Granite Colors the surface treatment is usually smooth.

Ceramic Finish and Color

55. Ceramic Finish designates the surface and color applied by the ceramic processes of coating, glazing, burning, etc.

56. (1) *Unglazed Terra Cotta*: Terra Cotta with a Ceramic Finish producing an unglazed finish made in various shades of buff, gray, salmon, red and brown. Most colors thus made are vitreous.

57. (2) *Glazed or Enameled Terra Cotta*: Terra Cotta having an impervious Ceramic Finish of a glassy texture which may be either lustrous or mat (sometimes designated as full or dull glazes or enamels) made in various colors.

- 58. (3) *Granite Color Terra Cotta*:

(a) *Unglazed Granite Color*:—A mottled Ceramic Finish similar to unpolished granite.

(b) *Glazed or Enameled Granite Color*:—A mottled Ceramic Finish similar to polished granite, made either lustrous or mat.

59. (4) *Polychrome Terra Cotta or Faience*: Terra Cotta having two or more colors on the same piece.

(a) *Polychrome, Unglazed*:—Unglazed Terra Cotta having two or more colors on the same piece.

(b) *Polychrome, Glazed*:—Glazed Terra Cotta having two or more colors on the same piece.

(c) *Polychrome, Blended Colors*:—Made only in glazed Terra Cotta. If, in polychrome glazed work, the colors are not to be separated by definite lines or contours of ornaments, but are to be blended together by brush treatment, or the like, the term "Polychrome, blended colors" shall be used. The character of work expected should be explicitly described.

(Note: For polychrome work always clearly specify the work to be done and the number of colors on a single piece.)

60. (5) *Special*: There are a number of Ceramic Finishes used by individual manufacturers the processes for which are patented or the names copyrighted which are not included in this Glossary.

61. (6) *Semi-Glaze*: An ambiguous term which should never be used.

62. (7) *Fire-Gilding*: A coating of gold glaze either mat or lustrous, fixed by an additional burning. (The area of surface to be gilded should be clearly described.)

Short Form Specification for Incorporation in the Architect's Specifications

To be used in connection with Standard Specifications and the Standard General Conditions of the American Institute of Architects.

63. *Note to Architect*:—The Standard Specification does not state who shall set the Terra Cotta, who shall provide wood centering, scaffolding, hoists, cover boards and protection (except tops of walls against weather). It does not include any cement or concrete work in connection with forming gutter grades and washes on projecting courses and features, or the furnishing or setting of sheet metal flashings and gutter linings. It does not include the furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel or structural concrete. It requires the architect to show on his drawings the sizes and arrangement of rolled or fabricated structural shapes used for supporting Terra Cotta. (See notes on corollary clauses at end of this specification for the work of other trades to take care of such omissions.)

General Conditions

64. The general conditions of the American Institute of Architects, Third Edition, shall form a part of this specification and contract and all work shall be subject to the provisions thereof.

Work Included

65. The work included in the contract comprises the manufacture, (and) delivery (and setting) of all Terra Cotta in accordance with the contract drawings and these specifications.

66. All (here insert a complete description of work) shall be of Terra Cotta.

Work Not Included

67. The following items are not included as a part of the contract for furnishing (and setting) Terra Cotta.

(a) Masonry backing. See specifications for (.....).

(b) The furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel. See specifications for (.....).

(c) Cement or concrete grading for gutters, washes, floors, etc. See specifications for (.....).

(d) Furnishing and setting sheet metal, see specifications for (.....).

Materials and Workmanship

68. All Terra Cotta work under this contract, except as hereinafter specified, shall be executed in strict conformity with the Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta, adopted by the NATIONAL TERRA COTTA SOCIETY; which Standard Specification is hereby declared and made a part of this specification with the same force and effect as if written herein in full.

Surface Finish, Ceramic Finish and Color

69. All Terra Cotta

(Note: If several textures or finishes are to be used give location of each.) shall be

70. (1) *Unglazed.*

Surface Finish or flat members shall be

(a) *Smooth.*

(b) *Tooled or Drove.*

(b1) Eight lines to the inch.

(b2) Six lines to the inch.

(c) *Light irregular drag or combing.*

(d) *Heavy irregular drag or combing.*

(e) *Special.*

(Note: Special surface finishes like "bush-hammered," "pitted," "vermiculated," etc., should be described.)

71. The surface finishes of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

72. (2) *Unglazed Granite Colors*—Surface finishes of flat members generally shall be (a, b, c, d, e). The surface finish of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

73. (3) *Lustrous or Full Glazed or Enameled*—Surface finish shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

74. (4) *Mat or Dull Glazed or Enameled*—Surface finish shall be

(See Note 3.)

75. (5) *Lustrous or Full Glazed or Enameled Granite*—Surface finish shall be

(See Note 3.)

76. (6) *Mat or Dull Glazed Enameled Granite*—Surface finish shall be

(See Note 3.)

77. The color of the Terra Cotta generally shall be (.....) as per approved sample or samples.

78. (7) The Terra Cotta comprising.... (described here in detail....) shall be (two, three, four) color polychrome. Colors (....specify where....) shall be blended.

79. (8) The surface finishes of (....specify where....) shall be fire gilded with (mat or lustrous) gold glaze.

(Note: Sections 1, 2, 3, 4, 5, 6 are alternates. If there is no polychrome work or no fire gilding omit sections 7 and 8. Sections a, b, c, d, e, are alternates for surface finish.)

Delivery

80. The Terra Cotta manufacturer shall furnish and deliver (f.o.b. cars factory with freight allowed to destination) (on trucks at the site of the building) (and set) all the Terra Cotta as indicated on the drawings or as here described.

Setting

81. All Terra Cotta shall be set by (Terra Cotta manufacturer) (mason.....). For such anchors and metal work

as are to be furnished by the setting contractor see Standard Specification.

(Note to Architect: If the Terra Cotta manufacturer is to set his material include the following clause in the Terra Cotta specification. See also suggested clauses at end of this specification to take care of these omissions and for incorporation in the specifications for the work of other trades.)

82. "Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse, shall be furnished to the Terra Cotta manufacturer free of charge by the (....mason contractor....)."

Terra Cotta Setter

(Note to Architect: If the work is of such scope or character that the proper handling and setting requires special skill, the following clause may be inserted:)

"The Terra Cotta manufacturer shall furnish at the expense of the setting contractor a competent Terra Cotta setter to assist in the sorting, selecting, handling and setting of the Terra Cotta."

Joints

83. (The Standard Specification does not require any joints to be rubbed. If rubbed joints are to be required it should be so stated here.)

84. (The Standard Specification requires all joints to be approximately 1/4 in. wide. If joints of a different width are desired it should be so stated here.)

Suggestions for Corollary Clauses

85. 1.—If the Terra Cotta is to be set by the Terra Cotta manufacturer, a clause similar in purport to the following should be included in the general requirements relating to masonry or brick work:

86. "Terra Cotta will be furnished and set by the Terra Cotta manufacturer. Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse shall be furnished to the Terra Cotta manufacturer, free of charge, by the (mason contractor)." A provision should also be included to the effect that the (mason contractor) shall construct the brick (concrete) backing for the Terra Cotta and "The backing shall proceed simultaneously with the setting of Terra Cotta. Each piece of Terra Cotta shall be backed up solid with brick and mortar, so as to make a perfect bond and homogeneous mass between wall lines. This backing shall extend beyond the wall line when necessary to structural stability. If concrete is used it shall not be stronger than a 1 to 9 mixture."

Also a provision under which the (mason) contractor shall place all concrete or cement grading for gutters, washes and balcony, loggia or other floors.

87. In the case of parapet walls specifications should state that flashing if used shall be carried through the wall, or if flashing be not used the back of the parapet wall shall be damp-proofed and the waterproofing carried through the wall.

88. 2.—In the specifications for sheet metal work there should be included a clause similar in purport to the following:

"The washes on all cornices and other exposed surfaces, where shown or specified, shall be covered with () which shall be turned up against vertical surfaces (cap flashed) and cemented into the raggles provided for the purpose in the Terra Cotta."

89. 3.—Structural Supports.

Under "Structural Steel," a clause similar in purport to the following should be included:

"Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta, and which are secured to the structural steel with short bolts or rivets, shall be furnished and erected by the contractor for (structural steel.)"

90. Under "Structural Concrete" a clause similar in purport to the following should be included:

"Steel beams, channels, angles, T's, plates, fabricated brackets and outlookers and other members, bolts, rods, wires, anchors, and sleeves for supporting Terra Cotta, which are imbedded in the structural concrete, also shelf angles and continuous rods attached to structural concrete shall be furnished and set by the contractor for structural concrete, in strict accordance with setting drawings prepared by the Terra Cotta manufacturer." (For information as to the sizes and character of bolts, rods, anchors, etc., see Section E paragraphs 24 to 35 inclusive on "Supporting Metal Work and Anchors" of Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta. Such supports should be clearly shown on the drawings.)

91. 4.—Under "Rough Carpentry" or other suitable division of work, there should be included a clause providing that the contractor shall furnish, set and maintain all centering, cover boards, boxing and protection for Terra Cotta, and remove the same upon completion of the work.

ECKARDT V. ESKESEN, PRESIDENT AND TREASURER

KARL MATHIASSEN, SECRETARY

THE NEW JERSEY TERRA COTTA COMPANY

ESTABLISHED 1888

Manufacturers of Architectural Terra Cotta

TELEPHONE
HANOVER 0176

Singer Building, 149 Broadway
NEW YORK, N. Y.

WORKS
PERTH AMBOY, N. J.

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BOSTON, MASS., FRANKLIN M. DAVIS
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This Company is a manufacturer of the highest grade of architectural terra cotta in glazed, unglazed, granite, polychrome and pulschrome finishes.

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THE NEW JERSEY TERRA COTTA COMPANY operates one of the largest and most modern plants in the East, and is equipped to manufacture work of any description.

Service

Architects and builders desiring expert advice on questions pertaining to architectural terra cotta may feel free to call on us for such service.



The Warwick, Northeast Corner of Sixth Avenue and 54th Street, New York, N. Y.

GEORGE B. POST & SONS, Architects
EMERY ROTH, Associate Architect

DWIGHT P. ROBINSON Co., Inc., Builders

The ornate window features above base course illustrate the use of terra cotta as a decorative material which can be economically duplicated. The modeler can mould the plastic clay to secure the fine ornamental lines required by the architect. An elaborate feature can then be reproduced any number of times at slight additional expense.

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ARCHITECTURAL TERRA-COTTA.
C P C STANDARD MACHINE-MADE PROFILES.

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Ceramic finishes of proved merit cover such a wide range that the variety of selection presented to architect and owner is almost limitless. The New York Company presents the results of forty years' constant research in this department.

The New York Company applies these ceramic finishes to terra-cotta which has been fabricated to outlast the building of which it will form a part.

Only the highest grade of selected clays, scientifically mixed and thoroughly pugged, tempered and aged enter into the construction of the New York Company terra-cotta.

With solidly pressed faces, sides and ends, all of honest thickness, and with heavy struts adequately placed, each piece of New York Company terra-cotta carries with it the New York Company guarantee.

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To meet the demand for selection of wide range of ceramic colors in standardized profiles for sills, copings, band courses, ashlar, mouldings, etc., we offer die run products made from precisely the same materials as the hand-made architectural terra-cotta, but at economy of price made possible only through standardization and machine fabrication. Because of the standardized method of packaging, this C P C machine-made product is available for the smallest jobs at the same price per unit charged for larger quantities. Small orders receive the same prompt and careful attention given to larger shipments. Packing schedule, etc., upon request.

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For over forty years the New York Company has manufactured terra-cotta of the highest quality only. Its product meets the most exacting requirements of architect and owner.

Service

The New York Company has at its command most complete facilities for the rendering of steady and dependable service to its customers.

Among prominent buildings just completed, it has furnished all of the architectural terra-cotta, exterior and interior, for the Statler Hotel of Boston, Mass., to the plans of George B. Post & Sons, Architects.



Court and Remsen Building, Brooklyn, N. Y.
SCHWARTZ & GROSS, Architects

Illustrating the use on the same building of hand-made architectural terra-cotta and C P C machine-made sills with identical coloring

THE NORTHWESTERN TERRA COTTA COMPANY

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Products

ARCHITECTURAL TERRA COTTA for exteriors and interiors, in plain, ornamental or sculptured design, in all known finishes, and in any desired color or combinations of color.

Also Northwestern Terra Cotta in stock designs; Northwestern Multi-unit Sills for steel sash windows; Northwestern Chimney Pots; Northwestern Garden Pottery; Northwestern Faience.

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More than fifty years of practical experience has equipped THE NORTHWESTERN TERRA COTTA COMPANY with both personnel and plants that insure a service unsurpassed in this industry.

For the *architect*: Northwestern experts co-operate with the architect, from the concept of the building, to furnish the technical information necessary to secure desired results.

For the *builder*: Northwestern executives give personal attention to the making of prompt and proper deliveries, thus reducing labor cost and obviating time penalties.

For the *owner*: Northwestern reputation and responsibility guarantees both the quality and the character of Northwestern Terra Cotta, which in turn insures a satisfactory yield on the owner's investment.

Northwestern Facilities

With the largest plant in the world devoted to the manufacture of architectural terra cotta (located in Chicago), with the most modern terra cotta plant in existence (located in St. Louis), and with the most unique plant in the Rocky Mountains (located at Denver), THE NORTHWESTERN TERRA

COTTA COMPANY has unsurpassed production facilities, for the largest or the smallest job.

Northwestern Terra Cotta

Glazed Northwestern Terra Cotta is impervious to moisture, and is made in any one of three degrees of gloss, viz.: bright, satin and matt.

Unglazed Northwestern Terra Cotta is covered with a slip coating of varying degrees of hardness and sheen.

Either glazed or unglazed material may have a plain, pulschrome, speckled, mottled, granite, old ivory, fire flashed, shaded, blended, or special color treatment.

All ceramic finishes are applied over a mechanical surface finish as selected: either smooth, tooled, drove, irregular drag or combing, bush hammered, rugged, pitted or special.

Northwestern Quality

Northwestern Terra Cotta is made from special fire clays, carefully selected by laboratory tests to produce a finished product rarely equaled and never surpassed for beauty and durability.

The Northwestern staff of ceramic experts, trained through three generations of constant improvement, are past masters of design, of color and of texture—the three essentials in architectural terra cotta.

Northwestern Specifications

In making out specifications for any terra cotta structure, always use the word "Northwestern," in connection with the color treatments, mechanical and ceramic finishes desired, and thus secure that quality of product and that character of service which has established Northwestern leadership for over half a century.



Pittsfield Building, Chicago
Owned by Marshall Field Estate

Northwestern Color Service

Recognizing the tremendous possibilities for the use of color architecturally, and appreciating the problems that will come with this development, THE NORTHWESTERN TERRA COTTA COMPANY has established a Consulting Color Service and places it at the disposal of any architect who may have a color problem to solve.

There is no charge for this service, neither does it carry with it any obligation from the architect to the company. It brings to you the results of years of thought, study and experiment in the application of color to the interior of buildings of all classes.

There are certain well-defined principles for the application of color to exteriors. These principles have been worked out not only by our own staff, but by consulting colorists of authority and repute, to the end, we hope, that this service may be the most practical and helpful ever offered to architects by any building material manufacturer.

Growing Trend to Color

You need only look through the pages of popular magazines to recognize and appreciate the tremendous trend to color in all lines of business. Note the brilliancy of the lacquers now so popular. Observe the color treatments of the most exclusive as well as the most popular automobiles. See how brilliant color has become the keynote for interior decorations.

These striking uses of color show conclusively that the American people appreciate color in every grade of its development.

The architects who recognize this national trend to color, and use color for the inspiring motif of their architectural masterpieces, will find an unusually sympathetic response on the part of their clients.

In the days of the Renaissance the architect was also a painter and a sculptor. He majored in

color as well as in form, as is evidenced by the masterpieces of Michelangelo and Raphael.

American architects now have the opportunity to follow in the footsteps of these illustrious masters, but they have better materials to work with.

Northwestern Advantages

Northwestern Terra Cotta offers all of the advantages of form that any other material can offer. It offers additional advantages in its various surfaces, different finishes, and enduring beauty. To these is added the charm of color, from pleasing tints to brilliant hues—either in plain, ornamental or sculptured surfaces.

Among a few of the notable Northwestern Terra Cotta structures are the:

Wrigley Buildings, Pure Oil Building, Bell Building and Pittsfield Building in Chicago; the American Insurance Union Citadel at Columbus, Ohio; the Union Central Life Insurance Annex, Cincinnati, Ohio; and hundreds of similar outstanding examples of American architecture.

Northwestern Floodlighting

The value of Northwestern Terra Cotta for floodlighting purposes is unsurpassed. Textures and finishes are designed especially by Northwestern to secure the greatest degree of illumination at the least cost for electric current.

This use of floodlighting has a direct bearing upon the value of Northwestern Terra Cotta structures in color effects—because the beauty of color treatments when illuminated at night is even greater than their charm in the daytime.

Architects or owners who desire more information regarding the use of Northwestern Terra Cotta, and the application of color to building design, are invited to write the Consulting Color Service of THE NORTHWESTERN TERRA COTTA COMPANY, Chicago, St. Louis or Denver.



The A. I. U. Citadel, Columbus, Ohio
45 stories (555 ft.) high

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DENISON LOAD-BEARING TILE.

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The manufacture, sale and use of Denison Load-Bearing Tile are licensed under the "Wilson System Bearing Wall Construction" Patented; patents as follows: United States Patents No. 760,774; No. 784,476; No. 1,234,990; No. 1,171,913. Reissue No. 14,414; No. 1,350,399. Canadian Patents No. 151,165 and No. 178,744. Other domestic and foreign patents pending.

Advantages

(1) Two separate mortar beds in every course, both lying in same horizontal plane. (2) Dead air space insulates between these two mortar beds same as body of tile is insulated, thus preventing formation of frost or moisture lines on inside of wall. (3) This air space between mortar beds insures against conduction of moisture through wall. (4) Because of insulated mortar joints, plaster may be applied direct to the tile without the use of furring.

(5) All vertical webs are in perfect alignment to carry all load pressures. This gives a wall the greatest load-bearing capacity. (6) Tile is completely symmetrical, thereby facilitating laying. (7) It is a complete unit which will stand on its own base in a stable condition when stood on either face or end, thus facilitating handling and piling.

(8) Works out to all brick heights and thicknesses and bonds perfectly with any header course from third to ninth. (9) Dimension tile of fractional lengths furnished to facilitate laying any length of wall. (10) Furnished with scored or smooth face, as ordered.

(11) Corner tile permit turning inside or outside corner without destroying insulating efficiency of wall at corners.

(12) Jamb and half-jamb tile are furnished for either casement or box frame openings, which provide weatherproof joints with the frames and maintain the insulating efficiency of the wall.

Strength

These tile are guaranteed by the various manufacturers to have a minimum crushing strength of not less than 700 lbs. to the sq. in. net area of web section. Laboratory tests, made for the various manufacturers by such recognized testing laboratories as the following, show a crushing strength per tile ranging from 120,000 to 193,750 lbs.: Iowa State College; State Universities of Iowa, Minnesota and Wisconsin; Carnegie Institute; Drexel Institute; Pittsburgh Testing Laboratory; Department of Buildings of Minneapolis and Detroit.

Costs

Construction costs will vary somewhat, due to such local problems as freight rates; yet, in general, practice indicates that it is safe to say that a given wall can be built of these tile at a cost that is 20% to 30% less than the cost to build the same wall of common brick, and the same price as to build it with common tile.

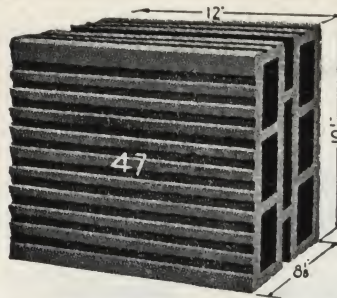
Specifications and Details

The following may be used as standard specifications for the use of these tile in "Wilson System Bearing Wall Construction":

Denison Load-Bearing Tile shall be laid with the voids horizontal except for corners, jambs, piers or pilasters; all vertical joints shall be staggered and the tile above should overlap the tile below by at least 3 in. When the wall thickness is greater than that of the tile, it shall be constructed of a combination of whole and half thickness units, spaced apart from each other the distance of the void between the two lobes of the whole tile, and the next whole tile above shall bond two subadjacent tile below together by overlapping two bearing webs of each, retaining all bearing webs in alignment. Where joists rest on the wall they shall extend into same so that they will overlap at least two bearing members of the tile. Where wall heights do not work out to even courses of the tile being used, a smaller unit shall be used to complete the height. Dimension lengths, which are furnished in sufficient quantities, shall be used to complete lengths of walls and between openings, etc.

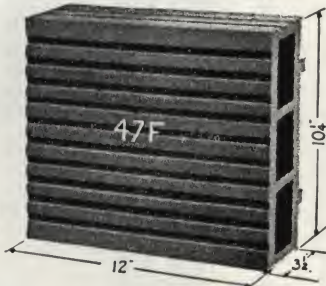
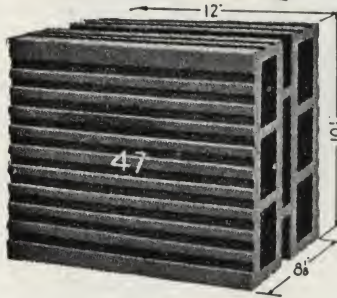
Working Drawings

A portfolio, containing a full set of detail and working drawings and standard specifications furnished free on request made to any licensed manufacturer.

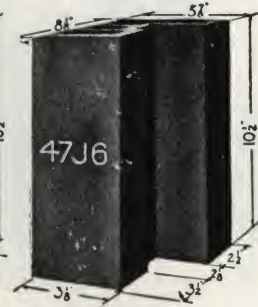
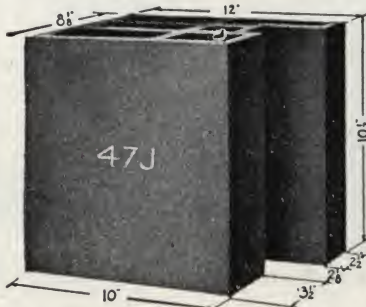
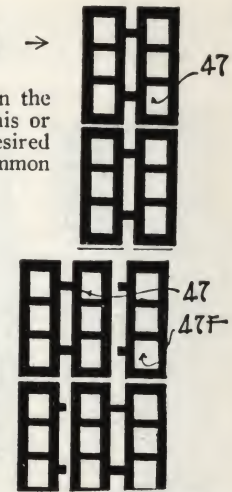


← THESE — BUILD — THESE →

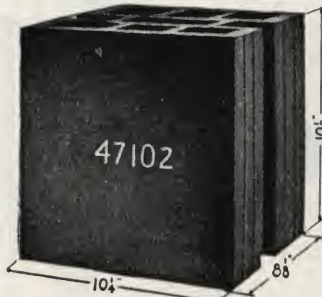
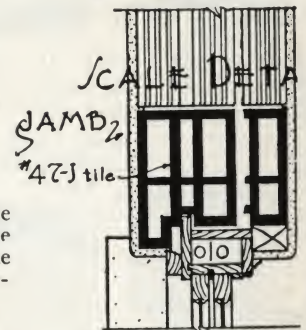
The No. 35 or the No. 23 and their allied units may be used in the place of, or in connection with, the No. 47 and its related units in this or in any of the other constructions shown here. In this way any desired height of wall can be reached that may be reached by using common brick.



An "F" tile is, in reality, one of the two lobes of either a No. 47, a No. 35 or a No. 23. It may be furnished ready split, or it can be split from the full standard unit on the job.

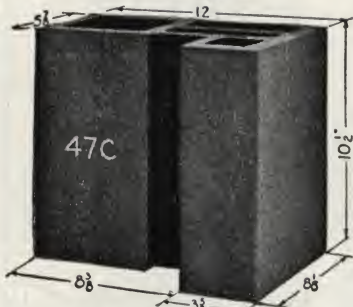
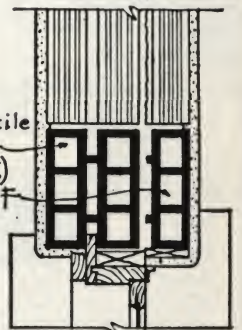


The "J" and "J6" units in the different sizes make possible weatherproof joints between the wall and a box frame without destroying the wall insulation.

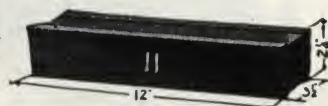
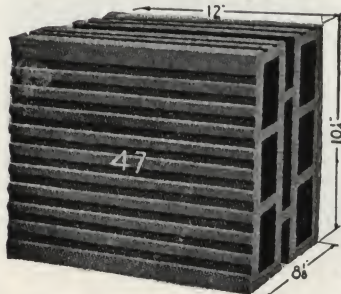
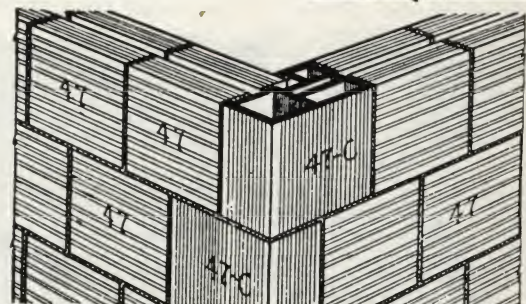


These units in the different sizes make weatherproof joints between the wall and casement frames without destroying the wall insulation.

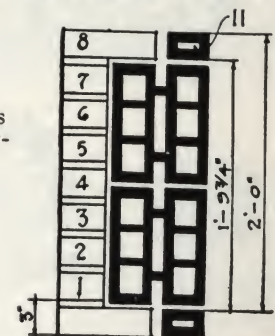
10"-#47 tile on end (#47I02) 47I02F



This corner unit enables either an inside or an outside corner to be turned without destroying the wall insulation. It bonds the two walls together into a strong and rigid corner.



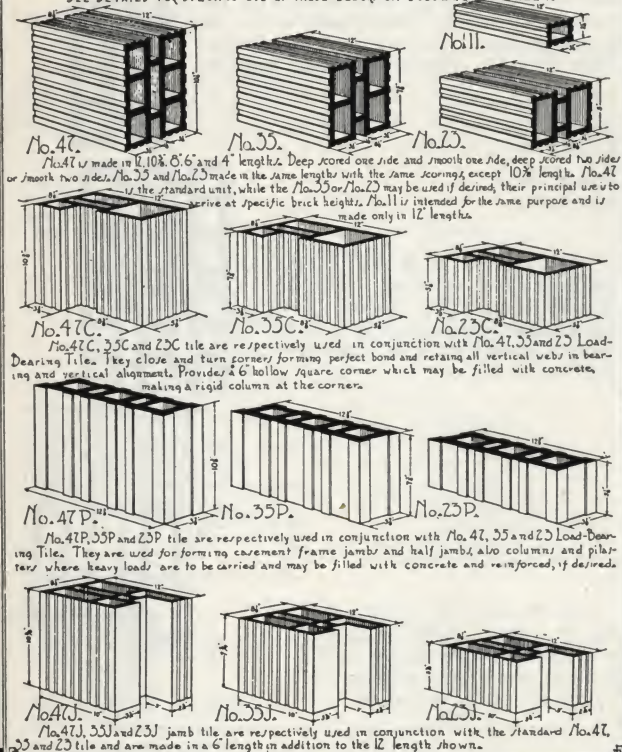
The No. 11 is a hollow unit for backing up header courses of brick and maintains both the insulating and the load bearing efficiency of the wall.



Construction Details of Load-Bearing Tile

LOAD-BEARING TILE

See DETAILS FOR SPECIFIC USE OF THESE BLOCKS ON SUBSEQUENT SHEETS

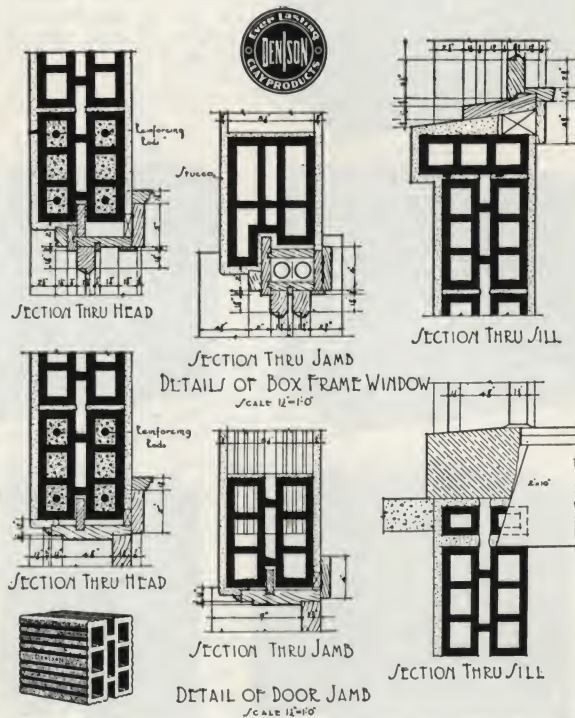


Set No. 1.

1921

SHEET No. 1.

LOAD-BEARING TILE



Set No. 2.

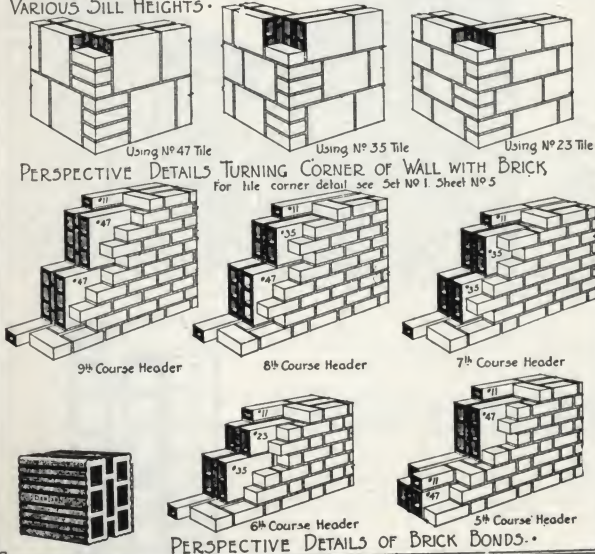
1921

SHEET No. 3.

LOAD-BEARING TILE



METHOD OF LAYING UP OPENINGS OF VARIOUS HEIGHTS AND OF ARRIVING AT VARIOUS SILL HEIGHTS.



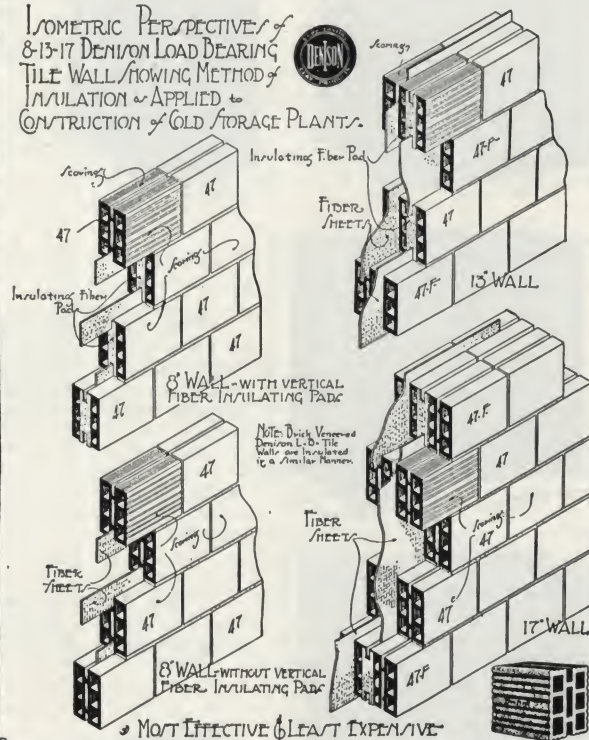
Set No. 5.

1921

SHEET No. 7.

LOAD BEARING TILE

ISOMETRIC PERSPECTIVE of
8-13-17 DENISON LOAD BEARING
TILE WALL SHOWING METHOD of
INSULATION as APPLIED to
CONSTRUCTION of OLD STORAGE PLANTS.



Set No. 8.

1916

SHEET No. 1.

Sample Construction Detail Plates Reduced

P. BANNON PIPE CO.

Hollow Tile Fireproofing and Patent Lidded Pipe LOUISVILLE, KY.

Products

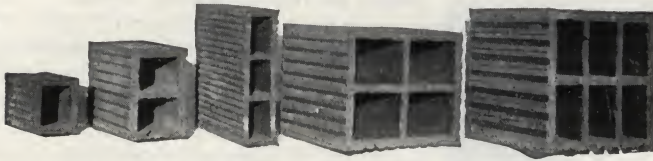
HOLLOW TILE FIREPROOFING; SHALE BRICK; FIRE BRICK; WALL COPING; FLUE LININGS; CHIMNEY TOPS; SEWER PIPES; PATENT LIDDED PIPE and EXPANSION PIPE SUPPORTS.

Also, Vitrified Culvert Pipe; Drain Tile; Glazed Conduit Pipe (for underground work); Vitrified Paving Brick and Blocks; Boiler and Grate Tile.

Hollow Tile and Shale Brick

Hollow Tile—For fireproofing of every description. Made of shale. For partitions and furring tile, 1½ to 16 in.; building tile, 6-cell and 9-cell, 6 to 12 in.; book tile, back up blocks; column covering; standard arch floor tile, 6 to 16 in.

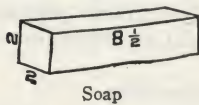
Shale Brick—Are manufactured hollow; with rough texture face, and common.



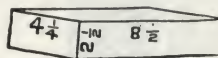
HOLLOW TILE SIZES

Fire Brick

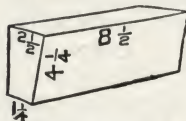
All shapes and sizes.



Soap



Square



Side Wedge

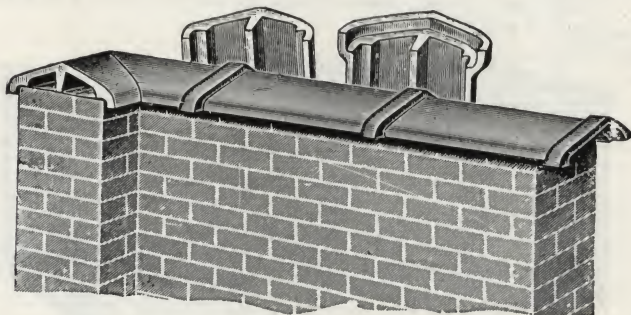


Circle, 36, 40 and 44

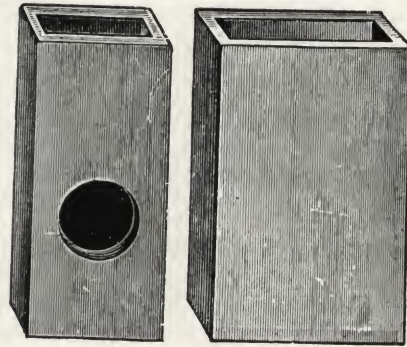
FIRE BRICK SIZES

Wall Coping

Made of best fire clay and shale, thoroughly vitrified, glazed to render surface as smooth as glass. Tile is shaped to fully cover wall, protecting same from action of the elements; also secures the top course of brick.



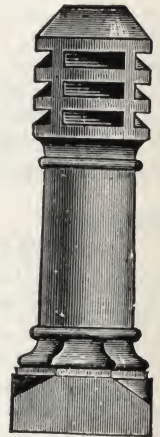
WALL COPING, HIP SHAPE
With or without rib



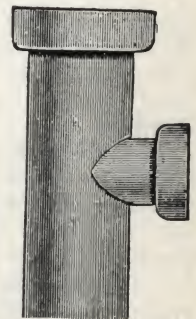
8½ x 13 in., pipe hole

13 x 13 in.

FLUE LININGS



No. 14
CHIMNEY TOP



SEWER PIPE
T-Branch

Sewer Pipe and Fittings

Made of vitrified salt glazed fire clay and shale.

The salt glazed surface, being smooth, clean and impervious, protects pipe and fittings from dampness, frost, all acids and sediments.

It is durable, low in cost, convenient for construction, and because of its smooth glazed surface has greater carrying capacity than any other material. It can be laid by unskilled labor.



LIDDED PIPE

For conducting steam and water pipe

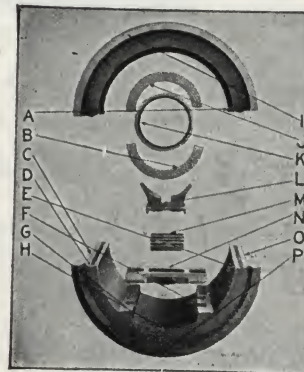


Plate E, Single Line

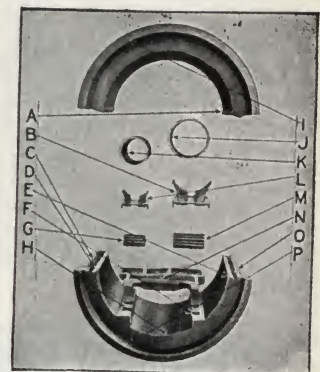


Plate F, Double Line

DETAIL OF CONDUIT

Reference letters point as follows:

Plates E and F—A, reinforcement inside along score cut on both sides of lid half; C, outer open scores; D, trenchlike fracture; E, inner open scores; F, support anchoring pocket; H, drainage space; I, hub of lid half; O, cement shelf and outer reinforcement at each side of lower half; P, hub of lower half.

Plate E, only—B and J, standard covering; K, 6-in. iron pipe; L, saddle receiving K, direct; M, 4½ x 2-in. toothed roller (meshes in rack of saddle and cradle); N, No. 15-F-15 cradle (the finger supported style).

Plate F, only—B, saddle for main line J; L, saddle for return line K; G, roller for return saddle; M, roller for main line saddle; N, No. 16-F-15-D cradle (the rib supported, boss-anchored style).

CLAY PRODUCTS COMPANY, INC.

Manufacturers of Insul-Glaz Tile, Caentile and Vitrified Clay Conduit

GENERAL OFFICE

BRAZIL, IND.

Products

INSUL-GLAZ TILE.

CAENTILE (Smooth and Matt).

Also manufacturers of Vitrified Clay Conduit, Building Conduit and Textured Interlocking Tile.

Material

In Insul-Glaz and Caentile it has been our aim to perfect a material for wall construction which combines the many advantages of structural tile with surface finishes, that in quality and appearance are acceptable for the highest class of projects.

Insul-Glaz Tile—Insul-Glaz Tile is a smooth face vitrified fire clay tile with a uniformly heavy salt glazed finish and of a color most desirable in this class of material.

Caentile—Caentile is a vitrified fire clay tile with colors and textures of the highest grades of buff and gray, smooth or matt face brick.

Qualities

Insul-Glaz Tile and Smooth Caentile—Super Quality—The standard of perfection of smooth face vitrified tile, glazed or unglazed.

Commercial Quality—A high grade vitrified tile, glazed or unglazed, suitable for many purposes.

Matt Face Caentile—First Quality—Standard of buff matt face vitrified tile unglazed.

Color

Insul-Glaz super quality tile is furnished in either a light, medium or dark shade. A range of shade will be furnished which blended in the wall will have an extremely light effect or a dark effect, as desired, and a ceramic beauty possible only with a slight mingling of shade.

Super quality smooth Caentile is furnished in blended shades of buff gray or cream buff.

Matt Caentile and commercial grades of Insul-Glaz Tile and smooth Caentile are furnished in full range of shade only.

While every endeavor is made to furnish shapes of the same variations of shade as the standard units, greater latitude must be permitted, particularly on rush shipments.

Construction Features of Insul-Glaz and Caentile

Insul-Glaz and Caentile have many advantageous construction features—among them the following stand out: fire, acid, oil and grease resistant; insulation quality; sanitary finish; high crushing strength and low dead weight; indestructibility; attractiveness of finish; economy and rapidity of erection; permanency of color and finish; readily cleaned; minimum upkeep; low relative cost.

Some of the Principal Uses

Among the principal uses of Insul-Glaz and Caentile are: finishing rooms of public or semipublic buildings where one or more of the construction features listed above are a necessity. School buildings—particularly in corridors, playrooms, workshops, basements, gymnasiums, laboratories, lavatories; for wainscots, etc. Others include hotels, natatoriums, hospitals, food preparation plants, power plants, warehouses, etc.

Facilities and Service

CLAY PRODUCTS COMPANY, INC. operates three factories with a combined capacity in excess of 125,000 tons per year. The plant locations are such that shipments can be made over any one of four trunk line railroads. Ample stocks of standard units are always on hand for prompt shipment.

The Company maintains an engineering department which is ready at all times to render assistance to the architect, engineer or builder in the solution of construction problems where the Company's products may be involved.

Special sizes or shapes can be manufactured to meet unusual conditions.



Window and Pilaster Detail, Office Building, Polar Ice & Fuel Co., St. Louis, Mo.



No. 400 Insul-Glaz Tile



No. 800 Smooth Caentile

Pertinent Data Regarding the Materials

Wall Thicknesses Which Can Be Built with Insul-Glaz and Caentile Units—*Veneer*— $1\frac{3}{8}$ and $1\frac{7}{8}$ in. (exclusive of mortar backing).

Single Faced— $3\frac{3}{4}$ and 8 in.

Double Faced— $4\frac{1}{4}$, $6\frac{1}{4}$, 8, $10\frac{1}{4}$, $12\frac{1}{4}$, $16\frac{1}{2}$ in. and up.

All walls from $4\frac{1}{4}$ in. may be of one finish of tile on one face and of a different finish of tile on the other face, i.e., a $4\frac{1}{4}$ -in. wall may be Insul-Glaz Tile on one face and Caentile on the other face.

NUMBER OF INSUL-GLAZ TILE OR CAENTILE REQUIRED PER SQUARE FOOT OF NET WALL

Thickness, in., of		Number of faces tile finished	Quantities required per sq. ft. of net wall
Veneer tile	Wall		
$1\frac{3}{8}$	.....	1-veneer	1.05 No. 350
$1\frac{7}{8}$	.....	1-veneer	1.05 No. 250
.....	$3\frac{3}{4}$	1	2.10 No. 400 or 1.05 No. 650
.....	$4\frac{1}{4}$	2	2.10 No. 250
.....	$6\frac{1}{4}$	2	1.05 No. 250 plus 2.10 No. 400
.....	8	1	2.10 No. 800
.....	$10\frac{1}{4}$	2	4.20 No. 400 or 2.10 No. 650
.....	$12\frac{1}{4}$	2	1.05 No. 250 plus 2.10 No. 800
.....	$16\frac{1}{2}$	2	2.10 No. 400 plus 2.10 No. 800
.....	$12\frac{1}{4}$	1-other face brick veneered; brick header every 6th course	4.20 No. 800
			0.70 No. 400 plus 1.40 No. 800 plus 7 face and 1 common brick.

Brick Displacement—Brick displaced by Insul-Glaz and Caentile equal 5x8x12-in. tile, 6 brick and 5x4x12-in. tile, 3 brick.

Crushing Strength—Approximately 3400 per sq. in. of gross bearing surface.

Absorption—Less than 5% of own weight in 48 hours.

Weight of Wall—Weight of Insul-Glaz and Caentile walls as compared to brick of equal thickness are given in the following table:

Insul-Glaz or Caentile		Equivalent Brick Wall*
Wall thickness, in.	Weight per sq. ft., lb.	Weight per sq. ft., lb.
$4\frac{1}{4}$	35	43
$6\frac{1}{4}$	55	84
8	60	84
$12\frac{1}{2}$	95	125

*Brick taken at 125 lb. per cu. ft.

Mortar Clinch—The $\frac{1}{2}$ -in. round holes in the exterior webs of the tile assure a permanent mortar clinch in the vertical joints of the tile wall, an important factor in exposed tile construction.

Hand Smoothed Edges—All cut edges are hand smoothed, in the green, so that finished faces will be free from any roughness or feathered edges, which are not only unsightly but cause chipping.

Mortar and Mortar Color—Insul-Glaz and Caen-

tile are designed for $\frac{1}{2}$ -in. joint and details of construction are standard for this size of joints. Some variation is possible to meet individual tastes.

Double Faced Walls—It is not recommended that double faced walls be built of one tile extending through the wall, but rather of two units as shown in details on plates following. This procedure will permit of alignment of both faces at a cost no higher than would be necessary with two-faced sorting.

Tests—The testing laboratory of the University of Wisconsin has made a series of tests on Insul-Glaz and Caentile. Copies of the reports of test will be sent upon request.

The following results of tests on three blocks are taken from one of the certified reports:

TEST ON STANDARD 5x8x12-IN. BLOCK

No.	Strength per sq. in.	*Percent of voids	Weight, lb.	Weight after 48 hr. immersion, lb.
Clay P. C. 4	3950	45.3	20.00	20.15
Clay P. C. 5	3690	44.5	19.02	19.13
Clay P. C. 6	3700	45.4	19.73	19.80

*Not including 10 small round holes lengthwise, 5 in. each vertical web.

Sorting, Packing and Shipping

Insul-Glaz tile are sorted for one face only, except shapes which are sorted for faces as marked on details.

Insul-Glaz tile are packed in the car with extreme care and thoroughness. Lath gates are used between tiers, lath and straw between rows and corrugated paper between faces.

Shipped by carload lots the minimum loadings are—

No. 800, 5x8x12 in., 3400 pieces

No. 400, 5x4x12 in., 5000 pieces

No. 650, combination 5x8x12 in. and 5x4x12 in., 3000 pieces.

Comparative Cost

Super quality tile average throughout the United States (east of Rockies) from 15 to 35% cheaper than salt glazed brick or interior face brick, in the wall.

Commercial grade tile average about the same as common brick, in the wall.

Samples

Samples of Insul-Glaz Tile, Smooth Caentile and Matt Caentile will be sent, without charge, to architects on request.

When Specifying

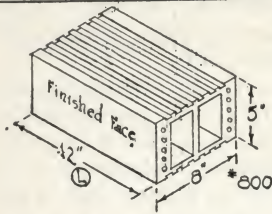
When specifying, give kind of material, quality, color range, whether bullnose or square closures, and whether cove base and wainscot cap units are desired.

References

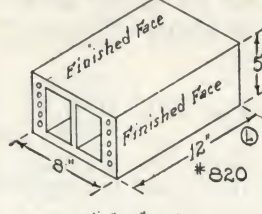
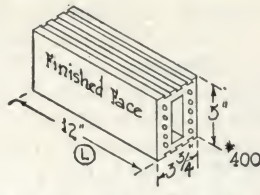
The varied character of the buildings listed below indicate the possibilities and the wide uses to which Insul-Glaz and Caentile can be applied.

BUILDING AND LOCATION	ARCHITECT
Horace Mann School, Gary, Indiana	Wm. B. Ittner, Inc.
Columbia Power Station, Miami Fort, Ohio	Sargent & Lundy
Industrial School, Boston, Mass.	Stone & Webster
Olympia Sports Arena, Detroit, Mich.	C. Howard Crane
Horn & Hardart Baking Company, Philadelphia, Pa.	Ralph Bencker
Sisters of the Sorrowful Mother Convent, N. Milwaukee, Wis.	E. Breilmaier & Sons Company
University of Texas Power Plant, Austin, Texas	Herbert M. Greene Company
Y. W. C. A., Washington, D. C.	Arthur B. Heaton

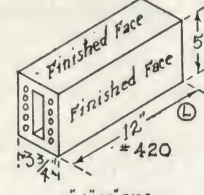
BUILDING AND LOCATION	ARCHITECT
Michigan State Militia Armories	State Architect
Cudahy Packing Plant, Kansas City, Mo.	Company Engineers
Cooper Hospital, Camden, N. J.	Morris & Erskine
Eastman School of Music Gymnasium, Rochester, N. Y.	Gordon & Kaelber
Columbia Country Club, Chevy Chase, Md.	Arthur B. Heaton
Allen County Infirmary, Hantertown, Ind.	C. R. Weatherhogg
Junior High School, Albany, N. Y.	Marcus T. Reynolds
Six Substations, Duquesne Light Company, Pittsburgh, Pa.	Byllesby Engr. & Management Corp'n
Highland Dairy Plant, Highland, Ill.	Neal C. Davis
Lasell Gymnasium, Williams College, Williamstown, Mass.	Densmore, LeClear & Robbins
Bath House, Cleveland Heights, Ohio	W. R. Powell
Hudson County Jail, Jersey City, N. J.	John T. Rowland
Y. M. C. A., Meridian, Miss.	P. J. Krouse
Fire House, Riverside, N. J.	Herbert O. Ziegler



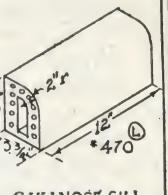
STANDARD 5x8x12 STRETCHER. 400 AND 800 SELECTED FOR ONE FACE ONLY



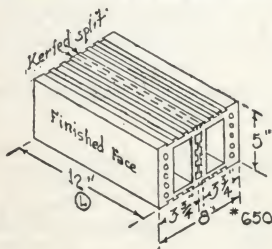
5x8x12 SILL (OR LINTEL) TILE. SELECTED FOR TWO ADJACENT FACES. ALSO FURNISHED IN 4-6 & 8 INCH LENGTHS.



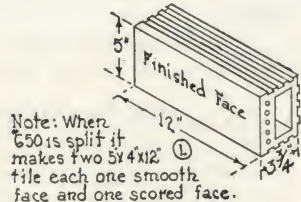
5x4x12 SILL (OR LINTEL) TILE. SELECTED FOR TWO ADJACENT FACES. ALSO FURNISHED IN 4-6 & 8 INCH LENGTHS.



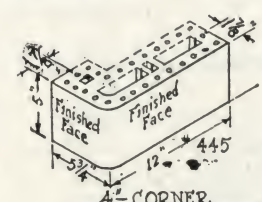
BULLNOSE SILL (OR LINTEL) STRETCHER TILE. ALSO FURNISHED IN 4-6 & 8 INCH SHORT LENGTH.



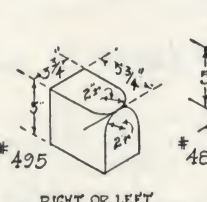
COMBINATION 5x8x12 AND 5x4x12 TILE. 600-12" L-SELECTED ONE-FACE EQUALS ONE SUPER-QUALITY 5x8x12 OR ONE SUPER-QUALITY 5x4x12 AND ONE COMMERCIAL 5x4x12. 650-12" L-SELECTED TWO-FACE EQUALS TWO SUPER-QUALITY 5x4x12.



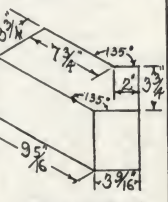
Note: When 650 is split it makes two 5x4x12 tile each one smooth face and one scored face.



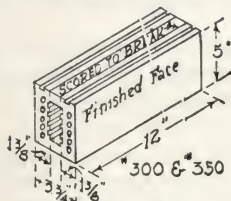
4" CORNER BULLNOSE KERFED METHOD OF KERFING FOR USE WITH 250 TILE



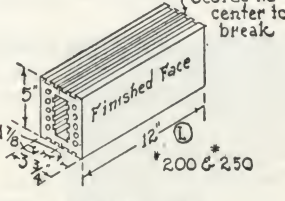
RIGHT OR LEFT BULLNOSE STARTER TILE. FOR USE WITH BULLNOSE JAMB & BULLNOSE SILL (OR LINTEL)



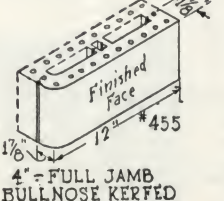
COMBINATION INT. & EXT. OCTAGONAL CORNER



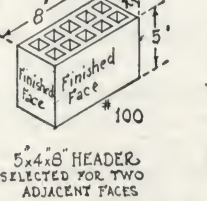
SLAB TILE. SELECTED FOR: 300 FOR 1-5x12 FACE, 350 FOR 2-5x12 FACES. 400-650-600-300-350-200-250 ARE ALSO FURNISHED IN 4-6 & 8" SHORT LENGTHS.



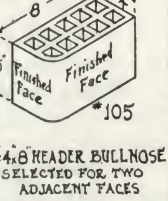
KERFED TILE. SELECTED FOR: 200 FOR 1-5x12 FACE, 250 FOR 2-5x12 FACES.



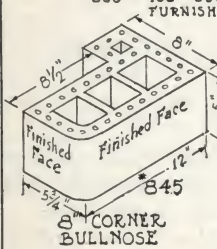
4" FULL JAMB BULLNOSE KERFED METHOD OF KERFING FOR USE WITH 250 TILE



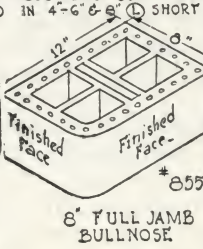
5x4x8 HEADER. SELECTED FOR TWO ADJACENT FACES. 100 IS THE ONLY STANDARD CLOSURE UNIT FURNISHED WITH MATT FACE. TILE. ONE USE OF 5x4x8 HEADER IS TO BREAK BOND OF STRETCHER TILE AT 4" & 8" POINTS. HALF HEADER TILE 5x3 1/2x5 3/4 MAY BE SECURED BY SPECIAL MANUFACTURE.



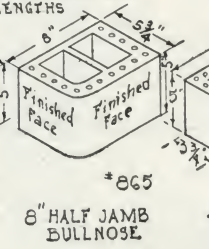
5x4x8 HEADER BULLNOSE. SELECTED FOR TWO ADJACENT FACES.



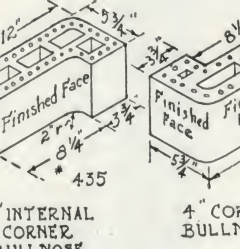
8" CORNER BULLNOSE



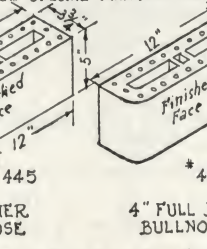
8" FULL JAMB BULLNOSE



8" HALF JAMB BULLNOSE



4" INTERNAL CORNER BULLNOSE



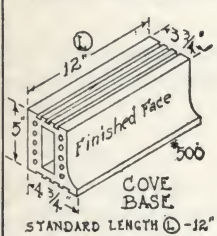
4" CORNER BULLNOSE



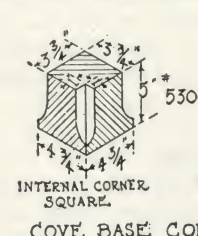
4" FULL JAMB BULLNOSE

4" HALF JAMB BULLNOSE

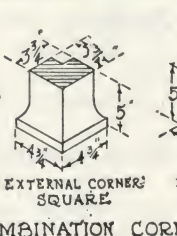
THESE UNITS (EXCEPT 435) CAN ALSO BE FURNISHED AS SQUARE CLOSURES AND ARE DESIGNATED 840-850-860-440-450 & 460 RESPECTIVELY.



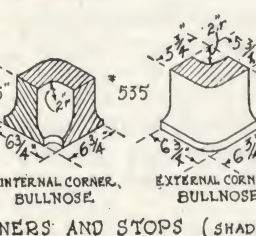
STANDARD LENGTH 12"



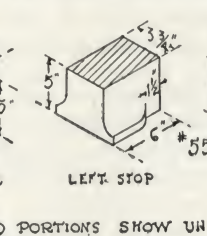
INTERNAL CORNER SQUARE



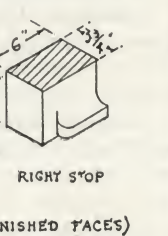
EXTERNAL CORNER SQUARE



INTERNAL CORNER BULLNOSE

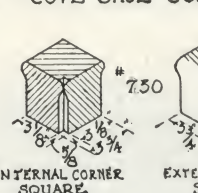


EXTERNAL CORNER BULLNOSE

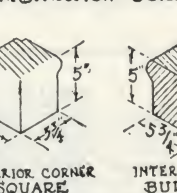


LEFT STOP

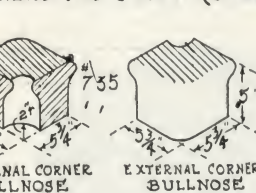
RIGHT STOP



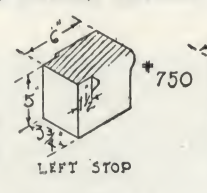
INTERNAL CORNER SQUARE



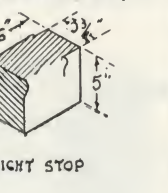
EXTERNAL CORNER SQUARE



INTERNAL CORNER BULLNOSE



EXTERNAL CORNER BULLNOSE



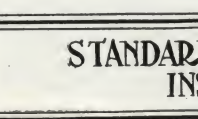
LEFT STOP

RIGHT STOP

WAINSCOT CAP COMBINATION CORNERS AND STOPS



STANDARD LENGTH 12" 500 & 700 ARE ALSO FURNISHED IN 4-6 & 8" SHORT LENGTHS.



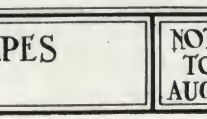
INTERNAL CORNER SQUARE



EXTERNAL CORNER SQUARE



INTERNAL CORNER BULLNOSE



EXTERNAL CORNER BULLNOSE



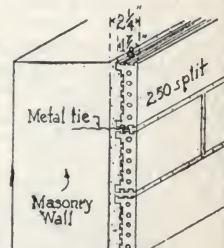
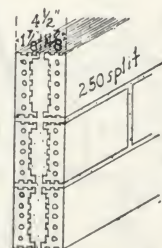
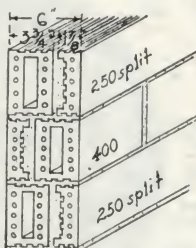
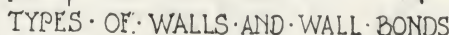
LEFT STOP

RIGHT STOP

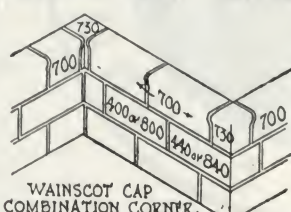
DRAWN BY SWEET'S CATALOGUE SERVICE

STANDARD STRETCHER UNITS AND SHAPES INSUL-GLAZ AND CAENTILE

NOT DRAWN TO SCALE AUG. 31, 1927 DRWG 1

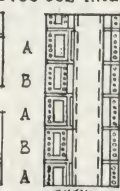


TYPES OF WALLS ILLUSTRATING THE USE OF KERFED TILE

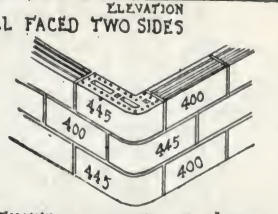


COVE BASE
COMBINATION CORNER

WAINSCOT CAP
COMBINATION CORNER



COURSE B - 550328
CHASE CONSTRUCTION IN 1



EXTERIOR CORNER OF 4" WALL
THIS CORNER TILE IS NOT FINISHED ON
8 1/4" X 5" OR 2" X 5" FACE

SUGGESTED
STANDARD
OPENING WIDTHS

0-4	6-5
0-8	6-3½
1-0½	6-7
1-1	6-11½
1-4½	7-3½
1-9	7-4
2-1	7-7½
2-1½	8-0
2-5	8-4
2-9½	8-4½
3-1½	8-8
3-2	9-0½
3-5½	9-4½
3-10	9-5
4-2	9-8½
4-2½	10-1
4-6	10-5
4-10½	10-5½
5-2½	10-9
5-3	11-1½
5-6	11-5
5-11	11-6

[illegible]

No. of Cours.	Table A	Table B	Table C	Table D
1	0-52	0-0	0-4	0-0
2	0-11	0-11	0-11	0-11
3	1-4	5	1-8	1-3
4	1-10	1-10	1-13	1-13
5	2-5	2-4	2-22	2-22
6	2-9	2-9	2-7	2-8
7	5-2	5-3	5-16	5-16
8	5-4	5-4	5-10	5-10
9	4-7	4-2	4-0	4-0
10	4-7	4-7	4-5	4-6
11	5-0	5-1	4-8	4-8
12	5-6	5-6	5-4	5-5
13	5-11	5-6	5-0	5-0
14	6-1	6-1	6-1	6-1
15	6-10	6-11	6-9	6-9
16	7-4	7-4	7-2	7-3
17	7-9	7-9	7-8	7-8
18	8-5	8-5	8-1	8-2
19	8-10	8-10	8-10	8-10
20	9-5	9-2	9-0	9-1
21	9-7	9-8	9-6	9-6
22	10-1	10-1	9-10	10-6
23	10-6	10-7	10-5	10-5
24	11-0	11-0	10-8	10-11
25	11-5	11-5	11-5	11-5
26	11-11	11-11	11-9	11-10
27	12-4	12-5	12-3	12-3
28	12-10	12-10	12-8	12-9
29	13-3	13-3	13-4	13-4
30	13-9	13-9	13-7	13-8
31	14-2	14-3	14-1	14-1
32	14-8	14-8	14-6	14-7
33	15-1	15-2	15-0	15-0
34	15-7	15-7	15-5	15-6
35	16-0	16-1	15-14	15-14
36	16-6	16-6	16-6	16-6
37	17-0	17-0	17-0	17-0
38	17-5	17-5	17-3	17-4
39	18-4	17-17	17-9	17-9
40	18-4	18-4	18-2	18-3

Note: Dimensions are subject to slight variations to be taken up in the joints.

**DRAWN BY
SWEETS CATALOGUE
SERVICE**

DETAILS OF CONSTRUCTION INSUL-GLAZ AND CAENTILE

SCALE: $\frac{3}{8}$ " = $\frac{3}{4}$ "
EQUALS 1 FT.
AUG. 26, 1927

HEATH CUBE SERVICE, INCORPORATED

Sustained by Licensed Heath Cube Manufacturers for National Sales Promotion

2525 North High Street

COLUMBUS, OHIO

LICENSED MANUFACTURERS

BASCOM, OHIO, J. A. MILLER TILE COMPANY
CHICAGO, ILL., WM. E. DEE COMPANY
CHILLICOTHE, MO., SHALE HILL BRICK & TILE COMPANY
CLEVELAND, OHIO, CLEVELAND BUILDERS SUPPLY & BRICK CO.
COLUMBUS, OHIO, OHIO FIRE PROOFING COMPANY
COLUMBUS, OHIO, NELSONVILLE BRICK COMPANY
DALLAS, TEX., FRASER BRICK COMPANY
DENVER, COLO., DENVER SEWER PIPE & CLAY COMPANY
EAST ST. LOUIS, ILL., HILL BRICK COMPANY
EL PASO, TEX., INTERNATIONAL BRICK COMPANY
HASTINGS, NEB., WESTERN BRICK & SUPPLY COMPANY
JACKSONVILLE, FLA., INTERLOCKING TILE COMPANY
LOS ANGELES, CALIF., LOS ANGELES PRESSED BRICK CO.
LOWELLVILLE, OHIO, MAHONING SHALE PRODUCTS COMPANY

LOUISVILLE, KY., CORAL RIDGE CLAY PRODUCTS COMPANY
MONTGOMERY, ALA., JENKINS BRICK COMPANY
MURPHYSBORO, ILL., MURPHYSBORO PAVING BRICK CO.
NEW YORK, N. Y., HEATH CUBE SALES, INC., 101 Park Avenue
NEWARK, N. J., BARNHART & TURNER, 31 South Street
PITTSBURGH, PA., MARTIN BRICK COMPANY
ROCKFORD, IOWA, ROCKFORD BRICK & TILE COMPANY
SALT LAKE CITY, UTAH, SALT LAKE PRESSED BRICK COMPANY
SAN FRANCISCO, CALIF., N. CLARK & SONS
SHEFFIELD, IOWA, SHEFFIELD BRICK & TILE COMPANY
SPOKANE, WASH., AMERICAN FIRE BRICK COMPANY
TACOMA, WASH., FAR WEST CLAY COMPANY
TRINIDAD, COLO., TRINIDAD BRICK & TILE COMPANY
WASHINGTON, D. C., UNITED CLAY PRODUCTS COMPANY

Patents

UNITED STATES

No. 1,158,362 October 26, 1915
No. 1,215,149 February 6, 1917
No. 1,244,328 October 23, 1917
No. 1,294,905 February 18, 1919
No. 1,319,336 October 21, 1919
No. 1,391,318 September 20, 1921
No. 1,403,953 January 17, 1922
No. 1,453,837 May 1, 1923
No. 1,511,467 October 14, 1924
No. 1,544,577 July 7, 1925
No. 1,553,858 September, 15, 1925
No. 1,556,333 October 6, 1925
No. 1,568,155 January 5, 1926
No. 1,581,574 April 20, 1926
Re. No. 16,468 November 9, 1927
Other patents pending.

Rights to manufacture and sell granted by the Heath Unit Tile Company, Tacoma, Washington, owners of the above patents.

A New Principle in Hollow Tile Construction

The Heath Cube is the outgrowth of all hollow tile, brickwork, and masonry in general. It is the first tile construction that recognizes the time honored brick dimension as established in masonry. The Heath Cube's adaptability is due to a size coinciding with brickwork. A brick is the unit of measure for the Heath Cube. It is a construction which gives an architect assurance of a dependable and scientifically constructed wall. It is dependable, as it cannot be incorrectly laid; and scientific, as it builds a wall with the webs and shells in fixed alignment.

The wall is built up in consistently formed tiers of load bearing members formed with the webs and shells in fixed alignment. This property is the same in either side-set or end-set cubes, or with halves and quarters. This is a property unique in Heath Cubes. There is no patch work in Heath Cube construction. Heath Cubes are the structural and economic solution of hollow tile construction. The inherent property of Heath Cubes is the constant and fixed alignment of the double webs over



two shells, which insures maximum strength in both side-set and end-set construction. No shear stresses are developed.

Architect's Detail Booklet

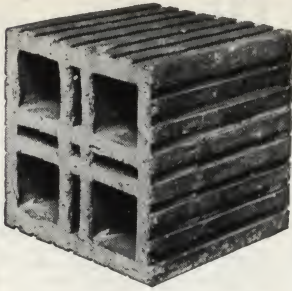
Write the Heath Cube Service or your nearest manufacturer for the Architect's Detail Booklet, which gives complete details, specifications, and full information pertaining to the use of Heath Cubes.

Quality Standards

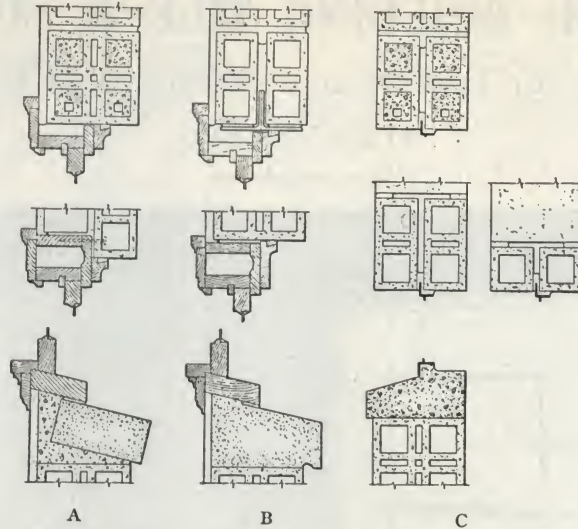
Manufacturers have been selected to make Heath Cubes on their ability to produce high grade quality products. The required quality conforms to the specifications of the Hollow Building Tile Association and the American Society for Testing Materials. Heath Cubes are one standard size and quality throughout the United States.

Estimating Data

2 Half-Cubes build 1 sq. ft. of 4-in. wall.
2 Cubes build 1 sq. ft. of 8-in. wall.
2 Cubes and 2 halves build 1 sq. ft. of 12-in. wall.
3 Cubes and 2 halves build 1 sq. ft. of 16-in. wall.
4 Cubes and 2 halves build 1 sq. ft. of 20-in. wall.
3 Cubes equal 1 cu. ft., including mortar.
1 Cube equals 6 brick, including mortar.
167 Cubes equal 1000 brick in the wall.
1000 Cubes require 1 yd. of mortar.
120 lb. per sq. in. gross area, is the safe working load for either side-set or end-set construction.
Webs and shells are $\frac{5}{8}$ in. thick. Cube contains 52% solids and 48% voids.
One cubic foot of Heath Cube masonry weighs 60 lb.
Cubes are generally scored but they may be obtained smooth on as many faces as desired.



One Cube
18 pounds



Window Details for 8-inch Walls

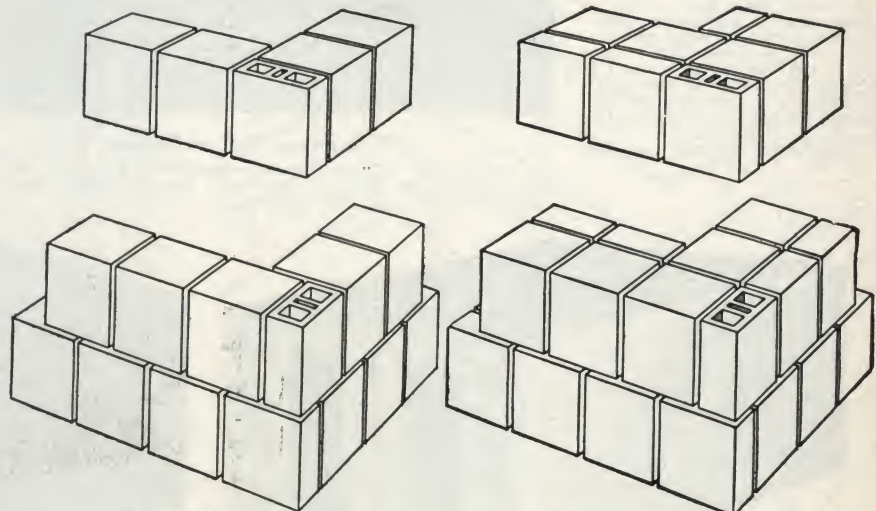
- A—Recess for box frame, brick sill, reinforced lintel.
B—Box frame without recess, stone sill, angle iron lintel.
C—Metal sash frames, with jamb of Half and Quarter Cubes



Six Brick
30 pounds

Wall Construction

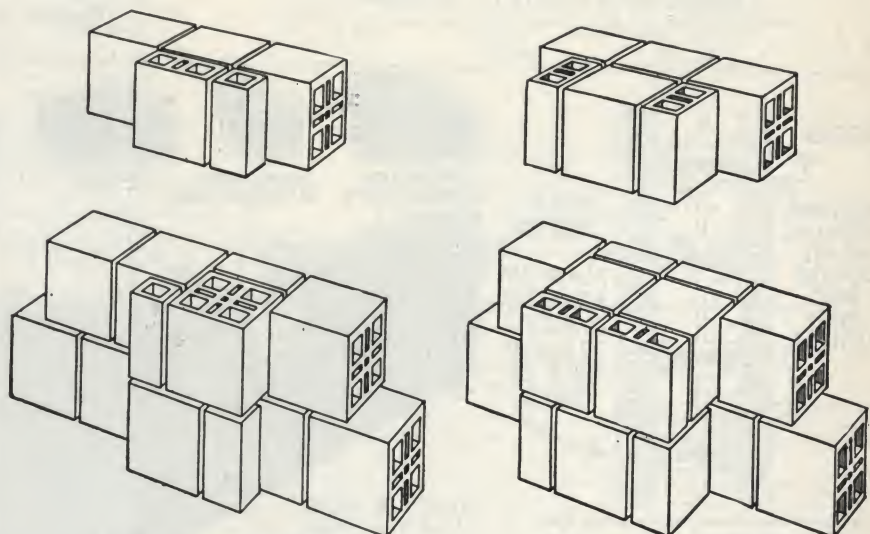
Cubes and Half-Cubes build walls same thicknesses as brickwork. Bonds face brick with through brick or metal ties for 8-in. walls. For walls 12 in. and thicker the Header-Cubes are used, bonding every third or sixth course of brick



Corner, 8-inch Wall

Corner, 12-inch Wall

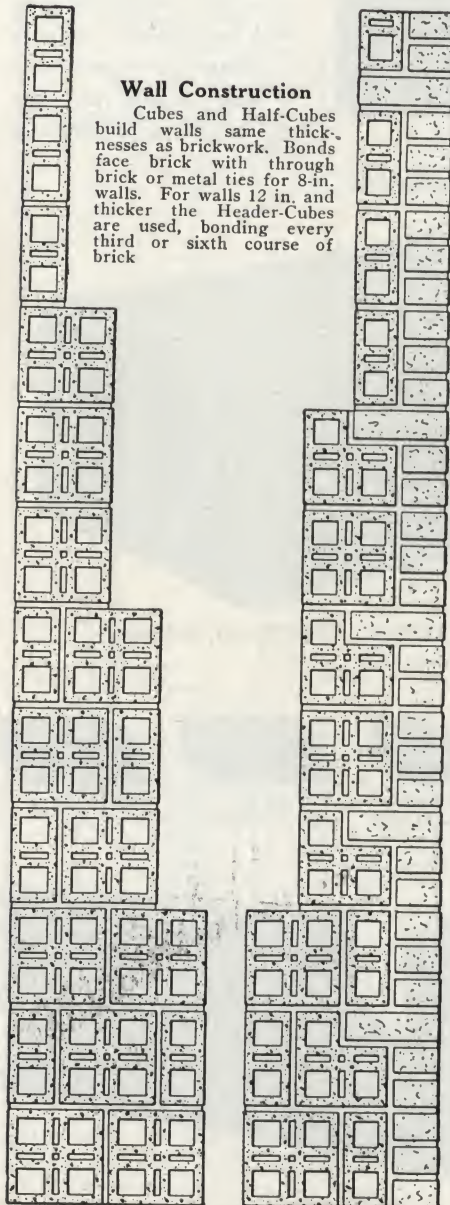
Method of building corners by end-setting Half-Cubes



12 by 4-inch Pilaster

16 by 8-inch Pilaster

Method of building pilasters by end-setting Cubes, Half-Cubes and Quarter-Cubes. No special tile shapes are required



HOOSIER BUILDING TILE & SILO CO.

Glazed Tile for Interior and Exterior Wall Construction

ALBANY, IND.

Hoosier Interior Tile

Made from our light-burning fire clay, burned to an extreme degree of hardness.

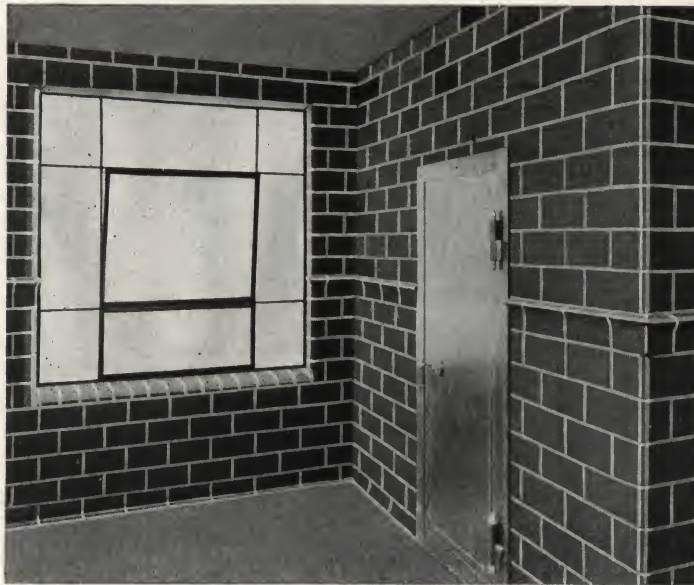
Colors—Light or dark buff, gray or cream shades.

Finish—Smooth or wire-cut glazed, or semiglazed. All smooth finish product for interior wall construction has hand dressed edges.

Size—5x12-in. face. Furnished in 4 and 8-in. widths in regular or scored-to-split designs for working out different thicknesses of wall. (See accompanying illustration of blocks. Details of measurement on following page.)

Uses—The principal use of Hoosier interior tile is for sanitary walls in public and semi-public buildings. In school buildings it is particularly appropriate for corridors, workshops, basements, gymnasiums, laboratories, lavatories, etc., where it is used as wainscoting. This material is also used quite extensively in power plants, warehouses, store-rooms, factories, packinghouses, etc. We recommend our light gray and cream colors in the semiglazed finish for use above wainscot or in wall construction where the reflection of glazed tile would be undesirable.

Grading—Hoosier interior



Interior Wall of Hoosier Tile

Interior and exterior corners, wainscot cap and base with base in connection with window and door openings. Special shapes can be furnished for Hoosier interior wall tile construction.

tile is graded as "A," "B" and "C" grades. "A" grade is our standard of perfection. "B" grade is a good quality product, not sorted as to shade and admitting of certain mechanical defects not allowable in "A" quality in either the glazed or semiglazed finish. "C" grade consists of culls or, as they are sometimes termed, seconds. (Write for special detailed sheet.)

Loading and Packing—Hoosier interior "A" grade tile is packed with corrugated paper between faces and lath or paper between ends. "B" and "C" grades will be packed in straw unless otherwise agreed on.

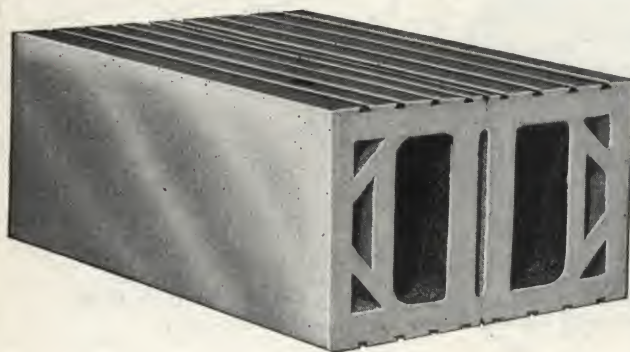
Hoosier Exterior Tile

In light colors it is made from our light-burning clay and in dark colors from our dark-burning clay; thoroughly vitrified and furnished in salt-glazed, semiglazed and dull finish.

Colors—Light or dark brown, gray, cream, wine-black and special mixtures, all of which are designated by shade numbers.

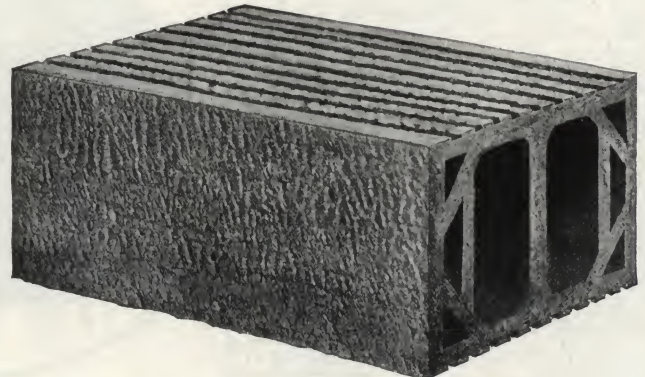
Finish—Smooth or wire-cut glazed, or semiglazed.

Size—5x12-in. face, furnished in 4, 8 and 12-in. widths. (See illustrations at bottom of page.)

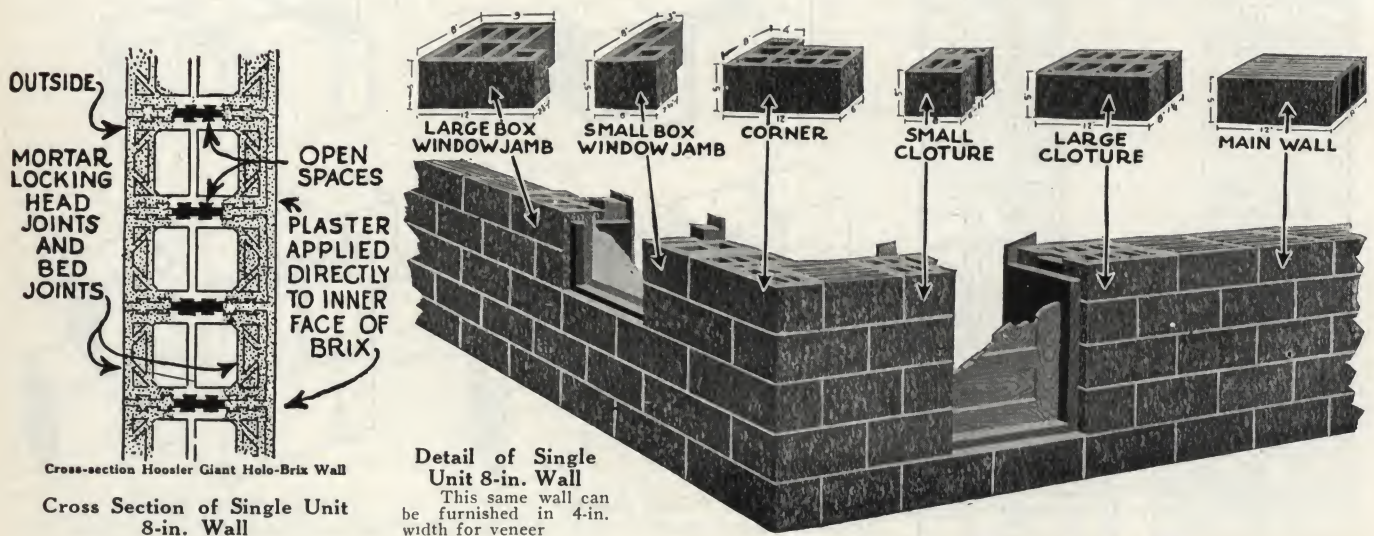


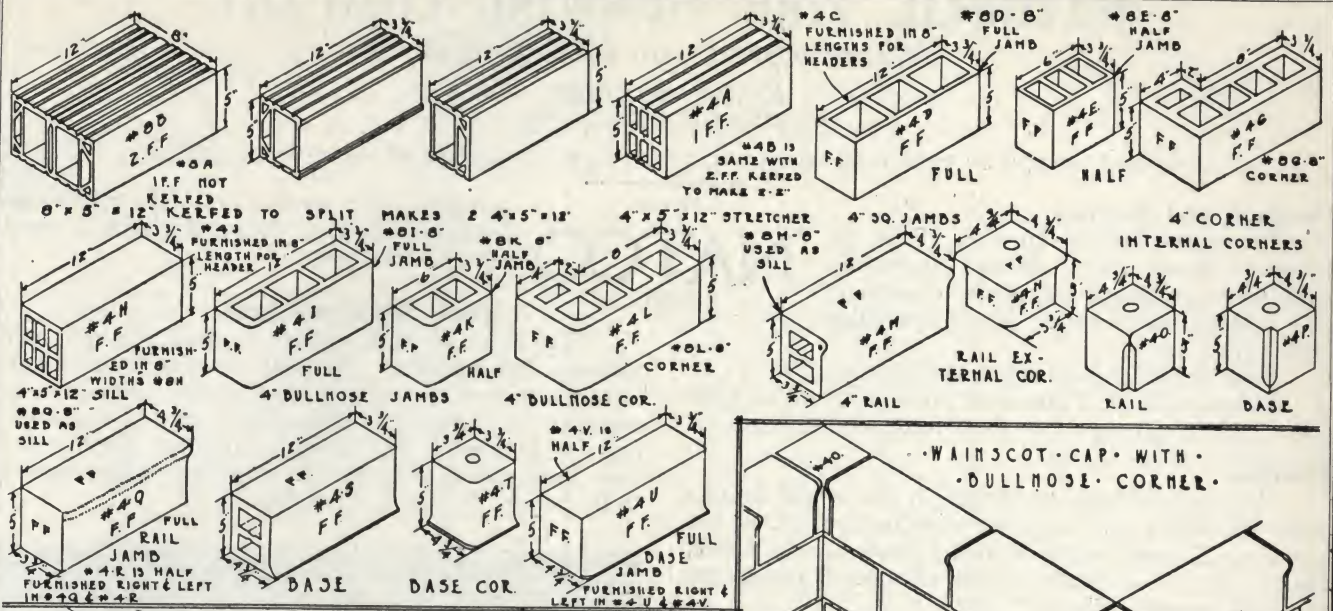
Smooth Glaze 8x5x12-in. Stretcher

Kerfed to make two 4-in. blocks with two finished faces

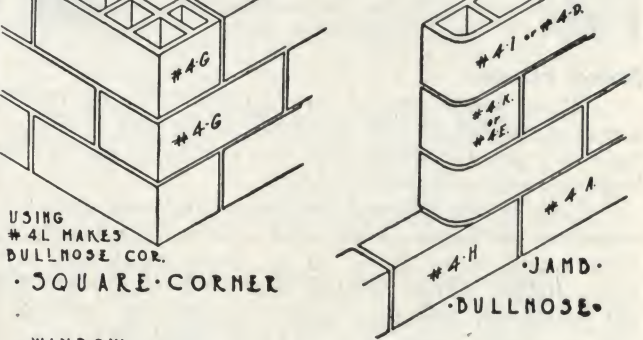


Regular 8x5x12-in. Matt Finish Stretcher

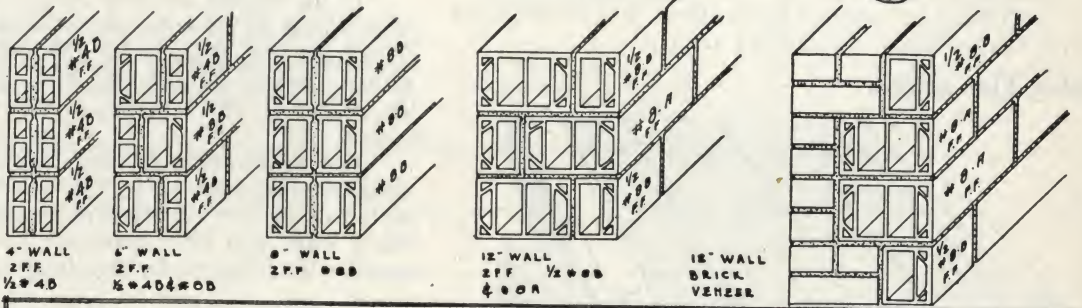
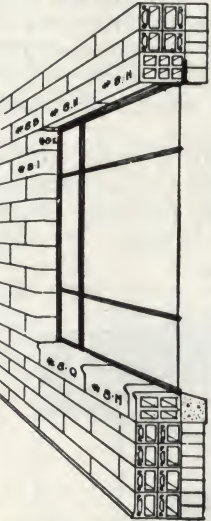




DETAILS BLOCKS IN PLACE



WINDOW CONSTRUCTION



Explanation

F. F. means finished face
 1 F. F. means one finished face
 2 F. F. means two finished faces
 8A and 8B, 4A and 4B, etc., is the stock number of the block
 Always order interior tile by stock number
 Measurements are as nearly accurate as possible, however, consideration must be made for slight shrink in burning, which is true of all clay products

Colors for interior: Buff, Gray and Cream
 Colors for exterior: Dark, Medium or Light Shades of Brown
 Colors in our "A" quality ware will be furnished according to our shade numbers with reasonable variation to bring out the ceramics
 For those looking for a good and less expensive job our "B" quality in full range of shades is quite popular

Special Shapes for Interior Wall Construction

Construction Features of Hoosier Tile

Uses—Hoosier wire-cut or mat-finish tile is used quite extensively for exterior finished wall in public buildings, such as churches, offices, storerooms, apartments, etc., and also in the more massive type of residence construction. Our smooth-glaze tile, in dark brown colors, we recommend for use in the construction of garages, factories, sidewalls of storerooms, basement walls, or in any class of building wherein line brick or cement block would be considered.

Grading—Hoosier exterior tile is graded as to first and second quality. Our first quality is our standard of perfection in this class of ware and is graded in different shades and blends, all of which are specified by shade number. Our second quality is a hard-burned product. No attempt is made to sort as to shade, and defects are admitted which are not allowable in our first quality. This grade will make a good wall in cases wherein appearance would not be considered.

Loading and Packing—All Hoosier exterior tile is loaded with straw between faces and ends. (Send for special color chart showing shades.)

May be summed up as follows:
 A crushing strength of more than 2000 lb. per sq. in., with a moisture test of less than 3%, make the product adaptable to load bearing finished walls. All tile are 5x12-in. face, with proper units to work in connection with openings to make bond. (See drawings.)
 Walls can be built in any multiple of 2 in. in width. Our 4 and 8-in. widths are the most popular. The former equals three brick and the latter, six. The unit is of such size that it lays up fast, eliminating unnecessary mortar joints and thereby saving both labor and mortar. As a natural consequence, there is a saving of from 20% to 30%, as compared to brick.
 In addition, are the advantages, of a hollow wall for insulation and the sanitary features of a hard-burned, glazed and non-absorbent wall with a load weight reduction of approximately 40% as compared with brick construction—a wall with an appealing and distinctive beauty that very much resembles brick in construction.

NATIONAL FIRE PROOFING COMPANY

Manufacturers of Hollow Tile

Fulton Building
PITTSBURGH, PA.

BRANCH OFFICES IN PRINCIPAL CITIES AND TWENTY-TWO FACTORIES IN THE UNITED STATES

Products and Services

STANDARD DENSE HOLLOW TILE for fireproof floors, roofs, ceilings, partitions, wall furring, column and girder coverings; for exterior walls of all kinds, including barns, silos, etc.

Also Kiln Bottom Brick and Fire Clay.

Contractors for FIREPROOF CONSTRUCTION in HOLLOW TILE in Chicago and New England Districts.

Facilities

We are the largest concern in the world devoted solely to hollow tile fireproof construction. Our output from 22 conveniently located factories in the United States and 1 in Canada insures economical transportation and prompt delivery.

Branding

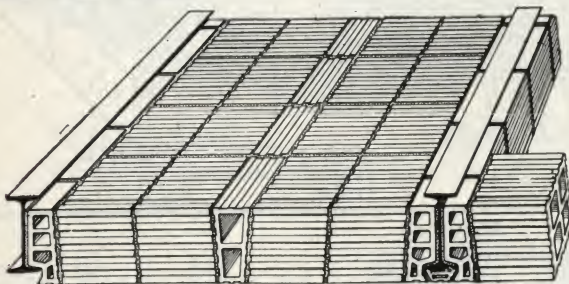
We originated the policy of branding all our hollow tile with our trade-mark name, Natco. Special types bear individual marks of identification, as: Natco XXX, Natco Header-Backer, Natco Backup, etc.

Natco Floor Construction

Fireproof floors of Natco hollow tile can be set more safely and conveniently than concrete floors in winter, as construction dries out in a few days. Floors are of two general types: (1) short span arches (segmental or flat) between steel beams; and (2) long span slabs of hollow tile in combination with reinforced concrete, supported on bearing walls or girders (steel or reinforced concrete). Sound and fire proof.

Following are typical illustrations and descriptions of the Natco floors in everyday use:

Natco Flat Arches



PERSPECTIVE OF STANDARD NATCO FLAT ARCH

To find total dead load of any floor use the following weights: Rock asphalt tile or cement finish weighs about 140 lb. per cu. ft.; wood flooring, 3½ lb. per sq. ft.; wood sleepers, 30 lb. per cu. ft.; cinder concrete fill, 60 lb. per cu. ft.; hollow tile arch, see table following; plastering, 5 lb. per sq. ft.; steel I-beam, divide weight of beam by span in feet

WEIGHTS AND SPANS. NATCO FLAT ARCH

Depth of arch, in.	Approximate weight, lb. per sq. ft.	Maximum safe spans	
		ft.	in.
6	28	4	0
7	31	4	6
8	33	5	0
9	37	6	0
10	39	6	6
12	44	8	0
14	51	9	0
15	53	9	6
16	55	10	0

The flat arch, the accepted type of standard fireproof floor construction, meets every requirement as to

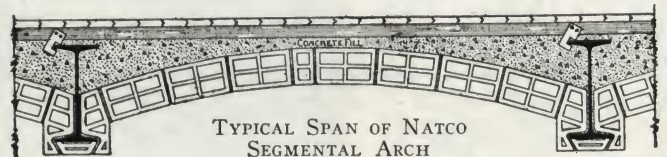
TRADE

NATCO
MARK

strength, fire protection, appearance and minimum weight. Natco flat arch is standard for this type.

Natco Segmental Arch

This form of arch combines great strength with economy and lightness. Suitable for warehouses, lofts, factories, sidewalks, or wherever a flat ceiling is not essential. A metal lath hung ceiling may be suspended from it to give a flat ceiling—a system employed in New York public schools, etc. It weighs approximately 35 lb. per sq. ft. for 6 in. arches.



TYPICAL SPAN OF NATCO SEGMENTAL ARCH

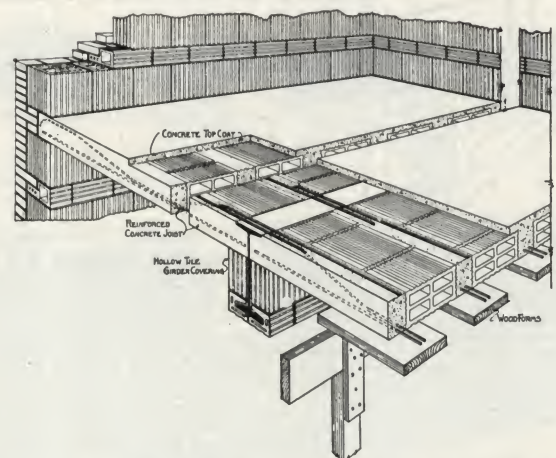
Natco Floors

These floors are of two types: (1) the regular one-way system of tile in combination with reinforced concrete; and (2) "Natcofloor"—a system of tile in combination with reinforced grout.

Both floors, adapted particularly to long span construction, eliminate girders and intermediate beams for clear spans up to 25 or 30 ft., doing away also with beam forms. They require one-third to one-half less flat centering, effecting great economy in erection—2x8-in. planks under each joist are sufficient.

In the regular one-way system of combination floor, rows of tile 12 in. wide are set between reinforced concrete joists 4 to 6 in. wide, which are poured monolithic with a concrete top, usually 2 or 2½ in. thick over the tile, mixed 1 part cement, 2 parts sand and 4 parts gravel.

For semicontinuous and continuous spans, proper reinforcement must be provided in top of slab over supports to take care of negative bending moment. Where heavy loads and long spans are encountered, the shear must be investigated by the designer.



PERSPECTIVE VIEW OF TYPICAL "COMBINATION" FLOOR
Note economical wood centering used; 2x8 or 2x10 in. under each joist is sufficient

TILE DEPTH AND STEEL AREA REQUIRED, "COMBINATION" FLOOR SLABS, 2-IN. CONCRETE TOP, JOISTS 4 IN. WIDE, 16 IN. O.C.

fc. = 650 lb. per sq. in.
fs. = 16,000 lb. per sq. in. $\frac{E_c}{E_s} = \frac{1}{15}$
Shear, 60 lb. per sq. in.

$\frac{3}{4}$ in. of concrete below reinforcement.

T=Tile; S=Steel.

*If moment $\frac{WL}{12}$ is used, investigate design for shear.

Total safe load (dead plus live), pounds per square foot	Continuous span $M = \frac{WL}{12}$	150	165	180	195	210	225	240	260	300	335	375	450
	Semi-continuous span $M = \frac{WL}{10}$	125	135	150	160	175	185	200	220	250	280	310	375
	Simple span $M = \frac{WL}{8}$	100	110	120	130	140	150	160	175	200	225	250	300
Span in feet		T	S	T	S	T	S	T	S	T	S	T	S
6													
7		3	.19	3	.20	3	.22	3	.24	3	.28	4	.27
8		3	.24	3	.26	3	.29	3	.31	4	.30	5	.30
9		3	.31	3	.33	3	.37	4	.34	5	.35	6	.34
10		3	.38	3	.41	4	.42	4	.45	5	.40	7	.37
11		3	.46	4	.47	4	.50	5	.48	6	.45	8	.41
12		4	.43	4	.47	5	.46	5	.53	6	.54	9	.49
13		4	.51	5	.55	5	.54	5	.59	7	.55	10	.56
14		4	.59	5	.63	5	.63	6	.58	8	.64	11	.61
15		5	.64	6	.67	6	.67	7	.66	9	.66	12	.63
16		6	.61	6	.67	7	.68	7	.75	10	.77	13	.65
17		6	.69	6	.75	7	.77	8	.74	11	.76	14	.73
18		6	.76	7	.83	7	.86	8	.83	12	.85	15	.81
19		7	.74	7	.80	8	.84	9	.81	13	.85	16	.81
20		7	.81	8	.89	8	.93	9	.91	14	.90	17	.88
21		7	.89	8	.93	9	.98	10	.94	15	.95	18	.90
22		8	.86	8	.93	9	1.03	10	.98	16	1.03	19	.95
23		8	.94	8	1.02	9	1.08	10	1.07	17	1.03	20	1.05
24		8	1.02	9	1.10	10	1.07	12	.98	18	1.12	21	1.13
25													

Note: Based on safe loads indicated, the thickness (inches) and the areas of reinforcement (square inches per joist) are the figures for average conditions, and are for general information only. Each particular operation should be designed in accordance with actual conditions.

The Natco Engineering Department is at the disposal of any one desiring further information.

WEIGHT OF COMBINATION SLABS PER SQUARE FOOT

Tile, in.	3	4	5	6	7	8	9	10	12	15
Weight, lb.	45	50	55	60	65	70	75	80	90	105

Note: Load tables are for general information only, as each particular operation should be designed in accordance with actual conditions.

"Natcoflor" System of Fireproof Construction

In the "Natcoflor," rows of tile 13 in. wide, specially designed to resist compressive stress without cement top, are set between mortar ribs 2 in. wide of 1 part portland cement to 2½ parts sand.

The "Natcoflor" is an exceptionally light slab of wonderful strength designed to reduce the dead load of fireproof floor construction carried on girders, columns and footings. A minimum of centering required and an all-tile ceiling surface properly scored for plastering.

TILE DEPTH AND STEEL AREA, "NATCOFLOR" COMBINATION LONG SPAN FLOORS, NO CEMENT TOP, 2-IN. MORTAR RIBS 13 IN. O. C.

fm. and ft., 1000 lb. per sq. in.
fs., 16,000 lb. per sq. in.

$\frac{E_t}{E_s} = \frac{1}{10}$

$\frac{3}{4}$ -in. below reinforcement.
T=Tile; S=Steel.

Total safe load (dead plus live), pounds per square foot	Continuous span $M = \frac{WL}{12}$	150	165	180	195	210	225	240	260	300	335
	Semi-continuous span $M = \frac{WL}{10}$	125	135	150	160	175	185	200	220	250	280
	Simple span $M = \frac{WL}{8}$	100	110	120	130	140	150	160	175	200	225
Span in feet		T	S	T	S	T	S	T	S	T	S
6		4	.16	4	.17	4	.19	4	.20	4	.22
7		4	.21	4	.23	4	.26	4	.27	4	.30
8		4	.28	4	.30	4	.33	4	.36	5	.34
9		4	.35	4	.38	5	.32	5	.39	5	.37
10		5	.33	5	.35	5	.39	5	.42	5	.40
11		5	.39	5	.43	5	.47	5	.50	6	.46
12		5	.47	5	.51	6	.44	6	.47	6	.51
13		6	.43	6	.47	6	.52	6	.55	6	.56
14		6	.50	6	.54	6	.60	6	.64	7	.61
15		6	.57	6	.62	7	.57	7	.61	7	.67
16		6	.65	7	.68	7	.73	7	.76	8	.73
17		7	.61	7	.66	7	.71	7	.76	8	.78
18		7	.68	7	.74	8	.69	8	.74	9	.78
19		7	.76	8	.81	8	.86	9	.81	9	.89
20		8	.71	8	.77	8	.85	9	.79	10	.89
21		8	.78	8	.85	9	.82	9	.88	10	.90
22		9	.75	9	.81	9	.90	10	.85	10	.99
23		9	.82	9	.89	10	.87	10	.93	12	1.00
24		9	.89	10	.96	10	.95	12	.82	12	1.10
25		10	.86	10	.93	12	.84	12	.89	12	1.20
26		10	.93	12	.81	12	.90	12	.96	12	1.05
27		12	.81	12	.88	12	.97	12	1.04	12	1.12
28		12	.87	12	.94	12	1.05	12	1.12	12	1.13
29		12	.94	12	1.01	12	1.12	12	1.20	12	1.20
30		12	1.00	12	1.08	12	1.20	12	1.20	12	1.20

DESIGN DATA

Size, in.	4	5	6	7	8	9	10	12
Mortar per sq. ft.	.05	.06	.07	.08	.10	.11	.13	.15
Wt. of tile	26	28	30	32	34	37	40	47
Wt. of floor	28	34	39	42	45	48	52	59

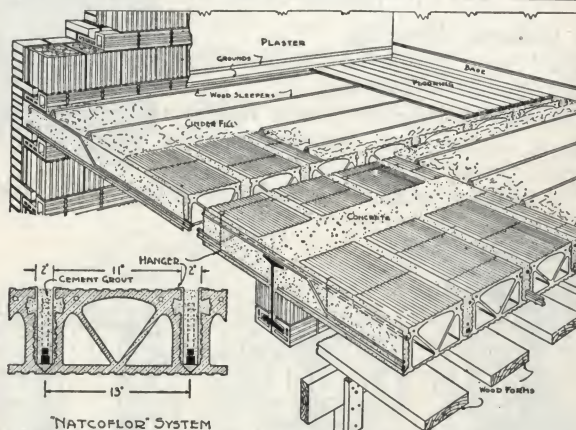
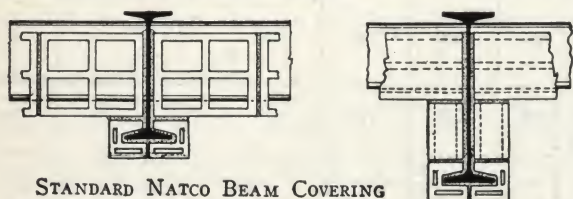


FIG. 3. PERSPECTIVE VIEW OF TYPICAL "NATCOFLOR"

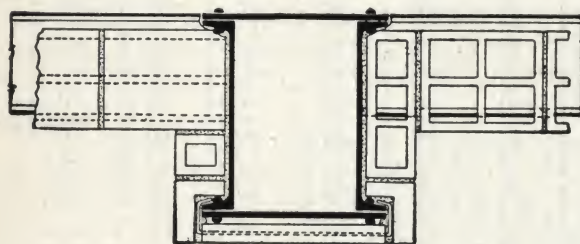
Note simple method of reinforcing; also economical wood centering. 2x8 in. under each joist is sufficient.

Natco Girder Covering

Hollow tile beam and girder covering is made in various forms to fit the flanges of all standard steel beams and girders. It is self-supporting except where the width to be covered is more than 12 in.; then the soffit is supported by metal clips.



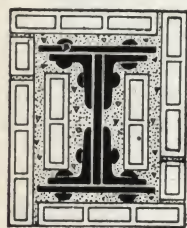
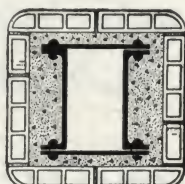
STANDARD NATCO BEAM COVERING

TYPICAL BOX GIRDER COVERING
Hung on metal clips**Natco Column Covering**

Steel and cast iron columns must be covered by at least 2 in. of hollow tile.

For square columns Natco hollow tile can be furnished in 3 and 4-in. thicknesses, and with rounded corners if necessary.

For circular columns, circular covering can be furnished in 3-in. thickness.

Square Column
CoveringCircular Column
CoveringSquare Column
Covering
Round Corners

STANDARD NATCO COLUMN COVERING

Natco Book Tile (for Both Roofs and Ceilings)

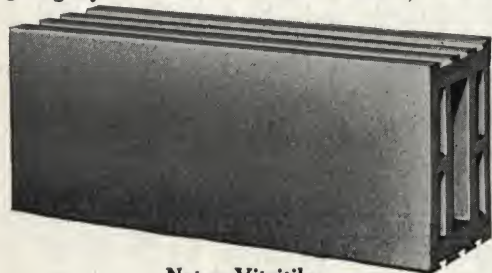
Natco book tile is used between and supported on T-irons to form flat, mansard and hip roofs. It is an effective preventive of condensation. It is also used for flat or hung ceilings.

Natco Furring Tile

Walls are furred to prevent the admission of moisture by lining the inside with Natco furring tile.

Natco Vitritile

Furnished in either light or dark shades, running from light grays or buffs to dark browns, either glazed



Natco Vitritile

or semi-glazed. Full range of shapes supplied. Used for interior walls of gymnasiums, laboratories, hotels, natatoriums, power plants, lavatories, warehouses, etc.

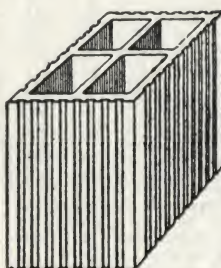
Samples of Natco Vitritile will be sent without charge to architects on request. Our Engineering Department is available to assist the architect, builder or engineer where required.

Natco Partition Tile

Fireproof, soundproof, easily erected, and the standard for stability, especially where called on to support plumbing fixtures, heavy picture frames, shelving, etc.

Stock sizes 2 to 12 in. thick, laying up 1 sq. ft. of wall surface. Half lengths also furnished.

Hollow tile partitions are commonly built of dense material: 3-in. tile can be used safely to a height of 12 ft.; 4-in. to 16 ft.; 5-in. to 20 ft.; and 6-in. to 24 ft.

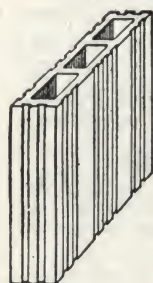


8x12x12 in.

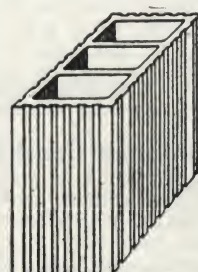
APPROXIMATE SIZES, WEIGHTS, ETC.,
OF NATCO PARTITION TILE

Size, in.	Minimum number of cells	Weight, lb.
2 x 12 x 12	3	14
3 x 12 x 12	3	15
4 x 12 x 12	3	16
5 x 12 x 12	3	19
6 x 12 x 12	3	22
*7 x 12 x 12	3	25
8 x 12 x 12	4	30
*9 x 12 x 12	4	33
10 x 12 x 12	4	36
12 x 12 x 12	4	40

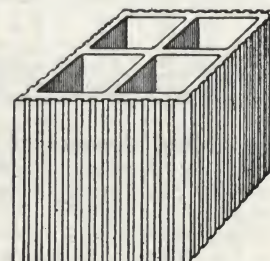
*Note: 7 and 9-in. can be furnished on request.



3x12x12 in.



6x12x12 in.



12x12x12 in.

TYPICAL SHAPES OF NATCO HOLLOW PARTITION TILE

Natco Building Tile (Smooth Face; Glazed and Unglazed, from Eastern Factories Only)

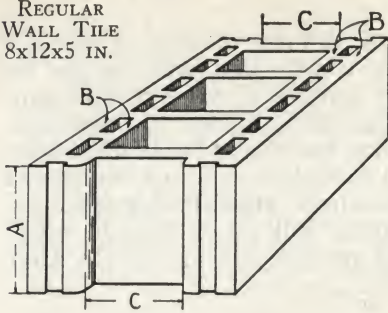
These particular tile are appropriate for bearing or curtain walls of all types of city or farm buildings. Samples sent on request.

Natco Double Shell Building Tile (Glazed and Unglazed, from Western Factories Only)

These Natco products are hollow tile units with combed and "Texture" face, affording a finished exterior surface when laid up in a wall. The Glazed Tex-Tile is a beautiful brown tone, while the unglazed comes in a variety of charming color combinations, shading from rich reds to browns. Tex-Tile have all the structural and artistic advantages of a good face brick with the added advantages of air spaces to check the passage of moisture, heat and cold, and a 30% decrease in cost of laying and mortar; manufactured in 8 and 6-in. thicknesses, with all necessary corners, jambs, sills, closures, joist tile, etc.

Superior Features—End construction (A) for greatest strength. Double shell (B) for ideal horizontal mortar joint. Moisture stop (C) for perfect insulation. (Illustration on following page.)

General Features—Burned clay tile—fire safety and permanence. Hollow (enclosed air spaces)—lightness and insulation.

REGULAR
WALL TILE
8x12x5 IN.

Large unit—rapid and economical handling.

Sizes and Types—6x12x5 in. for wall 6 in. thick.
8x12x5 in. for wall 8 in. thick.

Natco Header-Backer Construction (Patented)

This wall construction employs Natco load bearing tile as backing for face brick, properly bonded as required by all building codes. Its use assures a saving of tons of dead weight on structural frame and foundations and approximately one-quarter of labor and mortar expense over solid masonry construction. The Header-Backer wall is greatly superior to any other form of masonry for enclosure walls of office or loft buildings, hotels, warehouses, and for curtain or bearing walls of schools, banks, hospitals, garages, residences, etc.

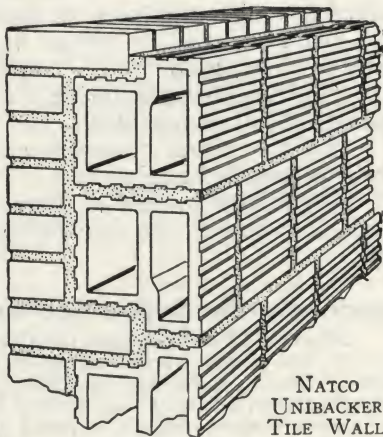
Natco Header-Backer tile is furnished in 6, 8, 10 and 12 in. thicknesses, and the header and backer tile may be combined with the 4-in. face brick to form walls of 8, 10, 12, 14, 16, 18, 20, 22 and 24-in. thickness. The backer tile are cut to heights to work up properly with the joints and bonds in the face brick. The 8-in. header tile displaces $4\frac{1}{2}$ brick, while the 8x12x10 $\frac{1}{2}$ -in. backer tile (most commonly used) displaces 12 brick. For residences we supply 3 $\frac{3}{4}$ x12x10 $\frac{1}{2}$ -in. tile to be faced with 4 in. of brick which, when bonded with headers every fifth course makes an 8-in. masonry wall.

12-IN. WALL OF NATCO
HEADER-BACKER TILE

12-IN. WALL OF NATCO
HEADER-BACKER TILE

Natco Unibacker Construction

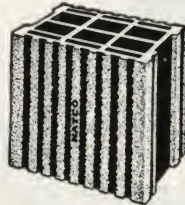
Natco Unibacker is a backing for face brick which increases speed of erection, and decreases dead load. It is furnished for 12,

NATCO
UNIBACKER
TILE WALL

14 and 16-in. walls. Unibacker provides so perfect a mechanical bond with the face brick that full bearing value is allowed on their own combined thickness. Floor joists have full bearing. Plaster may be applied directly to the inside surface, eliminating furring. Unibacker is used for both enclosure and bearing walls.

Natco Double Shell Load Bearing Tile

For wall bearing and curtain wall construction—hard burned tile exposed or to be covered with cement stucco finish.

NATCO DOUBLE
SHELL LOAD
BEARING TILE

Has a 12x12-in. face furnished for walls 6, 8, 10 and 12 in. thick. Scored for exterior stucco and interior plaster. Has exclusive enduring double shell feature with its moisture stops and wide surfaces for mortar beds. Soundproof and moistureproof. No cutting required. Furnished with reasonable percentage of corners, jambs, closures, sills, lintels and half tile.

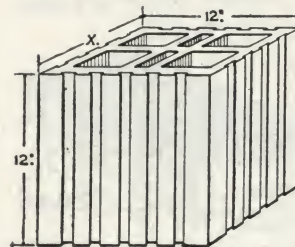
Natco XXX Load Bearing Tile



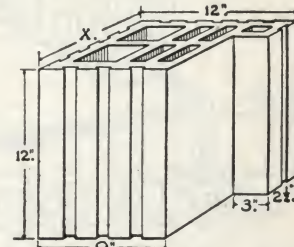
NATCO XXX TILE

Furnished in same sizes for construction similar to that of Natco double shell load bearing tile. Has many of its advantages. One 8x12x12-in. tile of either type is equivalent to 14 brick in an ordinary 8-in. wall.

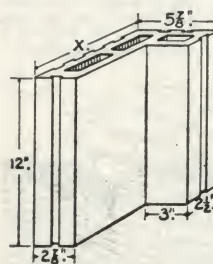
Write for Bulletin 174 on Natco Wall Construction.



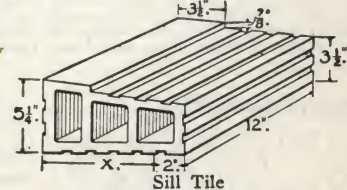
Standard Tile



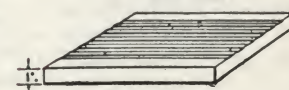
Jamb Tile



Half Jamb Tile



Sill Tile



Bearing Slab

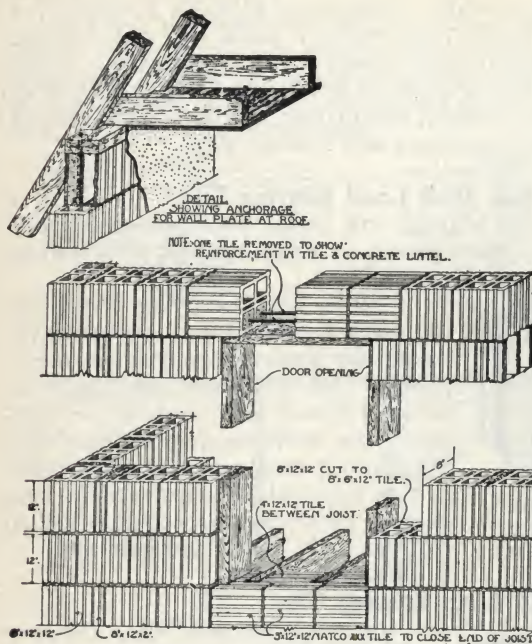
DETAILS OF TYPICAL SHAPES OF NATCO XXX HOLLOW TILE

APPROXIMATE SIZES, WEIGHTS, ETC., OF NATCO XXX HOLLOW TILE

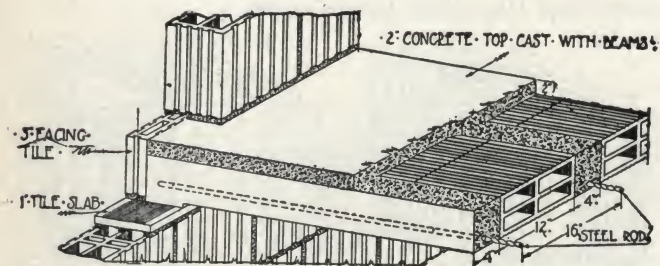
Standard sizes			Number of cells	Weight per sq. ft., lb.	Jamb tile			Half jamb tile			Corners		
Thickness	Height	Length			Thickness	Height	Length	Thickness	Height	Length	Thickness	Height	Length
(In.—in wall)					(In.—in wall)			(In.—in wall)			(In.—in wall)		
3¾	12	12	3	20	..	..	..	..	..	..	..	..	..
6	12	12	6	29	6	12	12	6	12	5⅝	6	12	12
8	12	12	6	36	8	12	12	8	12	5⅝	8	12	2
10	12	12	6	40	10	12	12	10	12	5⅝	10	12	4
12	12	12	9	52	12	12	12	12	12	5⅝	12	12	6
Slabs													
6	1	12	..	6									
8	1	12	..	8									
10	1	12	..	8									
12	1	12	..	12									
Sill tile													
10	5¼	12	3	20									
12	5¼	12	4	22									
14	5¼	12	4	25									

Note: When specifically called for on the customer's order, a reasonable percentage of half lengths are manufactured and shipped for use along with 1-in. slabs in working up to story heights.

Note: When specifically called for on the customer's order, a reasonable percentage of half lengths are manufactured and shipped for use along with 1-in. slabs in working up to story heights.



TYPICAL EXTERIOR WALL CONSTRUCTION OF NATCO XXX HOLLOW TILE

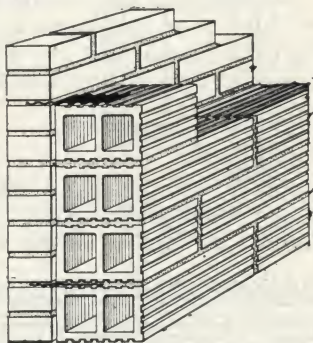


TYPICAL DETAIL OF NATCO XXX EXTERIOR WALL AND COMBINATION FLOOR OF HOLLOW TILE AND REINFORCED CONCRETE

By erecting interior partitions of Natco hollow tile in conjunction with this type of construction, it is possible to completely fireproof private residences, stores, apartments, school buildings, libraries, etc., at a cost of approximately from 15 to 20% over the ordinary frame construction.

Natco Backup Tile

For backing up face brick. Sizes 8x5x12 in., and 3 $\frac{3}{4}$ x5x12 in., displacing 6 and 3 bricks, respectively, in 12-in. and 8-in. walls; smooth on one 5x12-in. face and scored for mortar or plaster on other three sides, assuring decreased weight, an insulated wall and economy in material setting.



WALL OF NATCO BACKUP TILE

Materials and Methods

The materials and methods illustrated and described herein have been determined by wide practical experience in Natco hollow tile construction, and have been approved by fireproofing engineers and architects generally.

Full details, not easily furnished in limited available space, will be supplied on application.

Specification Notes

For the assistance of all those desiring to take full advantage of hollow tile construction, with its low initial cost and minimum expense of upkeep, this company offers the following specifications for wall construction, floor construction, and stucco finish, which have been carefully developed through years of use and may be regarded as the manufacturers' standard specifications.

The adoption of these will insure equitable conditions in estimating, and produce results in accordance with best practice.

It is suggested that the first clauses of wall or floor specifications entitled "General" might be quoted in full, followed by clauses stipulating:

- (1) Which contractor applies cement coat to exterior of foundation walls of tile.
- (2) Whether dampproofing shall be integral or applied and by whom furnished and done.
- (3) Whether door or window openings are to be caked by hollow tile layer, as specified, or by carpenter.
- (4) How and by whom fireplaces and chimneys shall be constructed.
- (5) By whom centering for any arched or clear openings shall be provided.
- (6) By whom centering and sleepers for floors shall be provided and set.
- (7) Which system of floor construction is to be used, or whether alternate estimates are to be given, etc.

Specification for Hollow Tile Walls

General—The contractor for this part of the work shall furnish, deliver and erect all materials required for exterior and interior bearing walls and any interior subdividing partitions, as indicated on plans, of hard burned hollow tile, together with all necessary special shapes required at corners, at joist level, in working around openings or to complete buildings as called for in this specification to approval of architect. All hollow tile shall be true and regular in size, manufactured of such design that all bearing webs and shells are in direct compression when laid in the wall.

Tile shall have all faces scored with special dovetail scoring to offer a good surface for the stucco and plaster finish. Tile cracked or broken on the outside shells will not be acceptable under this specification.

In general all exterior walls and interior bearing walls shall be of Natco XXX or Natco double shell load bearing hollow tile; non-bearing, subdividing walls shall be Natco partition tile as manufactured by the NATIONAL FIRE PROOFING COMPANY.

Laying—All tile used in the exterior walls and any interior bearing partitions must be laid with the cells or voids vertical in the wall, in order to develop their full strength. Interior subdividing, non-bearing partition tile may be laid on side if

desired, but must be started on the structural floor and wedged against the floor above. Care must be taken that the tops of all unfinished walls are thoroughly covered or protected against stormy weather.

Mortar—All mortar used for laying up the hollow tile shall consist of a standard portland cement, lime putty or hydrated lime, and clean, sharp sand in the following proportions by volume: 1 part portland cement, 1 part lime and 6 parts sand.

Foundation Walls—Any foundation walls so indicated on plans from top of footings to the underside of first floor beams shall be constructed of Natco XXX or Natco double shell load bearing hollow tile to produce thickness shown. Care should be taken to use the proper Natco hollow tile at the corners. Outside of walls from footing to a point above the ground shall be given a heavy coat of waterproofed cement or other approved dampproofing.

Jamb Tile—Provide for all double hung windows Natco jamb tile with rabbeted openings to receive the window frame box. Fill well with mortar, the space between the tile and the frame box to within 1 in. of stop bead.

The contractor for the setting of the tile is to calk all doors and windows with roofers' cement or oakum, furnished and set by him, to prevent the passage of air or moisture.

Lintels—Openings not exceeding 5 ft. in clear span may be spanned with Natco load bearing tile reinforced with proper steel rods in lower cells and filled solidly with stone or gravel concrete.

Openings over 5 ft. in clear span to be spanned with reinforced concrete girder faced with tile, or with steel angles—size of structural or reinforcing steel variable with load and span; all to be furnished and set by the contractor for tile laying to approval of architect.

Sills—Form all sills of Natco special hollow sill tile.

Special care must be taken to fill all joints so as to prevent moisture working through the same; the wood sill of the frame to be set in a heavy bed of roofers' cement.

Arch Openings—Build all arch openings shown on plans of 2-course rowlock hollow brick header arches, carefully laid on substantial centers. Arches will spring from the hollow tile and must be well bedded on them.

Porch Columns and Piers—Construct any porch columns and piers, so indicated of hollow tile to sizes as shown. Where column finish is round, build the same of 3-in. circular hollow tile column covering, filling the column with concrete when the second story walls are supported by them. If steel reinforcement is used, care should be taken to band the steel against lateral deflection.

Square columns shall be built of the proper size Natco load bearing tile.

Floor Beam Bearings—Provide and set load bearing tile slabs 1-in. thick under all floor beams as bearing plates for the same. These slabs shall also be used for working up to levels and story heights when the full or fractional tile do not work out correctly.

Beam Courses—Wood floor beams are to be framed into exterior walls as shown on detail, using Natco load bearing hollow tile in accordance with the following:

In 8-in. walls, $3\frac{3}{4} \times 12 \times 12$ in. for facing ends of beams and for filling between beams.

In 10-in. walls, $3\frac{3}{4} \times 12 \times 12$ in. for facing ends of beams and $6 \times 12 \times 12$ in. for filling between beams.

In 12-in. walls $3\frac{3}{4} \times 12 \times 12$ in. for facing ends of beams and $8 \times 12 \times 12$ in. for filling between beams.

Roof Plates—Embed in cement grout in two upper courses of wall at intervals of 5 ft. $\frac{3}{4}$ -in. bolts 24 in. long. Bolts to project 6 in. above the top of the wall, to allow plate to be fastened down with nuts.

Specifications for Floor Construction

General—Floor construction shall be the type known as the one-way combination hollow tile and concrete floor construction consisting generally of 4-in. reinforced concrete beams spaced 16 in. on centers with Natco hollow tile between, and covered with concrete top as shown or "Natcofloor" without concrete covering, all to have at least 4-in. bearing on walls.

Concrete—All concrete used in floor construction shall consist of 1 part portland cement, 2 parts clean sharp sand, and 4 parts broken stone or gravel of such size as will pass through a $\frac{3}{4}$ -in. ring. Concrete will be of wet mixture, and must be well tamped and worked around reinforcing steel after pouring.

Reinforcing Steel—Steel rods for floor construction must be of such type as will have a mechanical bond with the concrete. Corrugated, twisted or similar type will be accepted. Steel must have an elastic limit of not less than one-half the tensile strength. Rods must be clean and free from rust scales before placing in position, and must be placed not over 1 in. above bottom of floor.

Tile—Depth of Natco tile and size of steel reinforcement will be as shown on the plans or as specified by competent engineers for the given spans and loads, etc. All tile must be wet before concrete or grout is placed, so as to insure proper bond with the concrete.

Centers—Centers must be of such size as to insure of their not deflecting under the weight of the wet materials, and must be provided in such quantity as to insure speedy work. Centers must not be removed before the concrete has properly set, and under long spans a center line of supports must be maintained for at least 3 weeks after the concrete has been poured. In cold weather the centers must be left in place until directed by the architect to remove them.

Natcofloor—Grout for Natcofloor shall consist of 1 part portland cement to $2\frac{1}{2}$ parts of sand. Specifications for reinforcing steel, tile and centering shall be the same as is given above.

Specifications for Stucco on Hollow Tile

The stucco shall consist of the following materials and be mixed in the following proportions:

(1) Portland cement which has met the requirements of the American Society for Testing Materials.

(2) Sand free from organic matter or loam, and uniformly graded in size from coarse to fine.

(3) Hydrated lime—any good brand of prepared hydrated lime or well burned slaked lime putty will be accepted.

First coat: 1 cement, $\frac{1}{10}$ lime, 3 sand.

Second coat: 1 cement, $\frac{1}{10}$ lime, 3 sand.

Third coat: 1 cement, $\frac{1}{10}$ lime, 3 sand.

All stucco shall be applied immediately after being mixed; no re-tempered stucco shall be used. No stucco is to be applied when it is liable to freeze before it sets. All stucco work shall be kept thoroughly wetted down until cement has set, in hot or dry weather, as too rapid drying will cause cracking.

The tile surface shall be free from all foreign material, and shall be thoroughly wetted down before the first or scratch coat is applied. The first coat shall be well troweled so as to key behind the dovetail scoring, also to prevent air bubbles or holes, and shall be thoroughly scratched to insure proper bond with the next coat. The second coat should be applied as soon as the prior coat has sufficiently set to allow working upon the same, and should be straightened with darby and straightedge, then floated with cork or wooden float to prevent waves showing on the finished wall.

Should it be impossible to apply the second and last coats as soon as the former coat has become thoroughly set, wet down the coat already applied before applying others, to give a better bond between successive layers.

The finish coat should, as far as possible, be applied to the entire area of one side of structure to the corners at one operation.

Thickness of each coat should average from $\frac{1}{4}$ to $\frac{1}{2}$ in. If only 2-coat work the material must have a total thickness of not less than $\frac{3}{4}$ in., exclusive of the dovetail scoring.

Finish coat of stucco is to be waterproofed with an approved brand of integral waterproofing compound or other approved compound in accordance with directions of manufacturers.

Co-operative Services

The engineering department maintained by this company is fully equipped to give details and recommendations for the fire-proofing of buildings, and furnish all possible help and information to patrons who wish to avail themselves of the advantages offered.

HENRY MAURER & SON

Manufacturers of Terra Cotta Hollow Tile Fireproofing

TELEPHONE

ASHLAND 1510

420 East Twenty-third Street

NEW YORK, N. Y.

PLANT, MAURER, NEW JERSEY

Products

"RARITILE" Enclosure Blocks for walls faced with brick. Standard sizes of INTERIOR PARTITION BLOCKS, WALL FURRING, and WALL BEARING BLOCKS.

For Fire Brick, see page A255.

Quality

Deservedly reputed of best quality and workmanship, true to size and shape, with minimum tendency to breakage.

Facilities

Extensive clay mines adjacent to plant premises, owned, developed and operated by the company; plant located on tidewater in New York Harbor and two railroads (Central Railroad of New Jersey and Lehigh Valley R. R.) insures prompt shipment by boat or rail; motor truck deliveries direct to building give uninterrupted supply for work in progress. Modern and complete machinery and equipment afford ample provision for the largest contract requirements.

Backing Tile

The "Raritle" is a backing system of simple design, and yet possesses every desirable feature sought by architects, engineers and owners. Only one size of block is used, making an ideal construction from a standpoint of permanence, simplicity and economy.

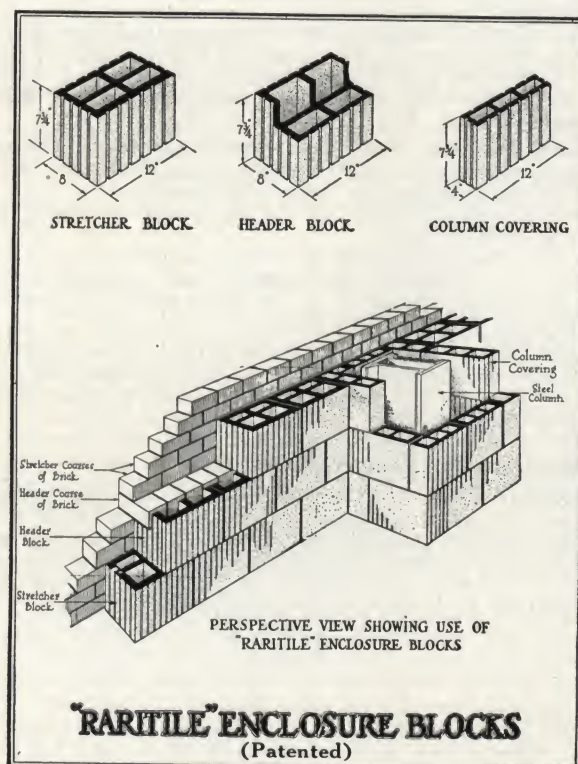
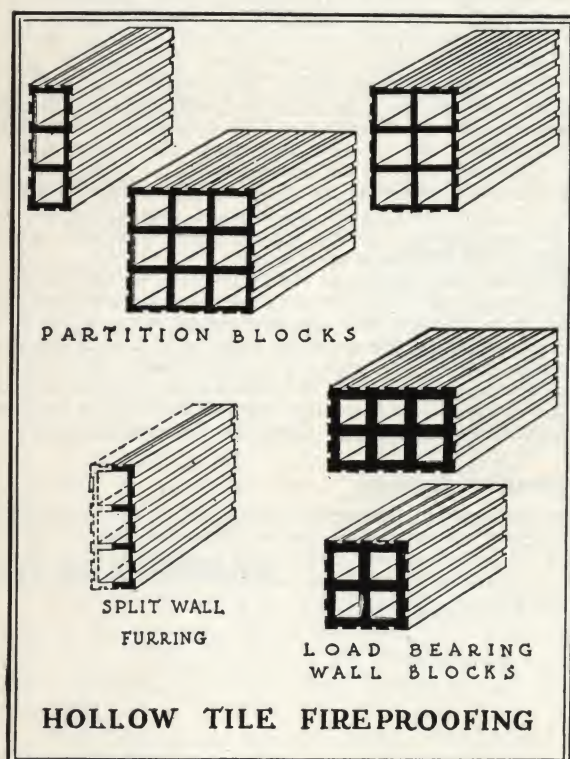
The webs and shells run vertically in perfect alignment, backing up both the stretcher and header face brick, with resultant maximum strength.

The air cells extend vertically the entire height from floor to floor with a continuous uninterrupted cubical air content, which creates absolute insulation as well as a true and complete furring into the wall; dampness can not penetrate as the cement joints are broken by the air cells.

Rigid unyielding support for the header face brick ties them in securely so they can not possibly sway or move out of place.

Catalogue

Descriptive catalogue on request.



RARITAN HOLLOW TILE CORPORATION

47 West 34th Street, NEW YORK, N. Y.

FACTORY: KEASBEY, N. J.

Products

HOLLOW TILE BLOCKS for partitions, furring, column and girder covering, etc.; LOAD BEARING EXTERIOR WALL BLOCKS and RARITILE ENCLOSURE BLOCKS for use with face brick.



of the various blocks are in perfect alignment. In this way all material acts in compression and the full bearing strength of the tile is utilized.

Facilities

The location of the company plant on the Raritan River two miles west of Perth Amboy and a direct connection with the Lehigh Valley R. R. places the RARITAN HOLLOW TILE CORPORATION in a position to make prompt shipment either by rail or water. And as all shipments are made direct from the factory, the company is solely responsible for materials and deliveries.

The clays are mined on the company property adjoining the factory, which is equipped throughout with modern machinery.

Raritle Enclosure Blocks

In the past few years, there has been a remarkable increase in the use of hollow tile blocks in conjunction with either common or face brick for building curtain walls for skeleton steel structures. This type of construction not only shows a marked saving in labor costs, but it also decreases the weight of the walls so constructed by about 30%, and thereby effects a proportional saving in the amount of steel required for wall columns and spandrel beams.

The Raritle Enclosure Tile protected by W. G. Demarest patents No. 1,426,048 and 1,479,379, has the good features common to systems in which hollow tile is tied in to face brick and has also the following additional advantages.

(1) A continuous vertical air cell on the interior of the wall running from floor to floor eliminates the necessity of additional separate furring blocks.

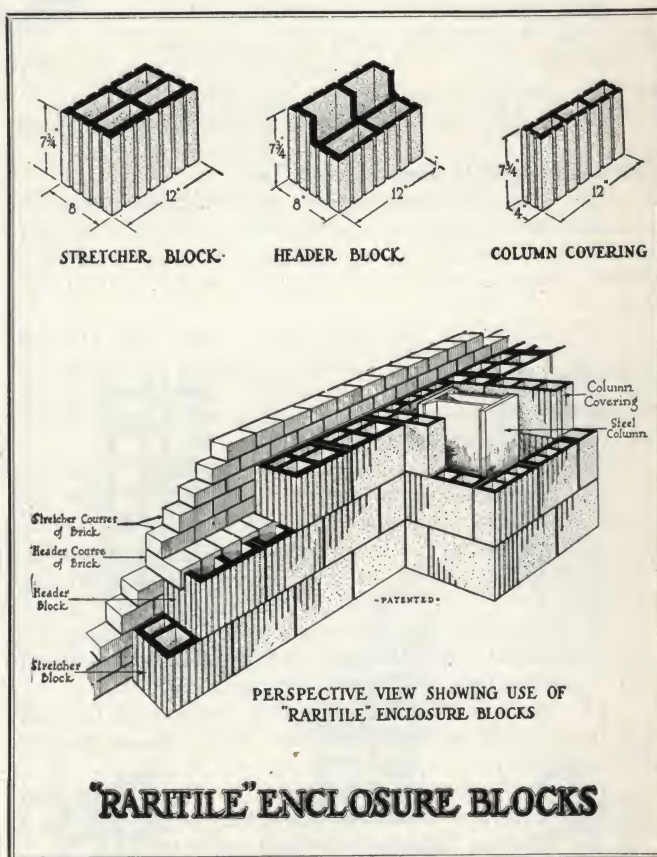
(2) The mortar joints are broken—there are no continuous joints through the wall.

(3) The blocks are of uniform height and approximately of uniform weight. This feature helps to speed up construction and makes it easy to tie in the face brick with any type of bond.

(4) The wall is so designed that webs and shells

Column Covering

For use with the Raritle standard wall block a 4-in. block of the same height is furnished for covering wall columns. This construction is simple and economical; the cost is approximately 30% less than a brick wall of the same thickness.



Some Recent Installations of Raritle Enclosure Blocks

BUILDING AND LOCATION

Equitable Trust Building, Broad St. and Exchange Pl., New York, N. Y.
Roosevelt Hotel, Madison Ave. and 45th St., New York, N. Y.
Heckscher Apartment, 277 Park Ave., New York, N. Y.
Penn Athletic Club, Philadelphia, Pa.
Paramount Theater, 43rd St. and Broadway, New York, N. Y.
Shelbourne Hotel, Atlantic City, N. J.
Park Lane Apartments, 299 Park Ave., New York, N. Y.
Railroad Co-operative Building, Lexington Ave. and 44th St., New York, N. Y.
R. H. Macy & Co., Broadway and 34th St., New York, N. Y.
Manhattan Eye & Ear Hospital, 210 E. 64th St., New York, N. Y.
New Madison Square Garden, Eighth Ave. and 50th St., New York, N. Y.
Ziegfeld Theater Building, Sixth Ave. and 54th St., New York, N. Y.
Apartment House, 580 Park Ave., New York, N. Y.
Office Building, Asbury Park, N. J.
Apartment House, 1165 Fifth Ave., New York, N. Y.
National Bible Institute Building, 340 W. 55th St., New York, N. Y.
Mt. Sinai Nurses' Home, 5 to 17 East 98th St., New York, N. Y.
Beth Israel Hospital, 16th St. and Livingston Pl., New York, N. Y.
Otis Elevator Co. Buildings, Yonkers, N. Y.
Apartment House, 1125 Park Ave., New York, N. Y.
Halstead Apartment House, White Plains, N. Y.
Apartment House, 990 Fifth Ave., New York, N. Y.

Office Building, 240 Madison Ave., New York, N. Y.
McMillan Building, 12th St. and Fifth Ave., New York, N. Y.

Five Apartment Houses

CONTRACTOR

Thompson-Starrett Co.
Thompson-Starrett Co.
Thompson-Starrett Co.
Thompson-Starrett Co.
Thompson-Starrett Co.
Geo. A. Fuller Co.
Geo. A. Fuller Co.
Geo. A. Fuller Co.
Marc Eidlitz & Son
Marc Eidlitz & Son
James Stewart & Co.
James Stewart & Co.
D. P. Robinson Co.
D. P. Robinson Co.
D. P. Robinson Co.
John Lowry, Inc.
Hegeman-Harris Co.
George Backer, Inc.
Turner Construction Co.
M. C. Reynolds Co.
Fred T. Ley & Co.
Fred T. Ley & Co.
Edward Corning Co.
Cauldwell Wingate Co.
Bayonne Housing Corp.
Standard Oil Co. of N. J.

ARCHITECT

Trowbridge & Livingston, New York, N. Y.
Geo. B. Post & Sons, New York, N. Y.
McKim, Mead & White, New York, N. Y.
Zantinger & Boree & McDary, Philadelphia, Pa.
C. W. & Geo. L. Rapp, Chicago, Ill.
Warren & Wetmore, New York, N. Y.
Schultz & Weaver, New York, N. Y.
Sloan & Robertson, New York, N. Y.
Robt. D. Kohn, New York, N. Y.
York & Sawyer, New York, N. Y.
Thomas W. Lamb, New York, N. Y.
Thomas W. Lamb, New York, N. Y.
Geo. M. Pollard, New York, N. Y.
Frank D. Chase, Inc., Chicago, Ill.
J. E. R. Carpenter, New York, N. Y.
McKenzie, Voorhees & Gmelin, New York, N. Y.
Robert D. Kohn & Chas. Butler, New York, N. Y.
Louis Allen Abramson, New York, N. Y.
Walter Moy, Owner
Schwartz & Gross, New York, N. Y.
H. C. Ingalls, New York, N. Y.
Rosario Candela and Warren & Wetmore, New York, N. Y.
Cross & Cross, New York, N. Y.
Carrere & Hastings, Shreve & Lamb, New York, N. Y.
A. J. Thomas, New York, N. Y.

UNIVERSAL UNIT TILE COMPANY

EXECUTIVE OFFICES

Scripps Building, SAN DIEGO, CAL.

LICENSED MANUFACTURERS

COLUMBUS, OHIO, CLAYCRAFT MINING & BRICK Co.
 DALLAS, TEX., RELIANCE BRICK Co.
 KANSAS CITY, MO., UNITED CLAY PRODUCTS CORP.
 LOS ANGELES, CAL., ROGERS BUILDING MATERIALS Co.
 MACON, GA., CHEROKEE BRICK Co.

MINERAL WELLS, TEX., MINERAL WELLS BRICK Co.
 PUEBLO, COLO., SUMMIT PRESSED BRICK & TILE Co.
 ST. LOUIS, MO., ALTON BRICK Co.
 SAN DIEGO, CAL., ATLAS BRICK & CLAY Co.
 SAN FRANCISCO, CAL., PORT COSTA BRICK Co.

Product

HOLLOW BUILDING TILE for structural purposes of novel and improved design, suitable for all types and varieties of buildings in which burned clay products can be used.

Design

The Universal Unit was designed to overcome the disadvantages of the present commercial forms of structural hollow tile and to facilitate and reduce the cost of manufacturing, shipping, handling, estimating and laying.



TRADE-MARK

dimension, walls can be built entirely without brick or brick can be used anywhere in construction and they line and bond with the tile.

Quality and Marking

All load-bearing Universal Units are composed of properly prepared grades of hard burning clay, shale, fire clay or mixtures thereof to provide maximum strength and fire resistance. Each unit has trade-mark "UU" impressed thereon.

Advantages of Universal Unit Tile

- (1) One size and shape for all standard thicknesses of walls and details of construction. Starter, corner, jamb, sill, filler and all special shapes readily cut with trowel from standard unit leaving sections of usable size.
- (2) Units are two bricks wide, three high and one long, with mortar joints, thus displacing six bricks in wall. Building construction can be designed with the Universal Unit same as for brick as they cut into any necessary combination of brick sizes.
- (3) This construction offers maximum resistance to frost and dampness penetration. All mortar bed joints are offset, lead upward from exterior to interior face of wall and are interrupted by vertical rising voids. Stucco and plaster may be applied direct to tile without furring.
- (4) Latticed interior construction and direct line continuation of webs through entire Unit insures maximum load bearing and lateral strength.
- (5) No ties or reinforcing required except for arch and lintel construction; jamb tile make masonry bond with wall.
- (6) Brick veneer work can be figured in supporting strength of walls as Unit bonds perfectly with it.
- (7) Perfect balance, easy and quick to lay.
- (8) Units nest perfectly, hence minimum breakage.
- (9) Units simply yet positively interlock.
- (10) Size, shape and cut-up features simplify quantity calculations.
- (11) Facilitates placing grounds and plugs for interior finish without danger of moisture penetration.

Estimating and Construction Data

Face sizes of units 8x8x8 in. Two units lay exactly one face foot of 8-in. wall; three units for 13-in. walls; four units for 17-in. walls, etc. Units weigh between 17 and 18 lb. Lintels formed of standard units or cut sections reinforced and filled with concrete, as required.

Tests by recognized testing engineers show each unit to have crushing strength of 50,000 to 100,000 lb.

Use of Brick

As units are worked out to brick sizes in every

Non-bearing Construction

Universal Unit tile offers superior advantages for curtain and filler walls in pier and girder construction. The convenient size and shape, ease and rapidity of handling and laying, make it compare favorably in cost with plain tile. Its lightness, in addition to its fireproof, frostproof and dampproof feature, renders its use most desirable in construction of this class.

In cities and localities where the Universal Unit is now available, it is rapidly being given preference over other forms of hollow filler wall construction.

Farm Buildings

The advantages of fireproof construction on the farm is rapidly being realized. Universal Unit is a superior material for all types of farm buildings, houses, barns, silos, corn cribs, etc. The one size and shape builds all.

The simplicity and economy of this construction especially recommend it for use where skilled labor is difficult to obtain and construction costs must be minimized.

Availability

Universal Unit tile is available for immediate shipment in many sections of the South, Middle West and Pacific Coast, and additional territory will soon be covered. The nearest sales office or agency can be obtained from the Executive Offices, Scripps Building, San Diego, Cal.

Patents

Universal Unit tile is manufactured and sold under the Richard S. Requa patent issued May 25th, 1920. Other United States patents allowed and pending. Patents pending, or issued, in all principal foreign countries.

Engineering Service

Free engineering service for advice or data concerning construction problems in connection with the use of Universal Unit tile is available at the Executive Offices. Architects, engineers and contractors are invited to freely avail themselves of this service.

Catalogues and Construction Details

Catalogues, detail sheets, miniature samples and general construction data will be supplied from the Executive office or any of the branch offices.

Specifications for "Universal Unit" Structural Hollow Tile Work

Work Included—Exterior walls and wherever called for on drawings, to be built of hollow tile as hereinafter specified.

Quality and Make—All hollow tile to be in the interlocking and load-bearing type supplied under the trade-name of "Universal Unit." The tile shall meet the load-bearing and other requirements of the local Building Code.

Mortar—All mortar for tile work shall be composed of 1 part portland cement to not more than 3 parts clean sharp sand, to which may be added lime paste or hydrated lime not exceeding 15% of the volume of the cement.

Construction—Tile shall be laid in the wall with the voids running horizontally, with the lower projection on the exterior side of the wall, as per manufacturer's drawings. All horizontal joints shall be flushed solid, but the vertical section of the offset bedding joints shall be left free of mortar to prevent dampness being drawn through the wall. Tile shall be laid so that the wall throughout shall be thoroughly bonded with masonry bond. Corners to be formed with half-tile laid on end and filled with mortar where required for the additional strength.

Openings—All openings to be formed with the tile, cut to special shape as required. Jamb tile to be laid on end and all voids adjoining the exterior side of the wall shall be filled with mortar. Jamb tile shall be locked and bonded with the wall courses. There shall be no solid mortar joints extending through the wall.

Lintils—Lintils over openings may be formed of the tile with voids filled with concrete and reinforced as required for adequate strength, or they may be of reinforced concrete cast in place.

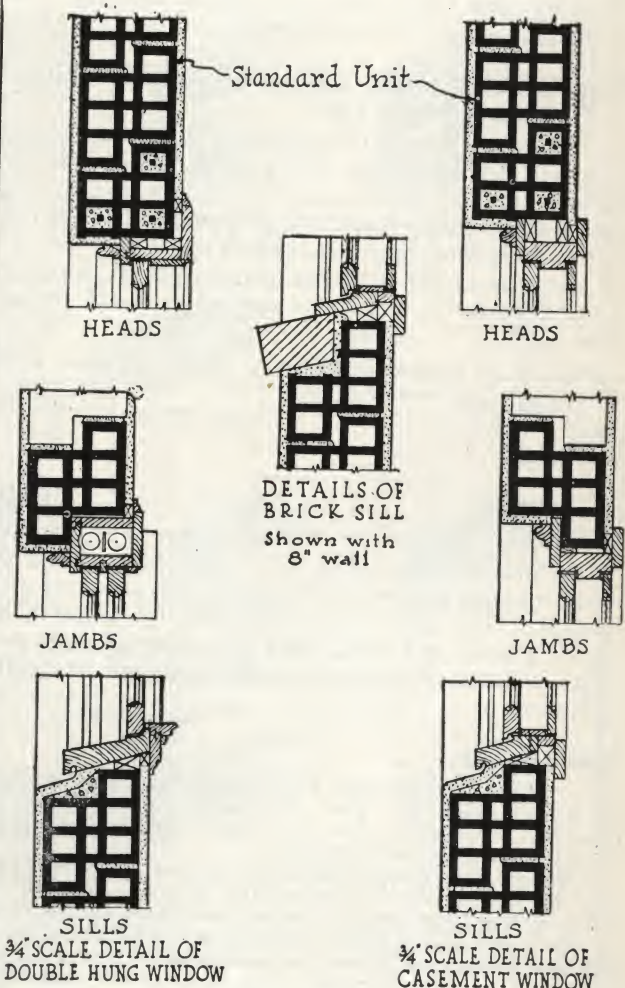
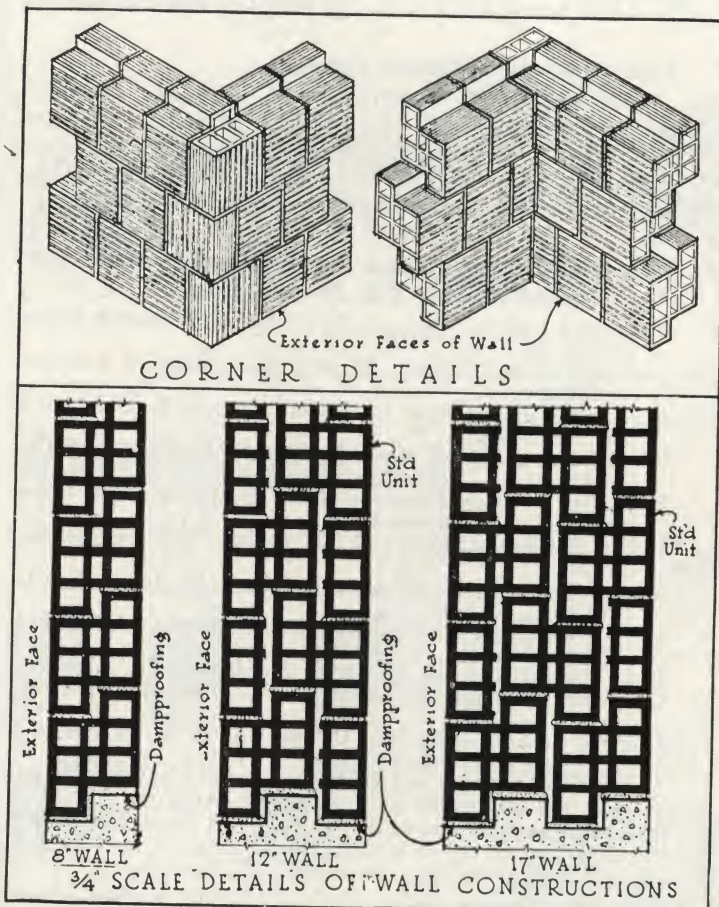
Anchoring Woodwork—The carpenter will place and accurately set all wood frames required in the openings in the tile walls, as the walls are built. Anchor these frames to the tile work each course with 10d nails driven partially into the frame and bent down over the tile. Bed ½-in. bolts supplied by and as directed by the Carpenter, every third course for securing end studs of frame partitions.

Joist Bearing, etc.—All joists, beams, etc., seated upon hollow tile walls shall extend into the wall so as to have full bearing on two supporting webs. Where heavy concentrated loads occur, the supporting section of the tile receiving the load shall be filled with concrete, and, if necessary properly to distribute the load, bearing plates of proper size or cast concrete shall be built in.

Stuccoed Work—Where walls are to be stuccoed on the exterior and plastered on the interior, the tile may be laid with no mortar in the vertical joints, the joints to be left open to provide an additional key for the plastering.

Chases for Pipes, etc.—Provide chases for pipes, conduits, etc., as directed. In no case shall the tile be cut through the second web so as to destroy the waterproof feature of the tile unless the spaces around the pipe are filled solidly with cement mortar.

Flashings—All flashings shall be built into the walls to the depth of the rebate. In building parapet walls, the tile work shall be brought up not less than 4 in. or more than 8 in. above the roof level and the work stopped at that point until the roofing has been laid and flashed into the rebate of the course, when the walls shall be completed to their required height.



Detail Drawings, Showing Simplicity of Construction, Waterproof, Fireproof, Interlocking and Load-bearing Features

A dampproof joint can readily be formed with the foundation by rebating top of foundation wall. This is easily done by laying 2"x4" in top of concrete as foundation is being finished. This surface can be treated with hot asphalt or a bonding coat, just before first course of tile is laid. Pockets for joists, concrete floors, etc., can be easily formed with this tile without weakening the construction or destroying the dampproof or fireproof features of the walls.

Window Details

Note the interlocking bond around openings

THE WHITACRE-GREER FIREPROOFING COMPANY

Manufacturers of Hollow Building Tile

WAYNESBURG, OHIO

CHICAGO, ILL., Builders' Building, 228 North La Salle Street

Products

HOLLOW FIRE CLAY BUILDING TILE.
GLAZED BUILDING BLOCKS; RADIAL CHIMNEY
BRICK.

Largest Independent Manufacturers of Hollow Tile in the United States

We have been exclusively engaged in the manufacture of hollow fire clay building tile for over 30 years, our product having been used in the construction of many of the largest buildings throughout the country.

Our three plants, situated in the great clay belt of Ohio and equipped with modern clay working machinery, have a combined capacity of 25,000 tons per month. Our exceptional facilities permit us to produce stock and special shapes on the shortest possible notice and at the lowest possible cost.

Hollow clay fireproofing as manufactured by us consists of practically all forms known to the trade—partitions, load bearing and back-up blocks, split furring, flat and segmental arch blocks, with all necessary shapes of girder and beam covering, column covering (both round and square), book tile and glazed building blocks.

Remarkable Physical Characteristics of Whitacre-Greer Hollow Tile

Whitacre-Greer hollow building tile is made from a famous clay containing high percentages of silica and alumina (the two components essential for insuring high fire resisting quality) and low percentages of impurities such as iron, lime, magnesia, potash and soda.

Because of the very low percentages of impurities in our tile, plaster and stucco applied to it will not discolor.

ANALYSIS OF WHITACRE-GREER HOLLOW BUILDING TILE

Components	Percentage
Silica	58.75
Alumina	26.43
Oxide of iron	2.57
Lime .....	.37
Magnesia .....	.77
Potassium oxide	1.49
Sodium oxide .....	.45

Whitacre-Greer hollow tile is burned hard and vitreous, insuring absolutely fireproof construction of great strength. The deep scoring provides for better bonding of plaster and stucco and the better general symmetry is due to the accurate machining by our unequalled equipment.

Specifications

All hollow tile shall be of hard burned dense fire clay as manufactured by THE WHITACRE-GREER FIREPROOFING COMPANY, Waynesburg, Ohio. No badly split, cracked, warped or underburned tile shall be used.

Hollow Tile Fireproofing—The hollow tile fireproofing shall be capable of withstanding the tests prescribed by the National Board of Fire Underwriters' standards for fire resistive floor, wall and partition construction. All arches shall be flat arch end construction with side construction keys and either end or side construction skewers. The faces of all tile that are to receive plastering or mortar shall have the standard scoring.

Fireproofing Steel—The thickness of fireproofing around steel members shall be 2 in. for soffit coverings on lower

flanges of beams and 2 in. on flanges of all beams or girders extending below the floor arches. Thickness of web covering is to be governed by the dimensions of the girder to be covered, but in no case to be less than 2 in. (The above shall be subject to variation in any particular locality depending upon existing state or municipal ordinances or by-laws).

Tile covering for square or round columns shall be at least 2 in. thick.

Detail Drawings—The contractor shall submit to the architect for approval, detail drawings showing the form and method of applying the fireproofing to the steel work before starting the manufacture of material. Stock shapes shall be used throughout where they conform to the requirements of this specification and fit the contour of the steel.

Partitions—All partitions and division walls other than load bearing walls, shall be constructed of light weight standard scored hollow partition tile of the several thicknesses indicated on drawings. All partitions to be set in cement mortar and bonded by breaking joints at least 3 in. in every course. All partitions under 14 ft. in height shall be 3 in. thick; from 14 to 18 ft. to be 4 in. thick; higher than 18 ft. to be 6 in. thick.

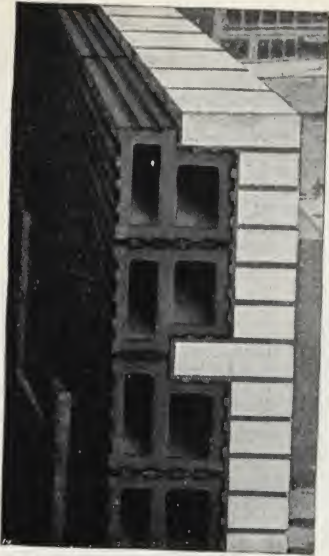
Load Bearing Tile—Standard load bearing tile shall have a heavy dovetail scoring and shall have an absorption of not more than 8%. Wherever possible, these tile shall be laid with cells vertical. All tile shall be capable of sustaining a load of 1200 lb. per sq. in. of gross area when laid with cells vertical.

Expert Advice Without Charge

Where special construction is necessary or when advice is desired regarding the best modern practice of fireproof construction, the assistance of our fireproofing engineers can be had for the asking. Estimates will be submitted upon receipt of plans and specifications.

Partial List of Buildings for Which We Have Finished Hollow Tile Fireproofing

McCormick Building, Chicago, Ill., 20 stories, Holabird & Roche, Architects
Monroe Building, Chicago, Ill., 16 stories, Holabird & Roche, Architects
Merchants National Bank, Indianapolis, Ind., D. H. Burnham & Co., Architects
Filene Building, Boston, Mass., 8 stories, D. H. Burnham & Co., Architects
First National Bank, Cincinnati, Ohio, 19 stories, D. H. Burnham & Co., Architects
Heisen Building, Chicago, Ill., 22 stories, Wm. Strippelman, Architect
Mackey Curtis Hotel, Minneapolis, Minn., 10 stories, Jos. C. Llewellyn, Architect
Union National Bank, Pittsburgh, Pa., 21 stories, MacClure & Spahr, Architects
Field Museum, Chicago, Ill., D. H. Burnham & Co., Architects
Carbondale High School, Carbondale, Pa., Owen McGlynn, Architect
Hibernia Bank Building, New Orleans, La., 20 stories, Favrot & Livaudais, Architects
U. S. Treasury Annex and U. S. Chamber of Commerce Building, Washington, D. C., Cass Gilbert, Architect
Masonic Temple, Syracuse, N. Y., Gaggin & Gaggin, Architects
Southern Railway Office Building, Washington, D. C., 10 stories
Grant Telephone Building, Pittsburgh, Pa., 20 stories
Penobscot Building, Detroit, Mich., Donaldson & Meier, Architects
William Penn Hotel, Pittsburgh, Pa., Janssen & Abbot, Architects
Cleveland Hotel, Cleveland, Ohio, Geo. B. Post, Architect
Union Trust Building, Cleveland, Ohio, 20 stories, Graham, Anderson, Probst & White, Architects
Commodore Hotel, New York, N. Y.
Bancroft Hall, U. S. Naval Academy, Annapolis, Md.
Book-Cadillac Hotel, Detroit, Mich., Louis Kamper, Architect



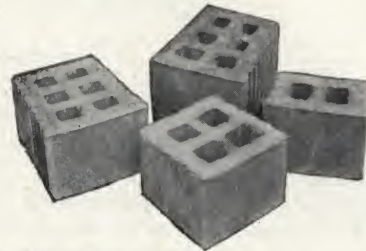
Typical Perfection Header-Backup Tile Construction

Perfection Header-Backup Tile

Insures a permanent construction for backing up face brick in load bearing and curtain walls. Adaptable to the largest steel frame buildings or smallest garage. It is economical because its use saves steel, cement and labor. This fact has been proven in many buildings where this form of construction has been used. This tile makes a wall that has a load carrying capacity of solid brick, and is lighter in weight than solid brick and cheaper. It is free from dampness due to the air chambers and passageways which it forms. This eliminates the necessity of furring and provides a scored surface for receiving plaster.

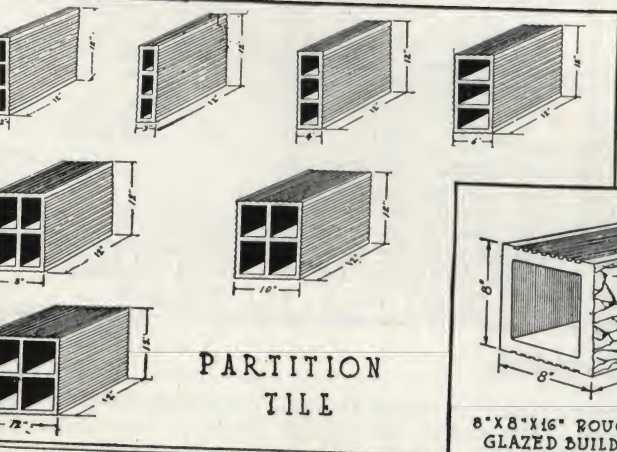
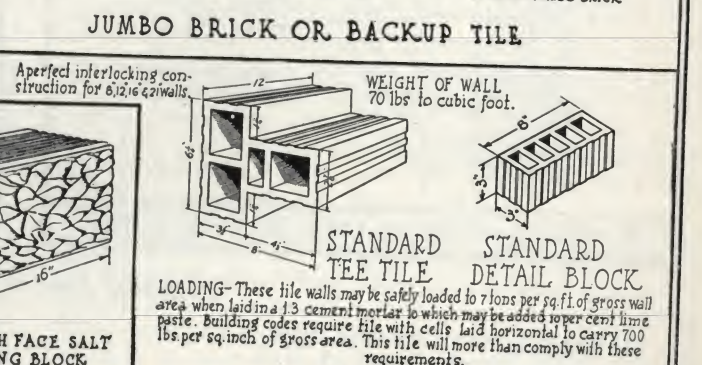
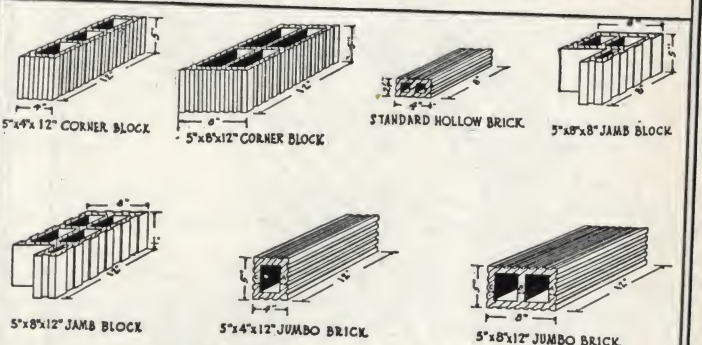
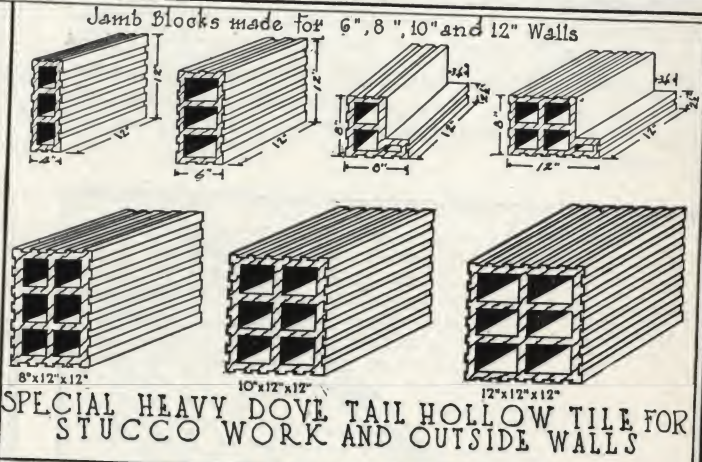
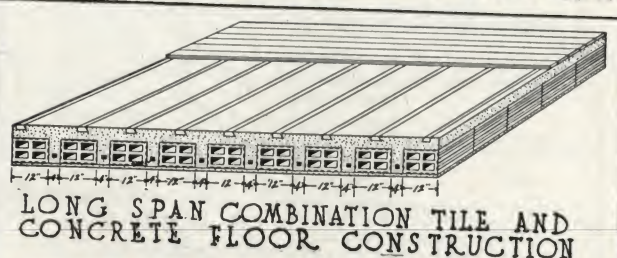
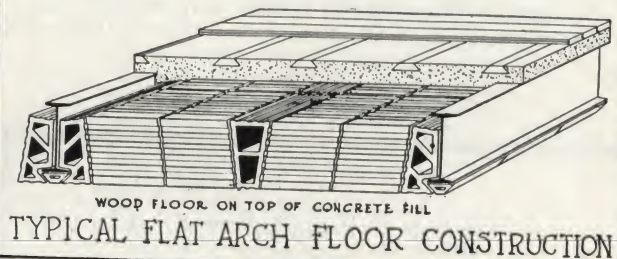
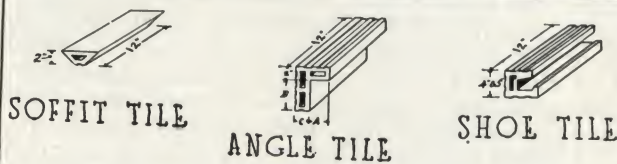
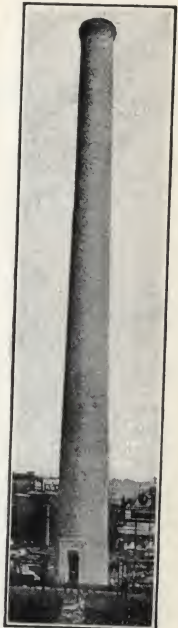
Made in 8, 10 and 12-in. widths so as to make 12, 14 and 16-in. walls with face brick.

This tile is approved by the New York City Bureau of Buildings. Tests were made at Columbia University for load bearing capacity, with the following results—8-in. tile averaged 2292 lb. per sq. in. of gross area; 10-in. tile, 1544 lb.; 12-in. tile, 1664 lb. These tests were made with cells horizontal, same as laid in walls.



Buff Fire Clay Radial Chimney Brick

Radial Brick Chimney Built of Whitacre-Greer Buff Radial Brick
HEINE CHIMNEY CO., Builders



WHITACRE-GREER HOLLOW FIREPROOFING TILE.

A. S. REID & COMPANY

"Excelsior" Back-up Tile, Hollow Tile of All Kinds, Sanitary Brick and Tile Wall Facing

68 Clinton Avenue
NEWARK, N. J.

1265 Broadway
NEW YORK, N. Y.

2814 N. Broad Street
PHILADELPHIA, PA.

1721 "H" Street, N.W.
WASHINGTON, D. C.

Products

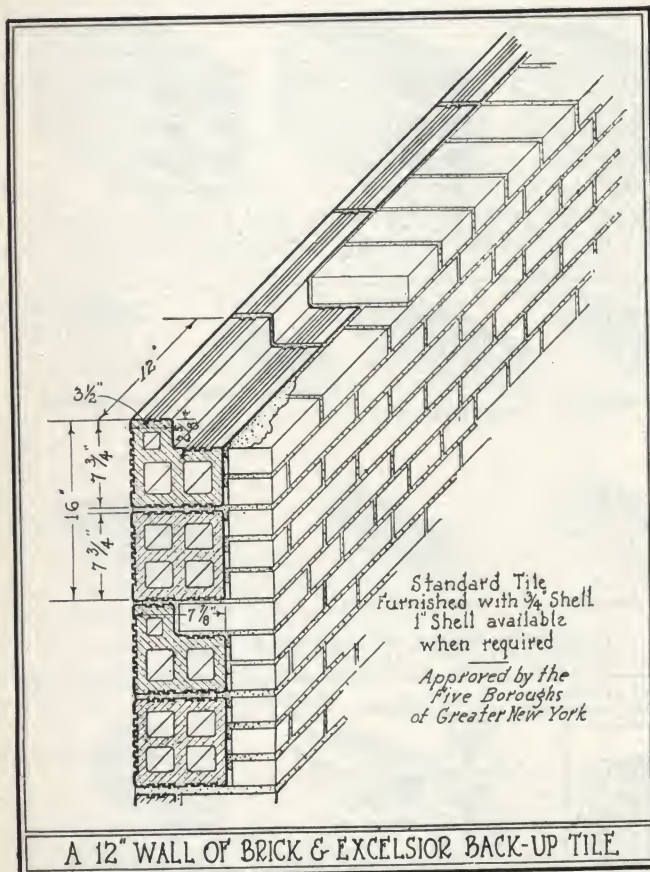
Designers and distributors of "EXCELSIOR" BACK-UP TILE and SALT GLAZED HEAVY DUTY TILE.

Also Heavy Duty Back-up Tile, Salt Glazed Tile and Brick, Textured Tile, Standard Partition and Wall Bearing Tile, Face Brick (all colors and textures).

"Excelsior" Back-up Tile

For all wall-bearing construction with brick facing.

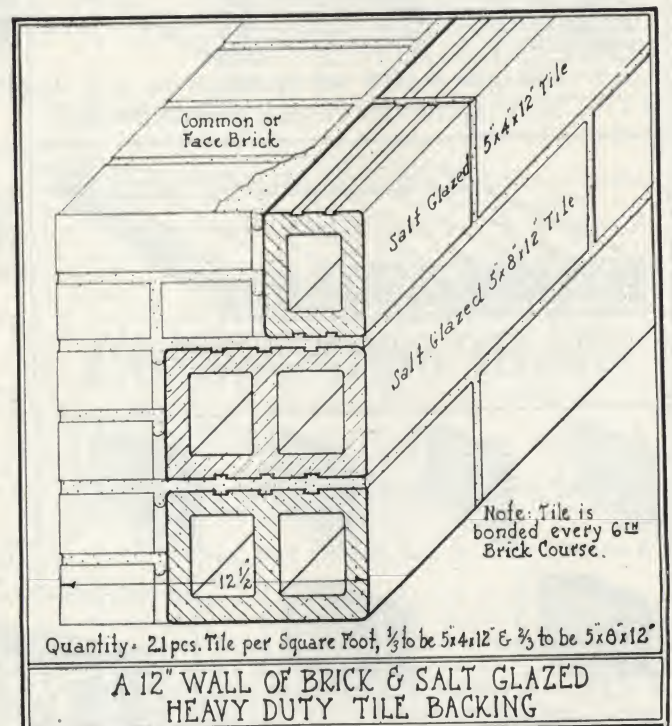
Advantages—All members of unit always under compression. Its simplicity promotes easy and effective bond with brick courses. Dimensions, weight and horizontal cells are most convenient for handling. A flat horizontal mortar bed for all joints—low mortar and labor costs with speed and strong construction. Plastering costs reduced. Horizontal scoring furnishes excellent plaster bond. Air insulation through many air cells. Can be furnished with smooth surface when tile are unplastered.



Salt Glazed Heavy Duty Tile

Adaptable to very diverse uses for interiors and exteriors of creameries, dairies, bakeries, packing houses, canneries; steam, electric, cold storage and manufacturing plants of all kinds; garages, fire stations; penal institutions; industrial laboratories, railroad buildings; country clubs, residences and many other structures. Can be used in gymnasiums, shower and locker rooms, corridors, stair-wells, cafeterias, kitchens, lavatories, lobbies, courts, power and boiler rooms, manufacturing rooms, residence basements and elsewhere.

Advantages—Sanitary, readily cleaned and light reflecting. Easily laid, as dimensions coincide with standard wall construction. Combinations of two units—5x4x12 and 5x8x12-in.—will build 8, 12, 16, and 20-in. walls of tile with brick or an all-tile wall. Exposed face of units (5x12 in.) make a pleasing appearance. Colors range from cream buff to rich mahogany. Economical to use—plastering and painting eliminated—easily handled by men on job. Wall bearing construction procured with sanitary facing in one operation—permanent glaze fused in burning to body of dense fire clay.



Partial List of Installations

The Granada Hotel, Brooklyn, N. Y.
Five Public Schools, New York, N. Y.
Public School, Ogdensburg, N. J.
Y. M. C. A. Building, Norristown, Pa.
N. Y. Telephone Building, Paterson, N. J.

Seaboard Refrigeration & Terminal Warehouse, Jersey City, N. J.
Hotel Colton Manor, Atlantic City, N. J.
Hotel Lafayette, Atlantic City, N. J.
Hotel St. Charles, Atlantic City, N. J.
Durant Auto Assembly Plant, Elizabeth, N. J.

CINDER CONCRETE BUILDING UNITS

MANUFACTURED UNDER STRAUB AND BO PATENTS—OWNED BY
NATIONAL BUILDING UNITS CORPORATION

1600 Arch Street
PHILADELPHIA, PA.

MANUFACTURED BY THE FOLLOWING COMPANIES

ALBANY, N. Y., FINCH & OSTRANDER, INC.
ALLENTOWN, PA., HOLLYWOOD BUILDING BLOCK CO.
ALTOONA, PA., JUNIATA RECONSTRUCTED STONE CO., Juniata, Pa.
APOLLO, PA., APOLLO STEEL CO.
ATLANTA, GA., ATLANTA CINDER BLOCK & TILE CO.
BALTIMORE, MD., CINDER BLOCK CORP.
BINGHAMTON, N. Y., STRAUB BUILDING UNITS, INC.
BRAEBURN, PA., BRAEBURN VOLCANO BLOCK CO.
BUFFALO, N. Y., BURNETT-WILSON-PFOHL, INC.
BUTLER, PA., SHUFFLIN & GREEN
CAMDEN, N. J., CONCRETE SPECIALTIES CO.
CINCINNATI, OHIO, CINCINNATI CONCRETE CORP.
CLARKSBURG, W. VA., CINCRETE, INC.
DENVER, COLO., CINDER BLOCK CO.
DES MOINES, IOWA, IOWA CONCRETE CRIB & CEMENT PRODUCTS CO.
DETROIT, MICH., DETROIT CINDER BLOCK & TILE CO.
DETROIT, MICH., R. E. HAMILTON'S SONS
EAST ST. LOUIS, ILL., ATLAS CINDER BLOCK CORP.
ELMIRA, N. Y., ELMIRA BUILDING UNITS, INC.
ERIE, PA., ERIE PATENT BLOCK CO., INC.
ESCANABA, MICH., UNIVERSAL MAGNESITE PRODUCTS CO.
FAIRMONT, W. VA., FAIRMONT WALL PLASTER CO.
(Sub-licensees and distributors in West Virginia)
FLINT, MICH., FLINT CINDER BLOCK & PRODUCTS CO.
FOREST PARK, ILL., ILLINOIS CINCRETE PRODUCTS CORP.
GENEVA, N. Y., GENEVA BRICK PRODUCTS CO.
GREENSBURG, PA., BUILDING MATERIALS CO.
HAMILTON, ONT., CANADA, E. J. SHEPARD, LTD.
HARRISBURG, PA., HARRISBURG BUILDING BLOCK CO.
INDIANAPOLIS, IND., STRAUB CINDER BLOCK CO.
JAMESTOWN, N. Y., JAMESTOWN BLOCK & TILE CO.
JERSEY CITY, N. J., CINDER BRICK AND TILE CO.
JOHNSTOWN, PA., ART STONE BLOCK CO.
KANSAS CITY, MO., CINDER BLOCK CO.
LANCASTER, PA., LANCASTER CONCRETE TILE CO.
LANSING, MICH., UNIVERSAL BLOCK CO.
LEMOYNE, PA., PENNSYLVANIA CONCRETE ROOFING TILE CO.
LEWISTOWN, PA., JAMES L. SHREFFLER
MCHENRY, ILL., FRETTE BROTHERS
MANORVILLE, PA., EDDY BROTHERS
MIDLAND, MICH., JOHN A. WHITMAN
MILWAUKEE, WIS., CINCRETE PRODUCTS CORP.

MOLINE, ILL., MOLINE CAST STONE CO.
MT. POCONO, PA., L. T. SMITH
NEW CASTLE, PA., STRAUB BLOCK CO.
NEW KENSINGTON, PA., STRAUB BLOCK CO.
NEW YORK, N. Y., CINDER TILE CO.
NORFOLK, VA., NORFOLK BUILDING BLOCK CORP.
NORTH BERGEN, N. J., HUDSON FIREPROOF BLOCK CO.
OMAHA, NEB., IDEAL CEMENT STONE CO.
PHILADELPHIA, PA., PHILADELPHIA PARTITION & BUILDING BLOCK CO.
PITTSBURGH, PA., STRAUB BLOCK CO.
POTTSVILLE, PA., POTTSVILLE BUILDING BLOCK CO.
PUEBLO, COLO., PUEBLO CINDER & CEMENT PRODUCTS CO.
READING, PA., BERKS BUILDING BLOCK CO.
RIDGEFIELD PARK, N. J., BERGEN BUILDING BLOCK CO.
RICHMOND, VA., RICHMOND PATENT BUILDING BLOCK CORP.
RIVER GROVE, ILL., CHICAGO GRANITE CO.
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ROCHESTER, N. Y., SCHAEFER BROS. BUILDERS SUPPLY CO.
ST. JOSEPH, MO., CINDER BLOCK CO.
ST. LOUIS, MO., CINDER BLOCK CO., Clayton, Mo.
SEATTLE, WASH., CONCRETE STRUCTURAL UNITS CO.
SELINGROVE, PA., CINCRETE PRODUCTS CO.
SPRINGDALE, PA., BROWN BUILDING BLOCK CO.
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SPRINGFIELD, OHIO, SPRINGFIELD CINDER BLOCK CO.
SYRACUSE, N. Y., SYRACUSE CINDER PRODUCTS CORP.
TARENTUM, PA., FRANK H. THOMPSON
TORONTO, ONT., CANADA, TORONTO BRICK CO., LTD.
TRENTON, N. J., CONCRETE SPECIALTIES COMPANY
UNIONTOWN, PA., HANKINS-PAULSON CO.
WARREN, OHIO, STRAUB PATENTED BLOCK CO.
WARREN, PA., WILSON-WETMORE LUMBER CO.
WASHINGTON, D. C., WASHINGTON CONCRETE PRODUCTS CORP.
WAYNESBURG, PA., J. E. DRURY
WESTFIELD, N. J., HUDSON FIREPROOF BLOCK CO.
WILKES-BARRE, PA., NEPENNA BUILDING MATERIALS CO., Kingston, Pa.
WILLIAMSPORT, PA., DELVAN BLOCK CO., So. Williamsport, Pa.
WILMINGTON, DEL., CINDER BLOCK CORP.
YORK, PA., YORK PATENTED BUILDING BLOCK CO.
YOUNGSTOWN, OHIO, PETER KLUG
YOUNGSTOWN, OHIO, GARLAND BLOCK & SAND CO.

Products

FOUNDATION and WALL BEARING BLOCKS; PARTITION TILE; BRICK; REINFORCED LINTELS; SILLS; CHIMNEY BLOCKS; FLOOR ARCH BLOCKS.

Patents and License

The manufacture and sale of cinder concrete building units is protected by United States Patent No. 1,212,840 to Francis J. Straub, and United States Patent No. 1,466,083, to Sigurd Bo. Other patents pending. The Straub patent has been broadly sustained by unanimous decision of the United States Court of Appeals. All plants work under license agreement with NATIONAL BUILDING UNITS CORPORATION.

Advantages

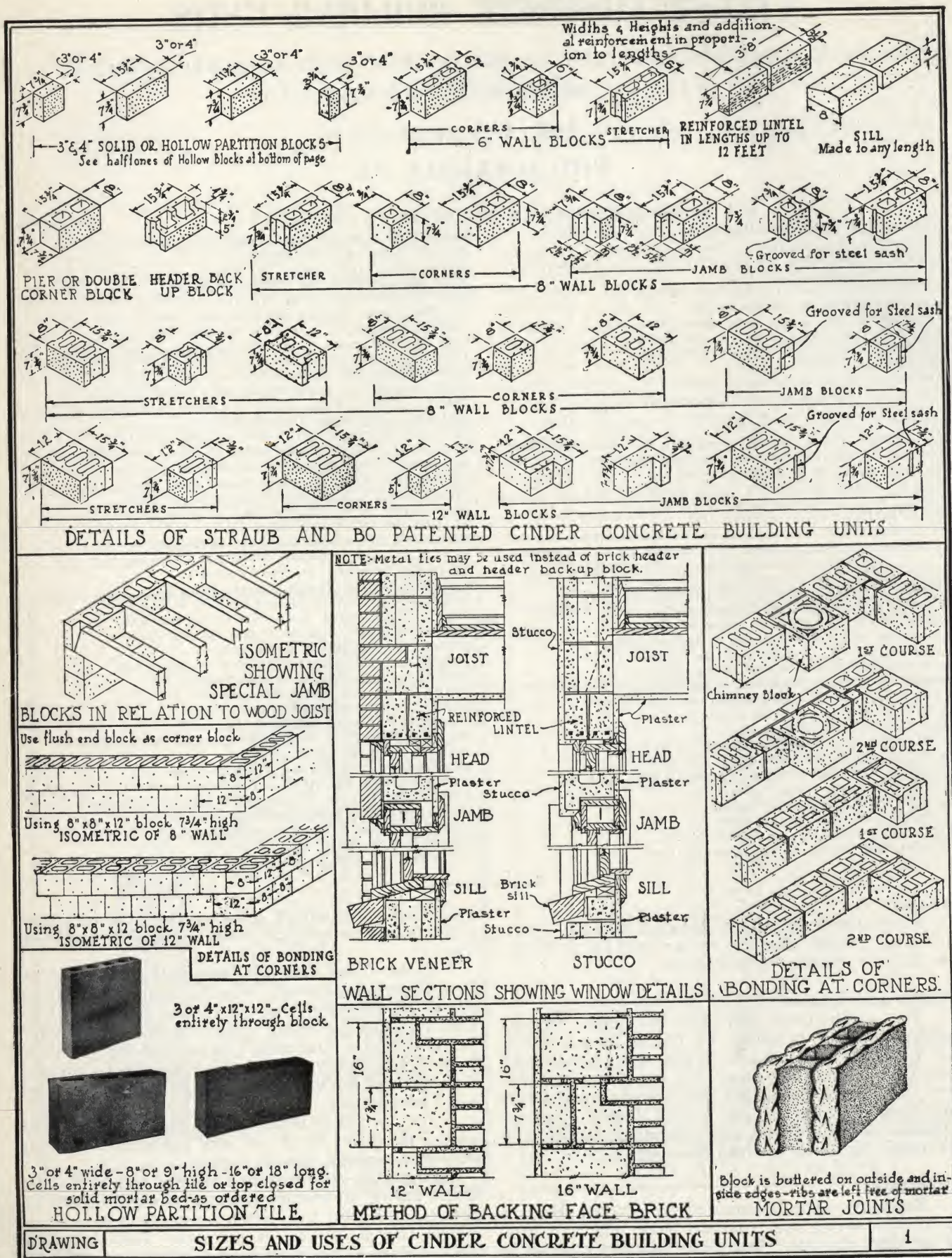
Economy—The lightness of the product effects a 20 to 40% saving over common brick, and 5 to 15% saving over clay tile. One 8x8x16-in. block displaces 12 brick and requires about one-quarter the mortar. Plaster is applied direct to cinder block, and the trueness of the wall, together with the texture, facilitate the

application. No nailing strips or plugs are necessary. Other economies will be found under other subheadings.

Tests—Tests made by Underwriters' Laboratories, Inc., Watertown Arsenal, Columbia University, University of Toronto, University of Illinois, Ohio State University, Rutgers College, Johns Hopkins University, Lewis Institute, Pittsburgh Testing Laboratory, Detroit Testing Laboratory, Kansas City Testing Laboratory, E. L. Conwell & Co., Philadelphia, Pa., and other recognized laboratories.

The NATIONAL BUILDING UNITS CORPORATION, or any of the plants listed will send copies of these tests and other pertinent data on request.

Strength—All plants are required to manufacture blocks having an average crushing strength of 800 lb. per sq. in. of gross area, which is equivalent to approximately 1200 lb. per sq. in. net area. Tests on cinder block walls at Columbia University show a ratio of wall strength to unit strength for cinder blocks of from 57 to 76%. This is the highest of any known masonry and consequently, carries a corresponding safety factor.

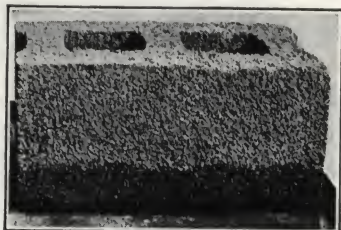


Breakage—Practically no breakage, even when the block and tile are dumped from trucks.

Fireproof—The official tests made for the National Board of Fire Underwriters at the Underwriters' Laboratories, Inc., in Chicago confirm the many demonstrations and results of actual fires. Prolonged exposure to fire and application of water to the wall causes no cracking or spalling, and the loss in strength is negligible.

Timeproof—Age increases the strength of cinder concrete building units. They are not affected by freezing or temperature changes. This is due to the toughness and cellular structure of the material.

Dampproof—The illustration shows the low capillary attraction of cinder blocks. This feature accounts for the fact that no water is drawn through the wall, even during the heaviest rain storm. It is also of importance in producing a stronger mortar joint in that the mortar is not robbed of its moisture.



Cinder Building Block Partly Immersed in Water

Illustrating the low capillary attraction of the material

For the same reason, stucco and plaster retain full strength on cinder concrete building units. The initial suction or absorption is rapid but limited. No wetting is necessary. The laying of these blocks during the winter months is thus made practicable.

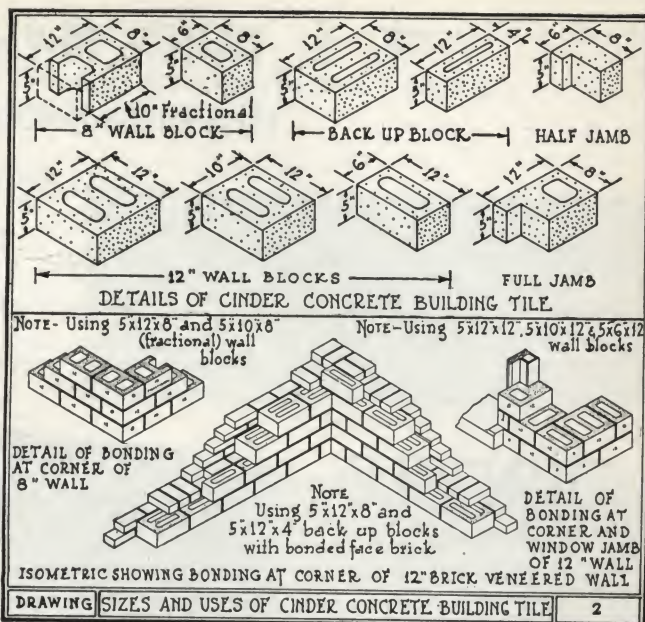
Non-conductor of Heat and Cold—The cork-like structure of the material builds insulation into the wall. It insures an even temperature within the house all year round and effects a substantial saving in fuel. The insulative nature makes lining with special insulative materials unnecessary. Cinder concrete building units never "sweat"; are rotproof and verminproof; no mold forms, and decorations are never injured where plaster has been applied direct to exterior walls, even in the severest climate. The material is ideal for icehouses, refrigeration plants, fruit storage, dry kilns, etc.

Soundproof—Cinder blocks are used extensively in schools, hospitals, churches, and the like where the acoustic design is of particular importance. A wall of this material, exposed or plastered, reduces the reverberation and absorbs the sound. Cinder tile forms the ideal partition, because it reduces the amount of sound transmission more than any other masonry material.

Stucco and Plaster—The rough texture affords a perfect key for plaster and stucco. These materials are readily applied and dovetail into the small crevices on the surface of the cinder block or tile.

No Through Mortar Joints—Cinder block and tile are always buttered on the outside and the inside webs, but not on the cross webs. Through mortar joints, with their tendency to conduct moisture, heat and cold through the wall are thereby avoided.

No Furring Required—The low capillary attraction and the high degree of heat insulation of cinder concrete building units make it possible to plaster direct without any furring or lathing.



Light of Weight—From 30 to 40% lighter than sand concrete. The hollow units 50 to 60% lighter than brick. This speeds up the laying and reduces the dead load of the wall.

Rapid Laying—Light weight, uniformity and a good mortar bed contribute to easy, rapid and economical wall erection. Less waste of mortar or time of setting than with clay tile.

Nailing—As good as wood for nailing; holding power is equal to yellow pine. Nails never rust. See Pittsburgh Testing Laboratory report. Holding power increases by age. Wood ground and trim can be thoroughly secured by toe nailing. Pipe hangers and other supporting members can be readily secured by means of lag screws, expansion bolts, etc.

Cutting—Cinder concrete building units are furnished in all fractions. They can, however, be readily cut and they can be chased and channeled for pipe and conduits without fracture.

Corners—Details of this on preceding page show several methods, all retaining full insulating value.

Steel Sash Installation—Grooves are moulded into jamb blocks to admit steel window frames. Two lintels to an opening provide this advantage without cutting or channelling.

Lintels—Reinforced lintels of cinder concrete provide all the advantages of strength, lightness, nailability and dampproofness.

Several standard sizes—see drawing No. 1. Specials on order.

Details, Catalogues and Data

Each plant is in position to submit details and give required information to architects, engineers and builders.

Address nearest plant or the head office of the NATIONAL BUILDING UNITS CORPORATION.

W. E. DUNN MANUFACTURING CO.

Hollow Concrete Building Units

HOLLAND, MICH.

400 Authorized Manufacturers Throughout the United States—Write or Wire Our Expense for Location of Nearest Duntile Supply

(The space below reserved for insertion of name and address of Local Duntile Manufacturer)

DUNTILE

The Perfected
All-Purpose Concrete
Building Unit



TRADE-MARKS

DUNTILE

*Builds
Better Buildings
Cheaper*

What Is Duntile?

Duntile is a trade-marked and nationally advertised hollow concrete building unit adapted to the complete construction of all kinds of buildings. It is designed for maximum strength both in the unit and in the wall. It is manufactured by standardized methods and machinery insuring uniform quality.

Its wide range of permanent colors opens a new field of architectural treatment. It combines the strength and economy of concrete in a practical, universal building unit.

Mat Glazed Duntile for Color

Duntile is now available in some forty shades and colors, a few of which are shown on the following page. The rich tones and deep textures offer the architect unlimited opportunity for achieving new exterior and interior effects. Because of the method of mat glazing, no two units are alike. Each has its own texture and produces, in a wall, a pleasing variegation. The mat glazing is waterproof and as permanent as the unit itself. For the outside of any building, and for interiors of stores, gymnasiums, etc., it is a beautiful and economical finish.



Architects Exhibition Home

Duntile triple air space walls plastered and stuccoed direct. W. F. B. Koelle, Northfield, N. J., architect and owner

**The Home Below Is
of Complete Duntile
Construction—Founda-
tions, Partitions
and Sidewalls**

Exterior is of buff
mat glazed Duntile. Built
in Aurora, Ill., by Mrs.
Blanche E. Watson



**Duntile Without the Use of Steel
Supports the Entire Building**

This is the Premier Hotel, Benton Harbor, Mich. FOLTZ & Co., Chicago, Architects

Scientifically Designed

The design of Duntile is responsible for its unusual strength. The cylindrical air space provides strong corners, a full mortar bed, and an arch support to distribute the weight—three features that assure solidity and permanence in the unit itself and in the wall. Its strength and quality have been conclusively proven in tests conducted by such authorities as Columbia University, Armour Institute of Technology, Pittsburgh Testing Laboratory, and Robert W. Hunt.

Details of tests will be furnished on request.

Permanence at Low Cost

Duntile lowers construction costs. The three buildings shown on this page were all erected at a distinct saving and

each represents a different form of construction. A large proportion of the saving is in labor. The light weight, full mortar bed, and square edges of Duntile make it easy to lay, and builders have found it to save as much as 30% in labor alone. The mortar saving is also a large one because of the full mortar bed and economical size of the units. Plaster and stucco, if used, can be applied direct, eliminating furring and lathing.

Mat Glazed DUNTILE in full range of colors,
exemplifying today's architectural trend, is now available at most of
the 400 DUNTILE plants



NO. D 20 ENGLISH RED



NO. D 50 MINGLED GREEN



NO. D 80 EGYPTIAN IVORY



NO. D 21 COLONIAL RED



NO. D 31 MANDARIN BUFF



NO. D 40 MOORISH BROWN



NO. D 60 BLUE SPRUCE



NO. D 30 TOKIO TAN



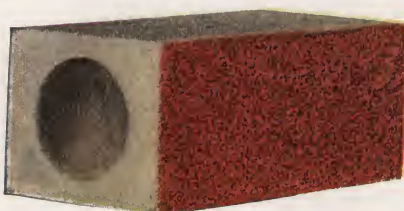
4" X 4" X 12" DUNTILE



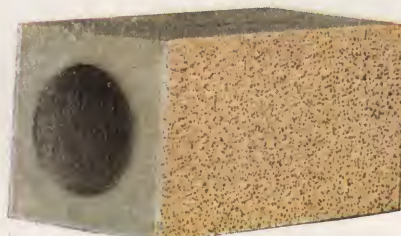
4" X 5" X 12" DUNTILE



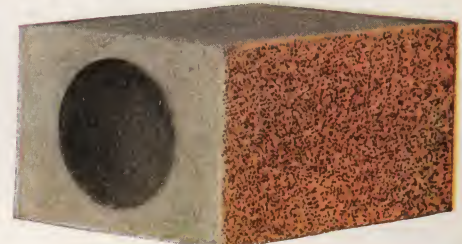
5" X 6" X 12" DUNTILE



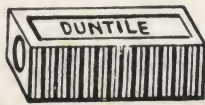
5" X 8" X 12" DUNTILE



6" X 6" X 12" DUNTILE



6" X 8" X 12" DUNTILE



REGULAR
DUNTILE



HALVES
DUNTILE



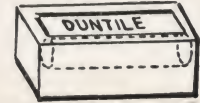
SECTION
DUNTILE



SECTION
BOND TILE



BOND
DUNTILE

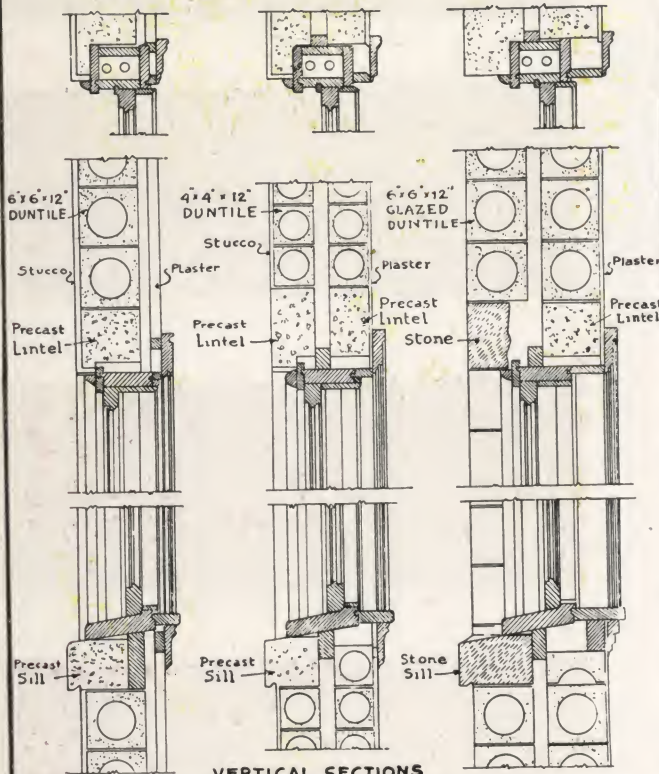


CORNER
DUNTILE

DUNTILE

Typical Duntile Units

DETAIL OF BALANCED SASH IN DUNTILE WALLS



VERTICAL SECTIONS

STANDARD DUNTILE SIZES

Height, in.	Width, in.	Length, in.	Displacement, cu. in.	Number brick equivalent	Weight, lb.
4	4	11 3/4	192	2.7	8
4	5	11 3/4	240	3.4	12
5	5	11 3/4	360	4.8	16
5	8	11 3/4	480	6.7	24
6	6	11 3/4	432	6.	21
6	8	11 3/4	576	8.	25
8	8	11 3/4	768	10.6	36

NEW YORK
PHILADELPHIA
BOSTON
BUFFALO
EASTON
CINCINNATI
CLEVELAND
DETROIT

CABLE ADDRESS
"TESTING PITTSBURGH"
WESTERN UNION CODE USED

SUBJECT Sheet 1.

PITTSBURGH TESTING LABORATORY

ESTABLISHED 1907
INSPECTING ENGINEERS AND CHEMISTS
PITTSBURGH PA.

CHICAGO
CINCINNATI
ST. LOUIS
BIRMINGHAM
LITTLE ROCK
DALLAS
SEATTLE
SAN FRANCISCO
LOS ANGELES

Laboratory No. 52230
Date 1-8-24

PLEASE ADDRESS ALL COMMUNICATIONS
TO THE COMPANY AND REFER TO
FILE NO.

REPORT OF TEST OF 4" x 5" x 12" "DUNTILE" CONCRETE TILE FOR W. E. DUNN MANUFACTURING COMPANY, HOLLAND, MICH.

COMPRESSION TESTS

Dimensions Inches	Gross Area Sq. In.	Net Area Sq. In.	Crushing Load Pounds	Crushing Strength-Lbs. per sq. in. Gross Area	Concrete
11.75x5.00x4.00	58.76	24.21	117900	2007	4871
11.70x5.00x4.00	58.50	24.10	108530	1855	4503

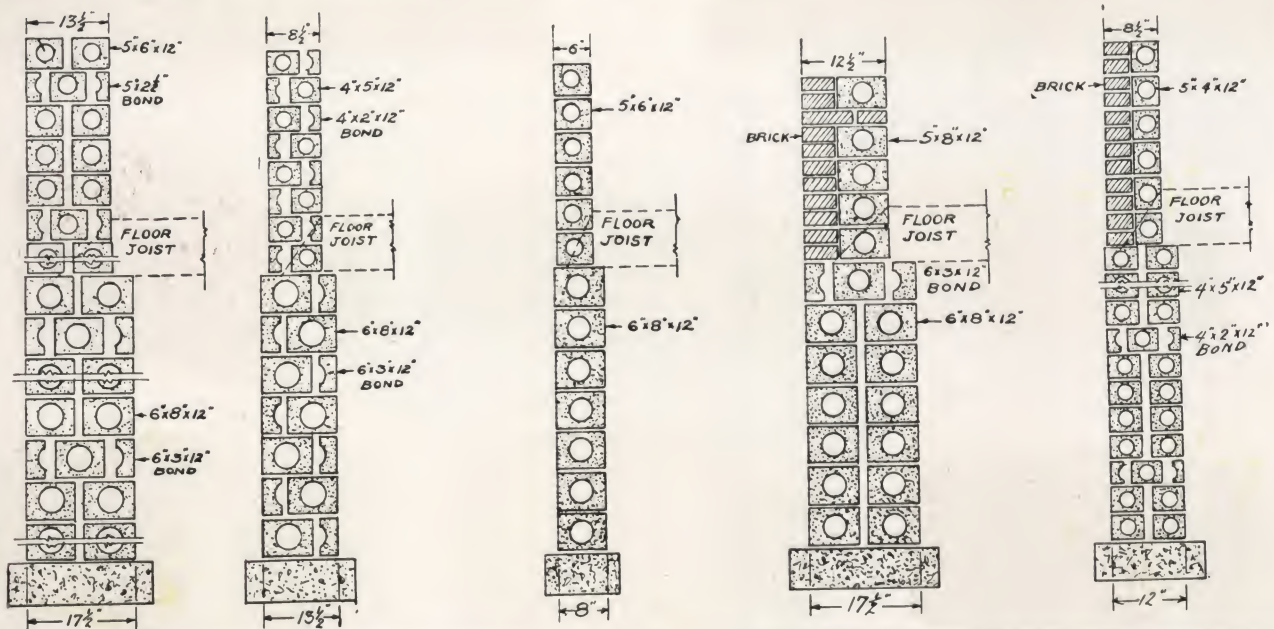
ABSORPTION TEST

One dried tile submerged in water 24 hours

Original Dry Weight of Tile	Weight of Tile After Being Submerged in Water	Weight Gained	Gain Percent
12 lbs 2 oz.	12 lbs 15 oz.	13 oz.	6.7

PITTSBURGH TESTING LABORATORY

W. H. Wood
W. H. Wood
Engineer of Tests



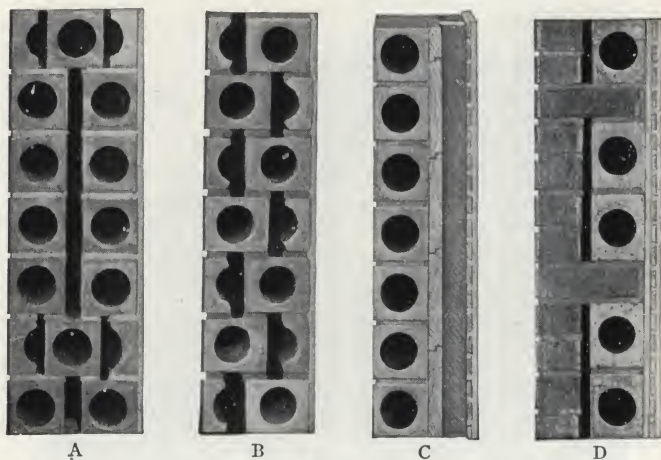
Typical Duntile Construction Details

Sizes Available

Duntile is made in seven standard sizes to meet every construction requirement. The dimensions and weights are listed on the preceding page, with details. Note that by combining the units in different ways walls of any standard thickness can be obtained. This gives Duntile great flexibility and makes it adaptable for foundations, load bearing walls, curtain walls, and partitions in any size or style of building.

Typical Forms of Construction

The wall sections illustrated herewith are typical of a few of the available constructions.



Type A—Represents the highest type of masonry wall at practically the cost of frame. Years of actual use have shown the fine insulating properties of this triple-air-space construction. Plaster is always applied directly to the walls and has never been known to crack or loosen. This wall is most economical when mat glazed units are used for the exterior, but when left plain it forms an ideal base for stucco. A 9-in. triple-air-space wall with the faced units can be built in many localities, for 54¢ per sq. ft.; with plain units, 44¢.

Type B—Consists of one regular Duntile and one bond tile—in reality a tile and one-half, alternating in every course. This gives two horizontal continuous dead air spaces with no continuous mortar joints. Typical cost of 9-in. wall Glazed Duntile is 50¢ per sq. ft.

Type C—Shows a wall section for use where veneer construction is insisted upon. It has not the advantages of the all Duntile wall, but is considerably cheaper than face brick veneer and illustrates the adaptability of



No Loss from Breakage—Duntile Can Be Dumped Without Injury



Hotel Ponce de Leon, Kansas City, Mo.

"This structure embodies more innovations than any other. It departs from the types previously erected here both in design and construction. A sturdy steel frame supports curtain walls of Duntile construction with stucco exterior. It will be the first tall building here with exterior walls of stucco which lends itself well to the Spanish design. The work of Edgar C. Faris, Architect. The building contains seventy-six apartment units of varying sizes."—*Kansas City Star*

Duntile when used in conjunction with other materials. Mat Glazed Duntile Veneer costs, generally, 57¢ per sq. ft.

Type D—For use where face brick is demanded. Duntile backing makes a permanent fireproof wall and avoids that "efficient" fire trap—veneer on frame. The 9-in. wall costs 73¢; 13-in. wall, 5x8x12-in. Duntile for backing, 83¢ per sq. ft.

Specifications

Standard masonry specifications apply to the laying of Duntile as well as to brick, no special method of treatment is necessary.

Standard Uniform Quality

The Duntile made in every authorized plant is required to meet the high quality standard set by the engineering department of the W. E. DUNN MANUFACTURING Co., makers of the production machinery. Consequently there are over 400 dependable sources of supply for this material. Every one is owned and operated by local men of high standing who fully appreciate their responsibility.

Regardless of what building operations you are concerned with, it will pay you to let the nearest plant submit facts and figures. Their product is dependable, offers a full color selection, and will lower construction costs.

Your Nearest Supply

Wire the W. E. DUNN MANUFACTURING Co., Holland, Mich., at their expense. This company or any Duntile plant will be glad to furnish prices, colors, further construction details, or samples of mat glazed Duntile.



One Thousand Dollars Was Saved by Duntile in This Store Building in Columbus, Ohio. White Glazed Units Used for Both Exterior and Interior Finish

NATIONAL STONE-TILE CORPORATION

Patentees, Licensors and Manufacturers of Stone-Tile

625 Market Street, SAN FRANCISCO, CAL.

NEW YORK OFFICE, Graybar Building, 420 Lexington Avenue

For Local Licensees, see Telephone Book under "Stone-Tile"

Product

STONE-TILE.



Stone-Tile—A Load Bearing Concrete Tile

Stone-Tile is a pre-cast hollow concrete building unit, smaller and easier to handle than building block or hollow tile. It is one of the most economical materials for permanent, fireproof walls in houses, schools, churches and business or industrial buildings of every description.

Made to Rigid Specifications—The manufacture of Stone-Tile is conducted under Standard Specifications to which each manufacturer must adhere under his license contract. In the Stone-Tile mix the aggregates are graded and the water ratio controlled so as to secure a plastic or *quaking* consistency.

Produced in Quantity—Every Stone-Tile plant is equipped to fill the largest orders on short notice.

Distinctive Texture—Stone-Tile has a distinctive pitted surface which gives a pleasing texture to exterior walls and makes a firm bond with plaster.

Flexible in Treatment—The convenient sizes and shapes of Stone-Tile lend themselves to a wide range of architectural treatment. Can be used to form arches and lintels. See illustrations on following page.

Can Be Reinforced—Stone-Tile pilasters may be filled solid and reinforced where concentrated loads occur and the total cost will be less than reinforced concrete.

Easy to Handle—Stone-Tile units can be handled as easily as common brick. An average bricklayer can lay from 600 to 1200 of 6-in. size, and from 500 to

900 of 8-in. size, depending on nature of the wall.

Extremely Economical—Stone-Tile can be furnished and laid at a price seldom in excess of 35¢ per sq. ft. of 8-in. wall; other sizes in proportion.

A Unit That Meets Every Condition

Stone-Tile Units are furnished in three principal sizes: No. 4 for partitions; No. 6 for 6, 12 or 18-in. walls, and No. 8 for 8 or 16-in. walls. Half tile are also furnished, as well as other shapes listed below.

DIMENSIONS AND WEIGHT OF STONE-TILE

No.	Dimensions, in.	Approx. weight, lb.	Web thickness, in.	Ratio of air space
4	3 $\frac{3}{4}$ x12x3 $\frac{1}{2}$	8 $\frac{1}{2}$	1 $\frac{1}{4}$	25%
6	5 $\frac{3}{4}$ x12x3 $\frac{1}{2}$	12 $\frac{1}{2}$	1 $\frac{1}{2}$	32%
8	7 $\frac{3}{4}$ x12x3 $\frac{1}{2}$	16 $\frac{1}{2}$	1 $\frac{3}{4}$	22%

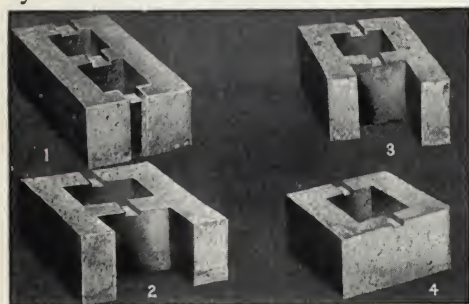
Mortar averages 1 cu. yd. per 1000 Stone-Tile of either size.

For Corners—Special corner tile are furnished in the No. 8 size. No. 6 tile require no special shapes at corners.

For Jambs—Appropriate jamb units (No. 6 or 8) are furnished for use at double hung windows, steel sash, and the like. (See first illustration on left below).

For Copings and Bearing Courses—Solid tile (No. 6 or 8) is used for bearing courses at joist lines and for capping walls at top.

For Arches, Pilasters, etc.—The standard units are adaptable for these purposes. Notice how these details are handled in the church building illustrated below on the left.



1—Jamb Tile for Steel Sash
2—8-in. Corner Tile
3—Recessed Jamb Tile
4—Half Tile

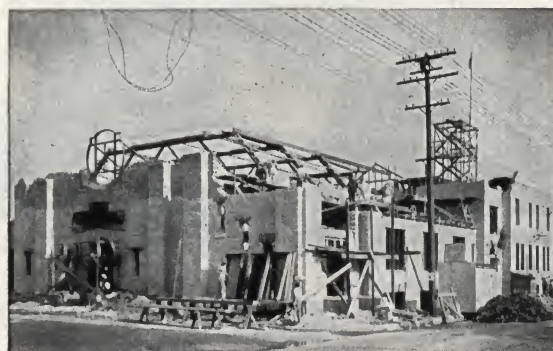


Stone-Tile Laid in Wall
Note the brick proportions



Church Built with Stone-Tile

Note the pleasing exterior appearance of Stone-Tile masonry and flexibility of use



Flexibility of Stone-Tile

Adaptable for arches, copings, cornices, etc.

Where to Procure Stone-Tile

Because of its strength, economy, pleasing texture and exceptional flexibility of treatment, Stone-Tile is being widely specified by architects. For their benefit we maintain a Service Department at the home office, which will co-operate in plans and specifications.

Stone-Tile can be procured from independent licensees in different parts of the country, by whom it is manufactured under the rigid Stone-Tile specifications.

Look in the telephone book under "Stone-Tile" for your local licensee—or write us for information.

Where Used

Stone-Tile has been and is being successfully and economically used in the following type of structures:

Apartment houses	Factories
Churches	Railroad stations
Residences	Schools
Stores	Theaters
Office buildings	Vaults
Hospitals	Warehouses
Mills	Garages

The illustrations show the beauty, strength and versatility of Stone-Tile.



Wall and Gateway of Stone-Tile

The Stone-Tile are set a little askew, the joints are raked out to give shadow lines and the whole brush coated



Exterior Walls of Stone-Tile Masonry, Brush Coated

WITMER & WATSON, Architects
Special "radius" units furnished for tower of this residence



Motor Mart Garage, Boston, Mass.

RALPH HARRINGTON DOANE, Architect
Largest of its kind in the world. Stone-tile backup throughout

UNITED STATES GYPSUM COMPANY

Pyrobar Partition and Furring Tile; Beam and Column Covering

300 West Adams Street

CHICAGO, ILL.

For Sales Offices, see page B1359

Products

PYROBAR PARTITION and FURRING TILE; PYROBAR BEAM and COLUMN COVERING.

For Acoustical Plaster, see page A19; for Structo-lite Cement, see pages A44-45; for Floor Voids, see page A114; for Reinforced Roof Tile and Monolithic Floors and Roofs, see pages A166-170; for Dry Fill Insulation, see page A200; for Wallboard, see page B1258; for Sheathing, see page B1271; for Lath, see page B1323; for Gypsum Plasters and Finishes, see pages B1359-1361; for Colored Finishing Plaster, see page B1365; for Stucco, see page B1377; for Plastic Paint, see page B1697.

Pyrobar Partition and Furring Tile

Moulded of 98% gypsum and 2% special fiber by continuous automatic machine process, insuring accurate proportions and uniform size, weight, strength, and density.

This company will erect Pyrobar partitions.

Approved by Underwriters' Laboratories, Inc., for:

Non-bearing corridor walls, partitions, wall furring, false columns and pilasters, unplastered partitions and corridors in merchandise storage warehouses.

Fire division walls.

Elevators, stairways, dumbwaiter and corridor enclosures.

Light wells, pipe chases, heat and vent ducts.

As covering for columns, beams, girders and trusses and other steel members requiring fireproofing.

Advantages—

Fireproof
Light weight
Save plaster.
Perfect plaster base

Economical
High sound insulation
Speedily erected
Easily cut for alterations

Distinctive

Economy—Pyrobar units are 2½ sq. ft. each, speeding construction and making for economy in handling and erection costs. Pyrobar walls are straight and true, requiring uniform ½ in. of plaster on a side to finish.

Cost—Its extreme light weight and large, true units secure economy in freight, labor, handling, erection, and plastering. Note the comparisons.



Pyrobar Precast Gypsum Partition and Furring Tile

Approved by Underwriters' Laboratories, Inc.

SIZES AND WEIGHTS OF PYROBAR PARTITION TILE

Thickness (all tile 12x30 in.)	For ceilings, heights up to, ft.	Weight tile per sq. ft., lb.	Weight mortar per sq. ft., lb.	Total weight** per sq. ft., lb.	
				Plastered One side	Plastered Two sides
1½-in. split	Furring†	4.9	1.4	7.9	
2-in. split	Furring†	6.4	1.4	9.4	
2-in. solid	10*	9.4	1.5	12.4	15.4
3-in. hollow	13*	9.9	2.0	12.9	15.9
3-in. solid	15†	13.0	2.0	16.0	19.0
4-in. hollow	17*	13.0	2.5	16.0	19.0
5-in. hollow	20*	15.6	2.75	18.6	21.6
6-in. hollow	30*	16.6	3.0	19.6	22.6

*Underwriters' recommendation. †No Underwriters' recommendation. **Weight of plaster, one side 3 lb. per sq. ft., two sides 6 lb. per sq. ft. (½-in. grounds).

COMPARATIVE WEIGHTS OF PYROBAR AND CLAY TILE

Thickness	Weight per sq. ft., lb.		3-in. tile in place	Weight per sq. ft., lb.	
	Pyrobar	Clay Tile		Hollow Pyrobar	Clay Tile
2-in. hollow.....	6.4	12	Unfinished.....	9.9	15.
3-in. hollow.....	9.9	15	Mortar.....	2.	3.5
4-in. hollow.....	13.0	16	Plaster both sides..	6.	9.
5-in. hollow.....	15.6	19			
6-in. hollow.....	16.6	22	Total weight.....	17.9	27.5

Specifications for Pyrobar Partition and Furring Tile

Partitions—Unless otherwise specified or shown, all partitions (Note: also mention vent shafts, pipe chases, column and beam or girder fireproofing or any other special items required with partitions) shall be built of UNITED STATES GYPSUM COMPANY'S Pyrobar Partition Tile, of thickness indicated on plans. All partitions shall start with a mortar bed, and the tile shall be set plumb, straight and true with vertical joints broken, and shall be wedged at ceiling and slushed with mortar. Corners of all partitions shall be built log cabin fashion, tile interlocking.

All intersecting partitions shall be cross bonded not less than at every third course. All partitions coming in contact with existing walls or partitions or with brick or other masonry walls shall be securely anchored to such walls by means of metal ties, anchor straps, other approved fasteners or by 10d steel cut nails partially driven into the masonry joints at each gypsum tile course or by providing recess in wall.

Furring—All outside walls, where so shown on plans, shall be furred with Pyrobar Furring Tile of thickness and type indicated on plans, laid up against the wall, and securely anchored to the masonry every square yard with 10d cut nails, metal ties, anchor straps or other approved fasteners left in place by mason contractor.

Mortar and Laying—All Pyrobar Tile shall be laid up in mortar composed of UNITED STATES GYPSUM COMPANY'S Set-fast Cement—1 part cement to 3 parts, by weight, of clean, sharp dry sand, thoroughly mixed. (Important: Do not use portland cement or lime mortar.) No mortar shall be retempered. All tile shall be laid with full, flush joints to a line, with horizontal beds uniformly level on each course. All joints, chinks, and crevices between the tile and other work shall be filled with mortar well slushed in.

Grounds for Trim—Chair rail, picture moulding, plaster grounds, baseboards and similar trim shall be secured to grounds or to nailing blocks set in the tile construction for this purpose. Nailing blocks shall not be less than ¾ in. thick, shall be nailed directly to the end of the gypsum tile and shall be of such other dimensions as to completely cover the end of the tile. When nailing blocks are used, they shall be spaced not to exceed 30 in.

Blackboards, toilet and heavy fixtures shall be secured by bolting through the tile construction, or shall be nailed to nailing blocks not less than 1½ in. thick of the character required for other trim, and spaced not to exceed 15 in.

Lintels—Openings not greater than 22 in. in partitions of tile may be spanned with a single tile, which shall have a bearing at each end of not less than 4 in. When such openings are more than 22 in. but not more than 4 ft., the Pyrobar Tile over these openings shall be laid in the form of a jack-arch. Openings over 4 ft. but not over 6 ft. shall be spanned by reinforced gypsum lintels. Openings over 6 ft. shall be spanned by metal lintels of approved design. (Note: Specify under Miscellaneous Iron.)

Wood Frames—(For Carpenter Specifications)—The carpenter contractor shall set and secure the rough bucks for openings ahead of the contractor for this work so as to cause no delay. These bucks shall be left plumb and true by the carpenter and shall be made of 2-in. lumber of the same width as the thickness of the tile, and there shall be ½x2¼-in. grounds nailed to the bucks to the height of the door forming a rabbet to receive the Pyrobar Tile.

Trim—All wood or metal trim shall extend over the junction between bucks or grounds and the plaster coats. For narrow trim an unrabbetted buck may be used if securely anchored to the tile.

Note: For best construction, we recommend the use of door bucks which extend from floor to ceiling, and preferably anchored to the tile by means of metal ties, anchor straps, other approved fasteners or by 10d steel cut nails partially driven into the buck at each gypsum tile course. Bucks not extending to ceiling should always be well anchored. It is good practice to use a strip of metal lath, corrugated or perforated iron or a wire mesh in the mortar course over the tiles forming the lintel and extending 30 in. beyond the joint on each side. Where heavy doors are used, the plaster may be reinforced against cracking by use of a metal lath or wire mesh facing, nailed to the tile, over the corners of the door openings.

Pyrobar Beam and Girder Fireproofing

Pyrobar beam and girder fireproofing consists of shoe tile which fit closely over the lower flanges of the steel, as illustrated, and side covering of Pyrobar partition units set in place as shown. Both shoe tile and side covering are of such dimensions as to provide 2 in. of fireproofing at all parts, thus fulfilling the requirements of the Underwriters Laboratories, Inc.

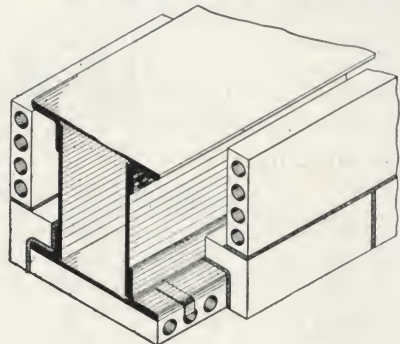
For built-up girders larger than may be accommodated with the standard sizes of shoe tile, a combination of angle and soffit tiles are used. Due to the great diversity of requirements for this type of fireproofing, angle tile are not manufactured in stock sizes but are made on order to job requirements. The soffit pieces are usually cut to fit on the job from Pyrobar partition tile.

Shoe tile are machine moulded in a double unit 18 in. long and are easily split by the mason into the two individual units. The advantages of the double unit are less breakage, easier and less expensive to handle and the protection afforded the inner edges. The large light weight units facilitate rapid handling and decrease setting costs, require a minimum of mortar and a minimum of labor to place. The true, protected inside faces will be found to fit perfectly around the beam and girder flanges. The double units of shoe tile as shipped weigh as follows per lineal foot:

B40, 14 lb.; B50, 14 lb.; B65, 15 lb.; B80, 16 lb.

Pyrobar Column Fireproofing

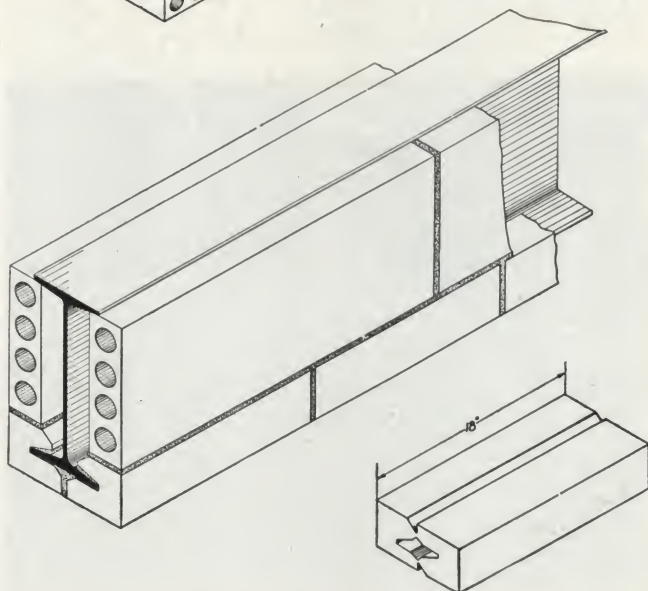
Column fireproofing is accomplished with 2-in. solid or 3-in. hollow Pyrobar partition tile. When desired or required by code, the space between the covering and the steel may be solidly backfilled with broken gypsum blocks and gypsum mortar.



(At Left)
Built-up Girder Fireproofed with Angle and Soffit Tile

(Below)
I-Beam Fireproofed with Shoe Tile

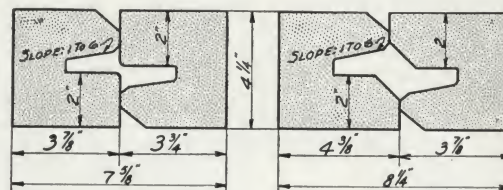
Sketch of shoe tile as shipped to the job



Fireproofing Efficiency

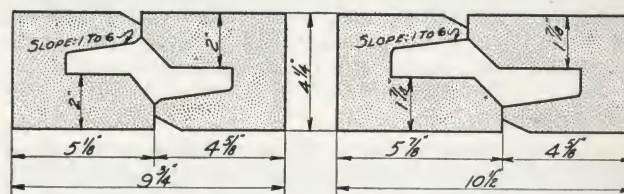
Authorities recognize that fireproofing is essentially a matter of insulating the building members carrying the load from the effect of high temperatures. Steel commences to fail at about 600° F. and the importance of an insulative fireproofing can not be overestimated.

The tests of the Bureau of Standards and Underwriters Laboratories, Inc., definitely show, and their reports state, that with gypsum fireproofing the maximum temperature in the steel was much lower than those obtained in comparable tests with other covering materials.*



SHOE TILE-B-40

SHOE TILE-B-50



SHOE TILE-B-65

SHOE TILE-B-80

BEAM AND GIRDER SHOE TILE DATA

Size of beam, in.	Weight of beam, lb.	Type of shoe	Size of beam, in.	Weight of beam, lb.	Type of shoe
Standard I-Beams					
6	12.5 to 17.25	B-40	15	42.9 to 55.0	B-50
7	15.3 to 20.0	B-40	15	60.8 to 75.0	B-65
8	17.5†	B-50	18	48.2†	B-80
8	18.5 to 25.5	B-40	18	54.7 to 96.0	B-65
9	21.8 to 35.0	B-40	20	65.4 to 100.0	B-65
10	22.4†	B-50	21	60.4†	B-80
10	25.4 to 30.0	B-40	24	79.9 to 100.0	B-65
10	35.0 to 40.0	B-50	24	105.0 to 120.0	B-80
12	27.9†	B-65	24	74.2†	B-80
12	31.8 to 55.0	B-50	27	90.0†	B-80
15	37.3†	B-65			
Bethlehem I-Beams					
8	17.5 to 19.5	B-50	15	71.5	B-80
9	20.5 to 24.0	B-50	18	49.0 to 74.0	B-80
10	23.5 to 28.5	B-65	20	59.0 to 82.0	B-80
12	28.5 to 36.5	B-65	22	65.5 to 71.5	B-80
15	38.5 to 64.0	B-65	24	73.5 to 83.0	B-80
Bethlehem Girder Beams					
8	31.0 to 37.0	B-80	10	41.5 to 50.0	B-80
9	36.0 to 43.5	B-80			

†Supplementary I-Beams.

Specifications for Pyrobar Gypsum Beam, Column and Girder Fireproofing

Girder and Truss Covering—All girders, beams and trusses, unless otherwise specified, shall be covered with Pyrobar Beam Shoe and Covering Tile in accordance with the standards of the UNITED STATES GYPSUM COMPANY.

Column Covering—This contractor shall cover all exposed interior columns, unless otherwise indicated, with [2-in. solid] [3-in. hollow] Pyrobar Gypsum Tile. The tile shall be laid plumb and true, the corners built log cabin fashion, the tile interlocking.

(If it is desired to fill in solid between the steel and the covering, add the following clause:)

The space between the column and the fireproofing shall be solidly backfilled with broken gypsum tile well slushed with gypsum mortar.

Mortar and Laying—See specification for mortar and laying Pyrobar Tile on preceding page.

*Digest of report giving comparable tests on clay tile, concrete and gypsum fireproofing available upon request.

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION

332 South Michigan Avenue
CHICAGO, ILL.

Product

VITRIFIED PAVING BRICK.

Uses

Vitrified paving brick is used architecturally for the wearing surfaces of driveways, ramps and walks serving residences, public buildings, factories and foundries; for passenger and freight platforms in electric and steam railway use; for railway and industrial freight yards; for bridge floors; for garden walks, terraces and rustic bridges.

Advantages

To the services listed above vitrified paving brick brings the same resistance to the wear and tear of traffic which has proved it the most economical surfacing material for street and highway paving.

Furthermore, because it is the only paving material which possesses a richness of color and texture, it is widely specified solely on the basis of appearance. In many instances, it is the only paving surface which contributes the proper setting to the structure it serves.

Its safety feature is also important. The rough, heat-hardened texture is virtually "skidproof" and is thus a protection to pedestrians, horses and motor vehicles, a particularly valuable asset in the construction of ramps, platforms or sloping driveways.

Even more important in many uses is the low repair cost and high salvage value of the vitrified brick pavement. When laid with asphalt filler, each brick remains a removable unit. Portions of the pavement can, therefore, be easily lifted and re-laid in the event that pipes or conduits need to be laid or repaired below the pavement; or the whole pavement can be moved to another

VITRIFIED
Brick
PAVEMENTS
OUTLAST THE BONDS

location with frequently 100% salvage of the brick. In the event of abusive traffic, asphalt-bound vitrified brick can be lifted and relaid with the untouched under surface up, providing a virtually new pavement at the least possible cost.

In factory or foundry use it is unaffected by heat or acids. It is dustless and will not absorb oil or grease.

It is sanitary. It does not rot, rut, roll or crack.

Standard Vitrified Paving Brick

Selection of type should be made from the standard types of the Committee on Simplification of Variety and Standards for Vitrified Paving Brick of the United States Department of Commerce. Subject to further simplification, these are four in number, as follows:

STANDARD VITRIFIED PAVING BRICK (AS USUALLY LAID)

Dimensions in inches—width x depth x length

Plain wire-cut brick (vertical fibre lugless).....	4	x2½	x8½
	4	x3	x8½
	4	x3½	x8½
Repressed lug brick.....	3½	x4	x8½
Wire-cut lug brick (Dunn).....	3½	x4	x8½

ESTIMATING DATA

Kind of brick	Laid	Depth of wearing surface	Number to lay 1 sq. yd.
Plain wire-cut brick:			
All sizes.....	Flat	2½, 3 and 3½ in.	36
3½ in. size.....	Edge	4 in.	40
Repressed lug brick:			
3½ in. size.....	Edge	4 in.	40
Wire-cut lug brick:			
All sizes.....	Edge	4 in.	40



Vitrified Brick Private Drive

Beauty, dignity, durability and a warm coloring combined in a single material



Vitrified Brick in Industrial Service

Anti-rutting, anti-crumbling, anti-absorbent and dustless, vitrified brick meets the severest industrial requirements

Joint Filler

Asphalt filler is the preferred type of joint filler for vitrified brick wearing surfaces, without prejudice to other types of filler which may have special utility in special instances of construction. Nature fights rigidity, and asphalt filler provides the necessary flexibility without robbing the brick surface of any of its qualities of hardness, toughness, density and smoothness.

Approximate Weights

The average weight of vitrified paving brick is approximately .084 lb. per cu. in.

With a 2½-in. depth of wearing surface, plain wire-cut brick, filler squeegeed, approximately 10 lb. of asphalt filler are required per square yard. Approximately 12 lb. of asphalt filler are required for the 3-in. depth brick and 14 lb. for the 3½-in. depth.

Up to 15 lb. of filler per square yard are required for lug brick in the 4-in. depth. Other depths about in proportion.

Specification

The NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION will furnish any desired specifications on request.

Prices

Request for price quotations made to the association will be referred to individual manufacturers who will then submit prices.

Free Handbook

The 92-page, fully illustrated data book, "*The Construction of Vitrified Brick Pavements*," which includes recommended specifications, will be found helpful when approaching any project requiring a paving specification.

Free to architects on request if professional letterhead is used.

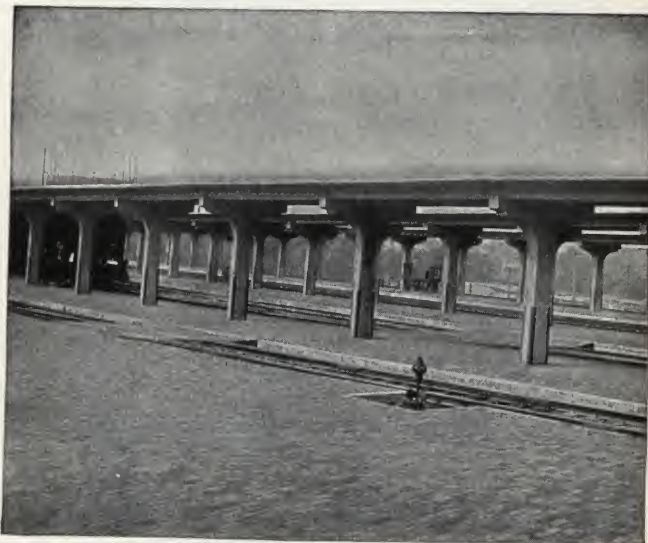
Co-operative Service

The offices of the NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION and its members are always ready to respond promptly to any request for information or personal consultation made by any architect or engineer in regard to vitrified paving brick and its uses. It is their responsibility to furnish any detailed information within their power and be as useful to any architect or engineer as the opportunity offers.



Vitrified Brick Walks Around the Home

Beauty of texture plus beauty of color plus the opportunity for interesting patterns. Paving brick harmonize with beautiful surroundings



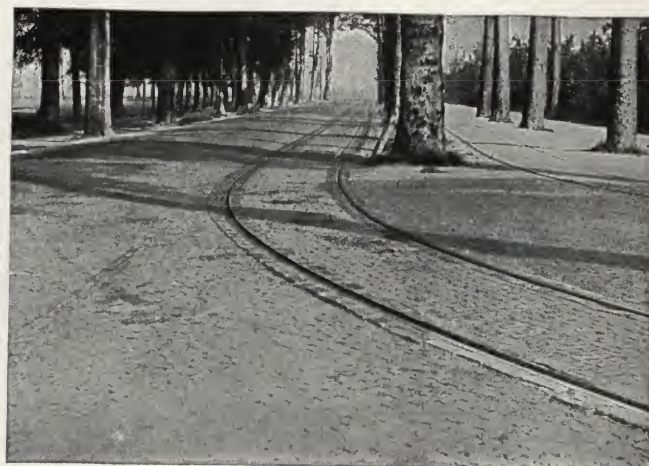
Vitrified Brick Pavements in Railway Service

Resisting abuse, never slippery, easy to maintain and repair, vitrified brick is the right choice for railroad platforms, ramps and freight yards



Vitrified Brick Pavement in Factory Service

Long life, low repair cost and a skidproof, non-absorbent, acidproof surface make vitrified brick the logical and foresighted selection



Selected by Napoleon

Holland boasts of brick pavements, still in use after more than a hundred years, built by order of Napoleon Bonaparte

AMERICAN BAR LOCK CO., INC.

Manufacturers of Sidewalk Light Construction

LONG ISLAND CITY, N. Y.

BRANCH OFFICES OR REPRESENTATIVES IN ALL LARGE CITIES

Products

"BAR LOCK CRUSHPROOF" DOUBLE REINFORCED CONCRETE SIDEWALK LIGHT CONSTRUCTION; SIDEWALK DOORS of all descriptions.

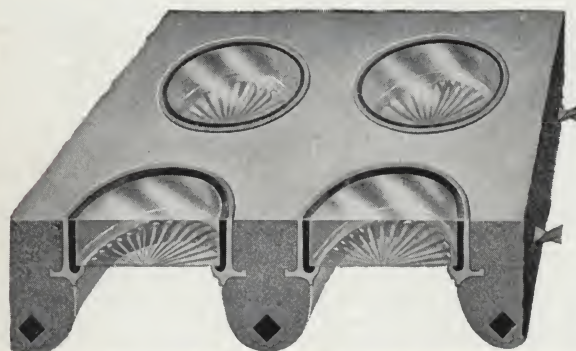
For Skylight Construction, see page A518.

"Bar Lock Crushproof" Double Reinforced Concrete Sidewalk Light Construction

The "Bar Lock Crushproof" cast iron shield protected glass makes it the most durable sidewalk light ever placed on the market in our 30 years' experience in this line of business. Especially designed for use where permanence, freedom from broken glass, leakage and maintenance charges are appreciated.

Made in completed factory finished slabs, ready to drop over the openings, or we will send our own mechanics, if preferred, to install in the field anywhere in the United States.

The cast iron shield insures an absolutely watertight joint under and around the glass, and the flange



"Bar Lock Crushproof" Round Lenses

on the outer surface insures a perfect anchor in the concrete.

The heavy body of reinforced concrete does not come in contact with the glass, eliminating another previous cause of breakage of glass from expansion.

The cast iron shields are solidly embedded in the heavy concrete construction and will last for the life of the building.

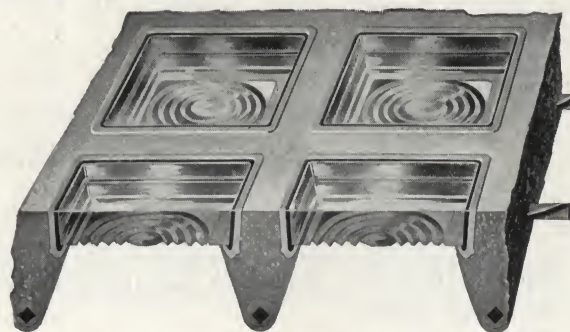
Special Features of "Bar Lock Crushproof" Replaceable Construction

Replacement—It is practically impossible to entirely prevent cracked or broken glass from accident or abuse, but a cracked or broken lens in the "Bar Lock Crushproof" construction may be replaced by unskilled labor in a few moments. There is no cutting of concrete, unsightly patchwork or likelihood of leakage.

The importance of this replacement feature will be readily appreciated.

Lazalite Glass—The glass used in this crushproof

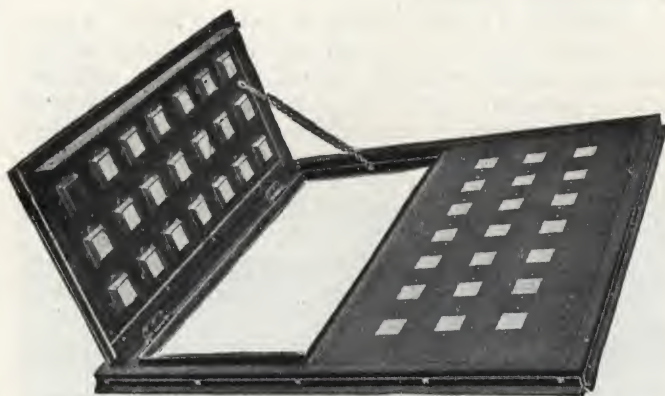
construction is made not only from a specially prepared, tough mixture, but each piece is separately polariscope tested, which effectually prevents all cracking or breakage from expansion or contraction. The lenses, being of pure crystal annealed glass with sunburst or Fresnel-lens undersurface, insure the largest light transmission and diffusion.



"Bar Lock Crushproof" Square Lenses

Specification

"'Bar Lock Crushproof' Double Reinforced Concrete Construction, using Lazalite polariscope tested glass, protected by cast iron shields, with signed guarantee to furnish glass for replacement free of charge (f. o. b. factory) for a period of 5 years."



"Bar Lock" Flush Sidewalk Doors

Prices, Details, etc.

Prices, details, etc., will be furnished upon application.

Five-year Guarantee

With each and every "Bar Lock Crushproof" sidewalk light installation using our cast iron shield protected glass, the AMERICAN BAR LOCK CO., INC., will issue a written guarantee to furnish, free of charge (f. o. b. factory) any glass required for replacement for a period of 5 years.

AMERICAN 3 WAY-LUXFER PRISM CO.

Sidewalk Light Engineers

1313-1315 South 55th Court
CICERO, ILL.
(Suburb of Chicago)

37-28 30th Street
LONG ISLAND CITY, N. Y.

For 3-Way Armored Glass Skylights, see pages A516-517; for Transoms, see page B1751

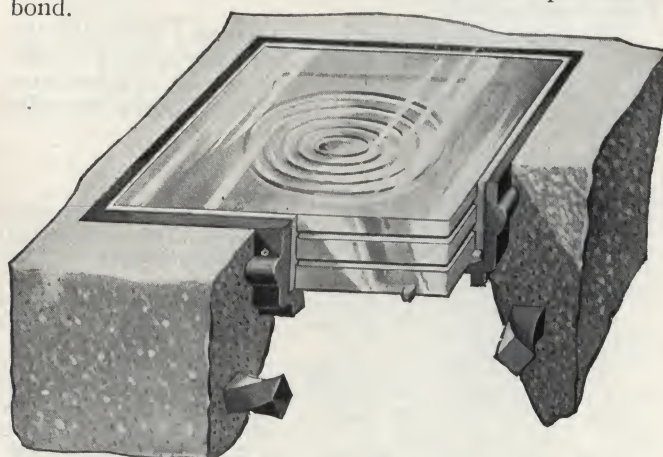
3-Way Armored Glass Sidewalk Lights (Glass Guaranteed for 5 Years)

Everything that the architect, builder, or owner has wanted and demanded of sidewalk lights is found in 3-Way Armored Glass Construction.

Great light area	Great strength
Waterproof	Perfect walking surface
Weatherproof	Protected glass
Expansion proof	Instant replacement of glass
5-year guarantee on glass.	

3-Way Armored Glass Sidewalk Lights embody all the results of our quarter-century of experience. It is the proven construction, for installations ten years old are as good today as when put in.

In this construction, the glass—both square lenses and round lenses—is armored against both expansion pressure and the assaults of traffic. Each lens is caulked with tar and brimstone compound in a cast iron galvanized ring, or bottomless cup. This is built right into the concrete slab, being perfectly embedded with a permanent bond.



Cut-away View of 3-Way Armored Glass, Showing Shield Embedded in Concrete

These slabs are made to fit the sidewalk openings. Reinforcing is of approved types with great strength and freedom of vibration. To install, it is simply necessary to slip in place, and to seal and caulk the joints with 3-Way Caulking Compound.

Each lens is of polariscope tested Flintex-Lazalite Glass, annealed to assure toughness. Two types of lenses are available—No. 12, 2¾-in. round glass set in 3-in.

round shields; No. 13, 3½-in. square glass set in 4-in. square shields.

Instant Replacement of Glass—Should one of these perfect lenses be broken it can be replaced by any one in a minute's time, for no cement patching is needed. Just three moves: clean out old lens, drop in new one, seal joint with hot tar and brimstone.

5-year Glass Guarantee—We have proven this construction so perfect and so lasting that we absolutely guarantee the glass in it for a period of five years. Any glass broken by any cause will be supplied free for replacement, f. o. b. factory, for five years from date of installation.



3-Way Armored Glass Sidewalk Lights

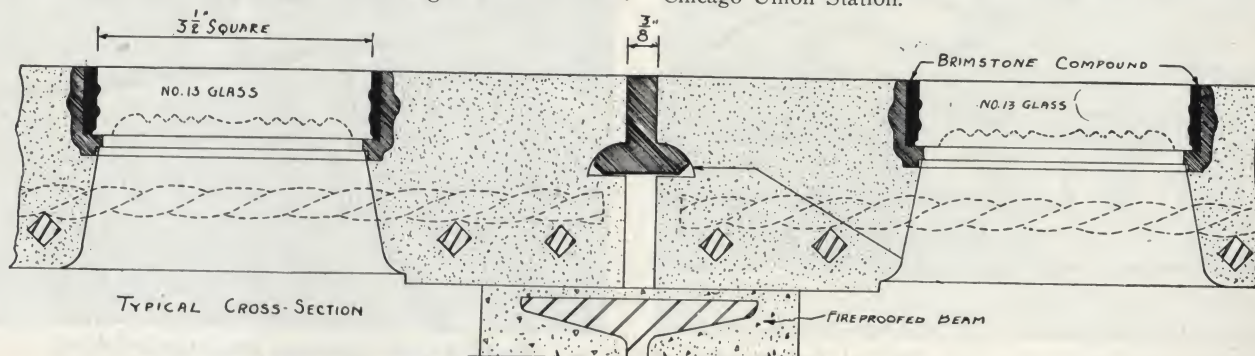
Specifications—Sidewalk lights as shown on the plans shall be of the reinforced concrete type known as 3-Way Armored Glass, as made by the AMERICAN 3 WAY-LUXFER PRISM CO.

Glass shall be only Flintex-Lazalite quality as manufactured by the Jeannette Glass Co.; polariscope tested and guaranteed to be free of manganese and all internal strains. Each glass to be set in a galvanized cast iron shield that provides a seat for the glass and a flange to be embedded in the concrete. Glass shall be caulked into the shield with tar and sulphur compound.

All glass to be [3½-in. square, Fresnel lens design (No. 13) set in 4-in. galvanized iron shields spaced 4¼-in. centers] [2¾-in. round sunburst lens design (No. 12) set in 3-in. round shields, spaced 4½-in. centers]. Any glass broken in 5 years to be supplied for replacement free, f. o. b. factory.

Simplex Fresnel Floor Lights

A reinforced concrete construction, everlasting, strong, great light area, never needs paint or upkeep of any kind. Glass of two sizes, as desired—4-in. square, set 4¾-in. centers, or 6½-in. square, set in 7½-in. centers. Proven perfect construction under all kinds of traffic conditions. Used in floor of concourse of Chicago Union Station.



Section 3-Way Armored Glass Sidewalk Lights Showing Waterproof Intermediate Joint

ALBERT GRAUER & COMPANY

Sidewalk Lights, Skylights, Floor Lights, Marquise Lights

1408-1424 Seventeenth Street

DETROIT, MICH.

REPRESENTATIVES

ATLANTA, GA., S. R. HEWITT, 606 Walton Building
 BUFFALO, N. Y., EDWIN G. DAY & Co., Erie County Bank Building
 CHARLESTON, W. VA., FIREPROOF PRODUCTS Co., 216 Professional Building
 CHARLOTTE, N. C., MONTEITH-SOULE Co., 1906 South Boulevard
 CINCINNATI, OHIO, AL LEVINSON Co., 504 Provident Bank Building
 CLEVELAND, OHIO, REPUBLIC ENGINEERING Co., 1836 Euclid Avenue
 COLUMBUS, OHIO, B. M. FREEMAN Co., 35 East Gay Street
 DALLAS, TEX., SOUTHWESTERN FLOORING & SALES Co., 1300 Young Street
 DAYTON, OHIO, JOHN G. POOL Co., 494 Ludlow Arcade
 FORT WAYNE, IND., ARC-CON SPECIALTIES Co., 226 E. Columbia Street
 GRAND RAPIDS, MICH., CHARLES VANDERVELDE, 757 Hawthorne Street
 HUNTINGTON, W. VA., E. L. WARNICK, P. O. Box 1581
 INDIANAPOLIS, IND., GENERAL CONSTRUCTION SUPPLY Co., 631 So. Delaware Street

KNOXVILLE, TENN., CHAS. M. ALLEN Co., 712 So. Gay Street
 LANSING, MICH., BRIGGS Co., 400-6 E. Michigan Avenue
 LIMA, OHIO, LUGABILL FUEL & BUILDING MATERIAL Co., Bryce Avenue and Metcalf Street
 LOUISVILLE, KY., LOUISVILLE BUILDERS SUPPLY Co., 18th and Magnolia Streets
 MINNEAPOLIS, MINN., H. S. NESBITT Co., Builders Exchange
 NEW ORLEANS, LA., NACHARY BUILDERS SUPPLY Co., 802 Perdido Street
 PITTSBURGH, PA., PITTSBURGH BUILDING SPECIALTIES Co., 1106 Jones Law Building
 RICHMOND, VA., LEE O. MILLER & Co., Builders Exchange
 SAN ANTONIO, TEX., JOHN A. WILLIAMSON Co., 516 Calcasieu Building
 SPRINGFIELD, OHIO, WILLIAM BAYLEY COMPANY
 TOLEDO, OHIO, J. M. WILSON Co., 1822 Adams Avenue
 WASHINGTON, D. C., LALLY-ROHLADER Co., Inc., 1756 M Street, N. W.
 YORK, PA., C. H. STRAYER, 50 W. Philadelphia Street

Products

GRAUER REINFORCED CONCRETE SIDEWALK LIGHTS, SKYLIGHTS, FLOOR LIGHTS, and MARQUISE LIGHTS; for all classes of buildings, tunnels, subways, train sheds, canopies, etc., installed in place or shipped in slabs ready to set.

Also manufacturers of Grauer Cement Floor Finish; Rubber, Linoleum and Cork Tile Floors, Composition Floors, Illuminating Sidewalk Doors, Coalhole Covers and Rings, Sidewalk Ventilators, Bullseye Glasses of every size for repairing sidewalk lights and skylights of any style or manufacture.

For Grauer-Watkins Red Asphalt Floor and Graustic Floor, see pages B1542-1543.

Advanced Design

Grauer daylighting installations for all purposes are built on a scientifically correct design which makes them positively proof against any conditions of weather or use. Accident or excessive abuse only can break them.

New type Grauer Shield Protected Lights eliminate repairs. Plastic cushions (non-leakable) around the glasses protect them from shaling and breakage due to expansion of surrounding concrete.



Skylights Over Restaurant, Nolan School, Detroit, Mich.

Grauer

SKYLIGHTS
 FLOOR LIGHTS
 SIDEWALK LIGHTS
 GRAUSTIC FLOORS
 RED ASPHALT FLOORS

With Grauer daylighting equipment, you can give buildings the great convenience and profitable investment of daylighting throughout, with assured permanent durability.

When breakage does occur, due to accident, new glasses are easily installed by unskilled labor at a trifling cost, and without showing the repair.

Fully Guaranteed

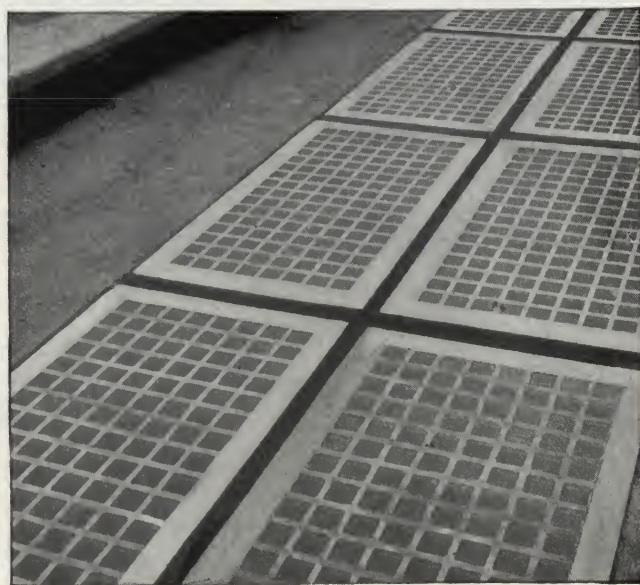
Grauer Shield Protected Sidewalk Lights are unconditionally guaranteed for one year, to be rust-proof, leakproof, and free from defect. Replacement glasses will be supplied free f.o.b. factory for five years.

Sidewalk Lights

The diagrams on following page, illustrate the construction of Grauer Shield Protected Sidewalk Lights. This construction carries a load of 300 lb. per sq. ft. and can be built to carry 1000 lb.

Glass—The best quality of glass (Grauer No. 20) is used, and guaranteed to be properly annealed, each glass having passed polariscope test.

Economy—The saving in electric current alone will pay for Grauer Shield Protected Sidewalk Lights in a short time, usually in one and a half years, the time depending on current rate. The added efficiency of employees or tenants using the basement, their health, comfort, and pleasant working condi-



Skylight Over Swimming Pool, Ferris School, Highland Park, Mich.

tions, pay many-fold for the daylight provided. Where basement spaces are daylighted, and used as salesrooms, the increased revenue frequently pays for the entire cost of construction in less than one year.

Ready-to-set-Sidewalk Slabs—Completely built slabs can be supplied on order, to fit specified spaces, when for any reason it is not desired to have our own skilled workmen install daylighting construction.

Specifications—The sidewalk lights shown on plans shall be constructed with carrying members of reinforced concrete. The glass shall be Grauer No. 20, set in rustproofed metal shields with an elastic compound. The design to permit glass replacement with unskilled labor. All glass is to be polariscope tested and guaranteed free of internal strains. The construction shall be capable of carrying a uniformly distributed live load of 300 lb. per sq. ft. without injury.

The entire construction is to be guaranteed waterproof and free of defects for a period of one year. Replacement glass to be furnished free, f.o.b. factory for five years.

Floor Lights

Floor lights permit the daylight to do double duty. Light thus admitted to a lower floor, even though diffused through one story, comes from above and is more efficient than light from side windows.

The construction is similar to that of Grauer Sidewalk Lights. The glass is, however, set directly in concrete as the extra expense of shields is unnecessary in interior installations.

Grauer Floor Lights maintain more weight than an ordinary floor will hold. They are permanently watertight, proof against rust and fire, require no upkeep expense.

The concrete carrying ribs are $3\frac{1}{2}$ in. in depth and on 6-in. centers both ways. The two styles of glasses are $4\frac{3}{4}$ in. square by $\frac{3}{4}$ in. thick. No. 89 is plain flat; No. 88 is diffusing and ornamental.

Specifications—The floor lights shown on plans shall be constructed of reinforced concrete and glass according to the Grauer System; installed complete in place by the manufacturer's own workmen. The glass shall be diffusing glass No. 88 [plain glass No. 89] $4\frac{3}{4}$ in. square, guaranteed free of strain by

polariscope test. Spans up to 8 ft. are to be made without intermediate beams, with a guaranteed safe live load of 250 lb. per sq. ft., with a factor of safety of 4.

The floor lights are not to be installed until after the surrounding floors have been laid complete. The floor light manufacturer is to provide an elastic, waterproof expansion joint of approved materials on the four sides of each opening.

The construction and glass is to be guaranteed for a period of one year, and any defects appearing within this period are to be promptly corrected to the satisfaction and without cost to the owner.

Skylights

Grauer Skylights with wire glass set in metal shields supported by a reinforced concrete grill, represent the greatest advance in skylight construction in years. Glass is protected from pressure, both structural and expansion. These skylights defy all weather conditions and are unconditionally guaranteed. If broken by smashing (the only way they can be broken) replacement is easy by unskilled labor.

Grauer Skylights may be walked on. They give large light area; are permanently watertight and proof against rust, fire and burglars. They require no upkeep expense.

Specifications—The skylights shown on plans shall have structural members of reinforced concrete, supporting permanent metal shields in which glass is set. Metal shields are to be rustproofed. Glass to be ribbed wire $8\frac{1}{4}$ in. square, $\frac{1}{2}$ in. thick, set in an elastic, watertight compound. Spans are to be made without intermediate beams up to 13 ft. clear. The entire construction is to be guaranteed for a period of one year and replacement glass is to be furnished free of charge for a period of five years.

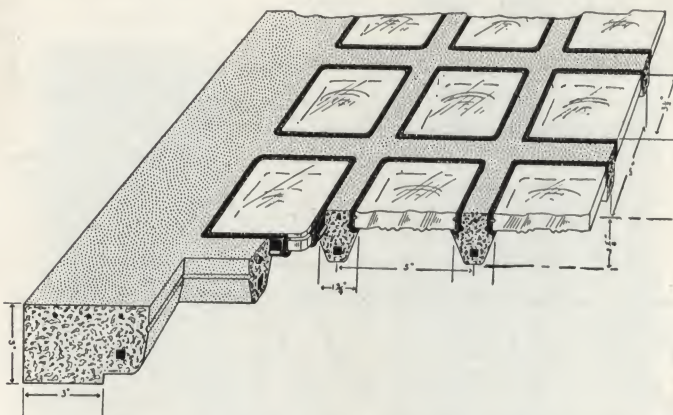
Marquise Lights

The Grauer Skylight construction is admirably suited for use in marquises, and is now being generally utilized for this purpose. Architects, builders and building owners who have had trouble with the constant breaking of the ordinary sheet glass formerly used in marquise work, have come to realize the economy and satisfaction of permanently meeting this problem in the first construction. The Grauer System is a most durable product adaptable to work of this character.

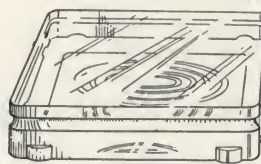
National Service

This organization is equipped to install Grauer Shield Protected Daylights in any building anywhere. Skilled crews are placed in charge of each installation. Our experience of 22 years in the design and construction of daylighting equipment, assures scientifically correct installation and permanent satisfaction.

Illustrated bulletins on lights for all uses, quotations and information, will be supplied promptly.



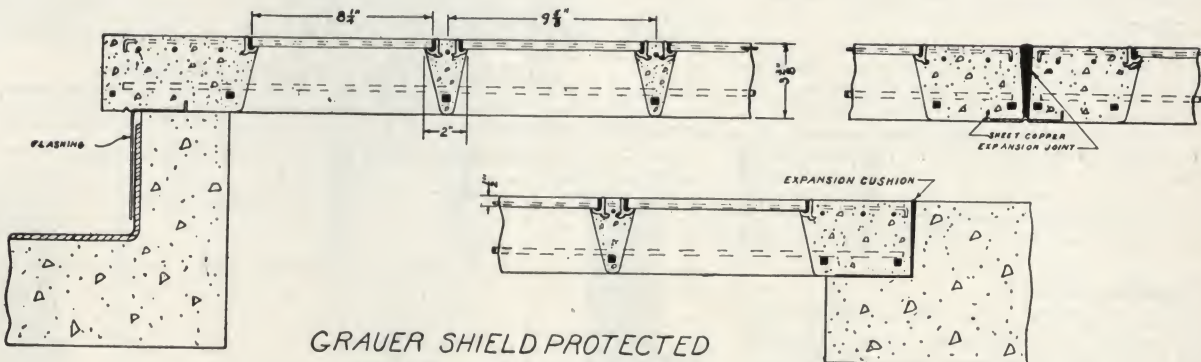
Section Through Grauer Shield Protected Sidewalk Light Construction



Diffusing Glass No. 20
 $3\frac{1}{2} \times 3\frac{1}{2}$ in.



Protecting Shield



GRAUER SHIELD PROTECTED
WIRE GLASS SKYLIGHT

P. M. BRUNER GRANITOID CO.

ESTABLISHED 1878

Sidewalk Lights, Floor Lights, Skylights

523-524 Frisco Building

ST. LOUIS, MO.

Bruner Construction

Bruner sidewalk lights, floor lights and skylights conform to recommendations adopted by United States Department of Commerce, Division of Simplified Practice, as per bulletin No. 49.

Standard Sidewalk Light Construction

In this construction there can be no leakage and no breakage of glass from structural or expansion stresses. Glass broken from accident or abuse can easily be repaired without disfiguring the construction in any way.

Specifications—The sidewalk lights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. BRUNER GRANITOID Co.'s Standard Sidewalk Light Bulletin, capable of carrying safe live load of 300 lb. per sq. ft. The glass to be $3\frac{1}{2}$ in. square by $\frac{3}{4}$ in. thick at supporting edge, set in 4-in. square metal shields with elastic compound. The lenses shall be set 5 in. on center. The ribs shall be $2\frac{1}{2}$ in. deep.

Bearing furnished for this construction should be 3 in. wide by $2\frac{3}{4}$ in. deep.

The entire construction to be guaranteed waterproof and free of defects for a period of one year. Replacement glass to be furnished free f.o.b. factory for 5 years.

Bruner Skylight Construction

We recommend that concrete curbs be formed as part of the reinforced concrete roof. Bruner reinforced concrete skylights being laid over these curbs and projecting beyond with drip formed on under side (as shown), a permanently mechanical watertight job is assured.

Where required, however, this skylight construction can be made flush with roof by setting same in rabbet formed in reinforced concrete and calking with our special waterproof compound.

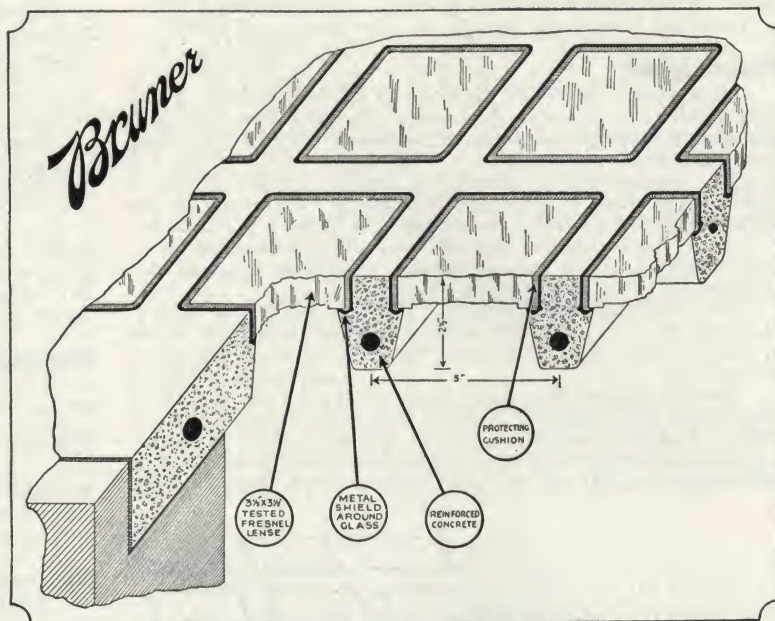
Specifications—The skylights shown on plan shall be of two-way reinforced concrete rib construction as shown in P. M. BRUNER GRANITOID Co.'s Skylight Bulletin. Glass to be ribbed wire $8\frac{1}{4}$ in. square, set in metal shields with elastic compound. Ribs shall be $3\frac{1}{2}$ in. deep, set $9\frac{1}{4}$ in. on centers both ways. The entire construction is to be guaranteed for one year, and replacement glass is to be furnished free of charge for a period of five years.

[Plans should show detail of bearing furnished.]

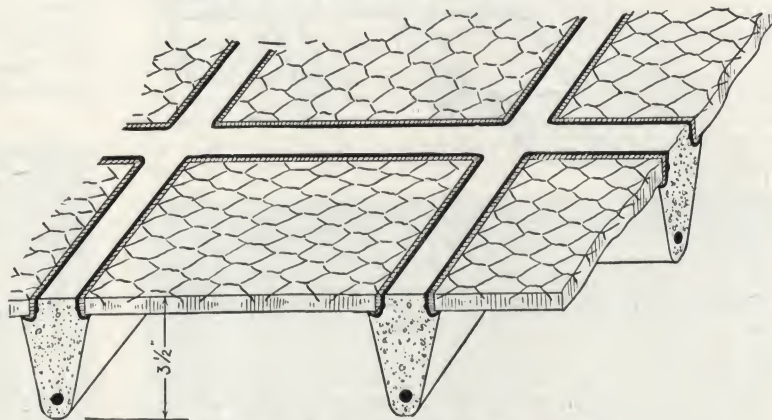
Broad Flexible Service

Bruner sidewalk lights, floor lights and skylights can be constructed in place, or made in panels at our factory and shipped anywhere.

We are at all times ready to give information, make details, or quote prices on our construction.

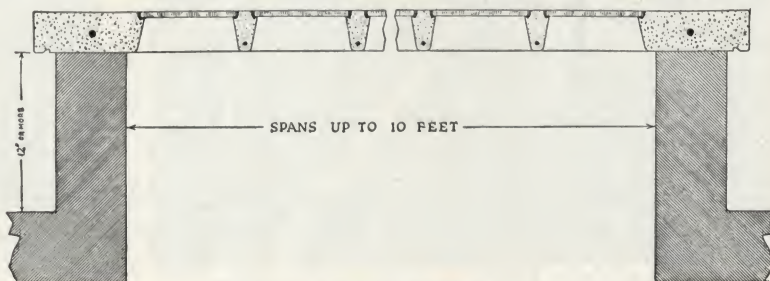


Standard Sidewalk Light Construction



Detail Bruner System Skylight Construction

Spans up to 10 ft. can be made without intermediate beams. Standard construction beams are on $9\frac{3}{4}$ -in. centers. Standard wire glass is $8\frac{1}{4} \times 8\frac{1}{4}$ in. The metal shield and protecting cushion construction is similar to that in the Bruner sidewalk lights.



Bruner Reinforced Concrete Skylights Mounted on and Projecting Beyond Concrete Curbs

J. MERRILL RICHARDS

Manufacturer of Sidewalk Lights and Glass Roofs

119-122 West First Street
BOSTON, MASS.

Products

RICHARDS' "UNITY" PERMANENT SIDEWALK LIGHTS and GLASS ROOFS, Standardized Constructions. For Magnalite Obscuring Glass, see page B1737.

Shield Protected Glass Constructions

Sidewalk Lights—Double reinforced concrete and glass construction, with glass set into hot-dip galvanized cast iron protecting shields with elastic material. $2\frac{3}{4}$ -in. diameter round, and $3\frac{1}{2}$ -in. square glass units.

Glass Roofs— $8\frac{1}{4}$ -in. square, $\frac{1}{2}$ -in. thick wired glass set into hot-dip galvanized shield with elastic material. Glass roofs are effective in barrel arches as shown below. They can be installed on flat pitch in interior courts or on roof to keep skylight off the skyline.

Advantages of Shield Constructions

Shields protect the glass from all compression in the top of the slab, eliminating glass breakage, even in marquises.

Glass broken by accident can be replaced in a moment's time by unskilled labor, making no unsightly repair patch.

There is no leakage.

Permanency.

Five-year glass guarantee.



Federal Reserve Bank of Boston
R. CLIPSTON STURGIS, Architect

Specifications for Shield Constructions

Sidewalk Light—Shall be Richards' "Unity" Construction using ($2\frac{3}{4}$ -in. round or $3\frac{1}{2}$ -in. square glass) set into hot-dipped galvanized cast iron shields with elastic compound.

Glass Roofs—Shall be Richards' "Unity" Construction with $8\frac{1}{4}$ -in. square $\frac{1}{2}$ -in. thick wire glass set into hot-dipped galvanized cast iron shields with elastic compound.

Guarantee

This contractor shall furnish written *guarantee* to maintain the construction against faulty materials and workmanship and any leakage caused by such for a period of one year.

Glass for replacement shall be furnished owner, free of cost f.o.b. factory, over a period of five (5) years for units broken by any cause outside of fire and accident.

List of Installations

BUILDING AND LOCATION

ARCHITECTS

Banks

- *New England Trust Co., Boston, Mass. Appleton & Stearns
- *Federal Reserve Bank, Boston, Mass. R. Clipston Sturgis
- *National Shawmut Bank, Boston, Mass. Parker, Thomas & Rice
- *Louisville Trust Co., Louisville, Ky. James J. Gaffney
- *Central Trust Co., Cambridge, Mass. Monks & Johnson

Office Buildings

- *John Hancock Mutual Life Insurance Building, Boston, Mass. { Parker, Thomas & Rice
F. A. Waldron, Engineer
- Lawyers Building, Boston, Mass. { Coolidge, Shepley, Bulfinch & Abbott
- *Decatur-Hopkins Building, Boston, Mass. Monks & Johnson

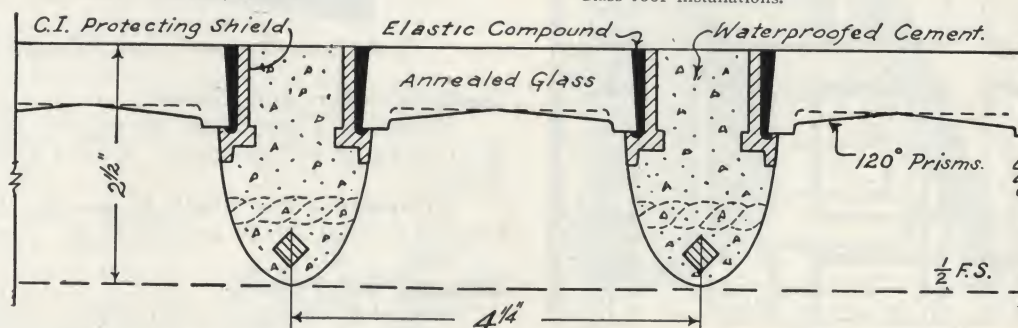
Schools and Halls

- *Dearborn District School, Roxbury, Mass. McLaughlin & Burr
- *Latin School, Boston, Mass. McLaughlin & Burr
- *Putnam District School, Roxbury, Mass. J. J. Driscoll
- Lyons Union School, Lyons, N. Y. Carl C. Ade
- *Faneuil Hall, Boston, Mass. Cram & Ferguson
- *East Boston High School, Boston, Mass. John M. Gray Co.

Factories

- C. N. & S. N. Russell Co., Pittsfield, Mass. S. M. Green Co.
- *Potter Drug & Chemical Corp., Malden, Mass. Lawrence & Wambolt
- Whitin Machine Works, Whitinsville, Mass. J. D. Leland Co.
- *Gillette Safety Razor Co., South Boston, Mass. Charles T. Main Co.

*Glass roof installations.



Section $2\frac{3}{4}$ -in. Round Glass, Typical of Shield Protected Glass Construction

Besides shielded glass we stock $6\frac{1}{4}$ -in. square replaceable glass adaptable for interior floor lights only

RICHARDS & KELLY MANUFACTURING CO.

Manufacturers of Prismatic Lights

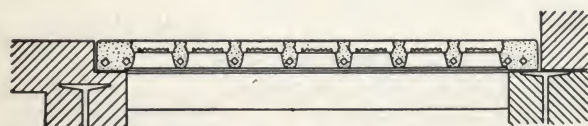
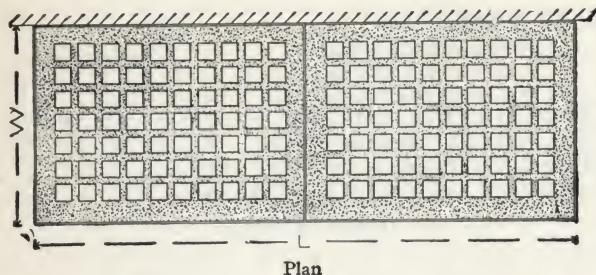
309-311 West Twenty-third Street
CHICAGO, ILL.

Products

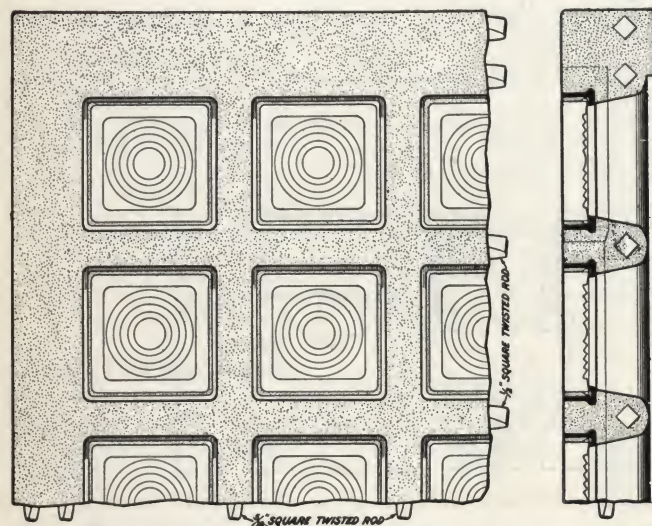
REINFORCED CONCRETE SIDEWALK LIGHTS.
REINFORCED CONCRETE FLOOR LIGHTS.
REINFORCED CONCRETE ROOF LIGHTS.
CAST IRON SIDEWALK LIGHT REPAIRS and REPLACEMENTS.
SIDEWALK DOORS.
COALHOLE COVERS.

Reinforced Concrete Sidewalk, Floor and Roof Lights

Manufactured in accordance with simplified practice recommendations adopted at Washington, D. C., November 18, 1925, by Sidewalk, Floor and Roof Light manufacturers, distributors and users, acting in conjunction with the Division of Simplified Practice.



Details Construction of Reinforced Concrete Sidewalk Lights



Glass

For Sidewalk Lights—3-in. diameter in *galvanized cast iron shields*; $3\frac{1}{2} \times 3\frac{1}{2}$ in. in *galvanized cast iron shields*.

For Floor Lights— $3\frac{1}{2} \times 3\frac{1}{2}$ in. in *galvanized cast iron shields*; 4×4 in. and $6\frac{1}{8} \times 6\frac{1}{2}$ in. without shields.

For Roof Lights— $8\frac{1}{4} \times 8\frac{1}{4}$ in. wire glass set in *galvanized cast iron shields*.

Guarantee—We will furnish free of charge f.o.b. our factory any glass broken in our *galvanized cast iron shield* type construction for a period of five years from date of installation, unless breakage is caused by fire or misuse.

Cast Iron Sidewalk Lights

We have discontinued furnishing cast iron sidewalk lights for new installations, but have patterns and glass for repairs and replacements.

Glass—For concrete setting 2, $2\frac{1}{2}$ and 3-in. diameters, 3 in. square, $2\frac{1}{2} \times 3\frac{1}{2}$ in. and $2\frac{1}{4} \times 5$ in.

For sulphur setting $1\frac{5}{8}$ -in. diameter.

Sidewalk Doors

Manufactured in flush or raised types, with either checkered steel or plain surface steel. In illuminating type, with various sizes of glass set in cast iron construction, or with square glass set in steel plates.

All doors are fitted with brass hinges, flush lift rings, device to hold in place while open, and slide bolt to lock from below. Flush door frames are cast with gutter to carry off water which seeps through the joints between doors and frames.



Flush Type Checkered Steel Sidewalk Door

Coalhole Covers and Frames

Sidewalk Type Stock Sizes—16, 18, 20, 24 and 30 in., with or without glass. Special sizes 26, 28 and 36 in.

Driveway Type Stock Sizes—20, 24 and 30-in. diameter; 20×20 , 24×24 and 30×30 in.

Estimates and Prices

Furnished promptly upon request, prices on sidewalk, floor or roof lights, given either f.o.b. cars or installed at building.

THE BARRETT COMPANY

Manufacturers of Roofing Materials

BIRMINGHAM, ALA.
BOSTON, MASS.

CHICAGO, ILL.
CLEVELAND, OHIO

NEW YORK, N. Y.
KANSAS CITY, MO.
SALT LAKE CITY, UTAH

MINNEAPOLIS, MINN.
PHILADELPHIA, PA.

THE BARRETT COMPANY, LIMITED, MONTREAL, QUE.

Products

ROOFING MATERIALS:

For flat surfaces: BARRETT SPECIFICATION PITCH and BARRETT SPECIFICATION FELT; BLACK DIAMOND PITCH and BLACK DIAMOND FELT. For detailed specifications see Volume I, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

For steep surfaces: BARRETT SPECIFICATION FELT, BARRETT SPECIFICATION PITCH, ANCHOR ASPHALT, and S. I. S. ROOFING. For detailed specifications see Volume II, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

Waterproofing:

For foundations, reservoirs, swimming pools, subways, tunnels, floors, etc., special specifications submitted.

Insulating and Building Papers:

For sheathing, lining, etc.

Dampproofing and Preservative Paints, Wood Preservatives, Flooring.

For Flashings for Brick and Concrete Walls, see page A478, also Volume III, Barrett Architects' and Engineers' Built-Up Roofing Reference Series; for Roof Leader and Roof-Vent Connections, see page C2333, also Volume IV, Barrett Architects' and Engineers' Built-Up Roofing Reference Series.

The Barrett Specification Roof

A roof that is guaranteed by a twenty-year or ten-year surety bond, as desired.

A roof that passes the most rigid inspection.

A roof that is scientifically and mechanically correct in every detail.

A roof that contains more than twice as much actual waterproofing material as is generally used in other built-up roofing.

A roof that has a wearing surface which resists all sorts of abuse and the most severe weather conditions.

A roof that is fire retardant; it carries Class "A" rating by the Underwriters' Laboratories, Inc.

A roof that takes the base-rate of fire insurance.

A roof that needs no repairs or paint.

A roof that costs less per year of service than any other roofing suitable for flat surfaces.

The Guaranty Bond

A 20-year Guaranty Bond is offered on Barrett Specification Type "AA" Roofs and a 10-year Guaranty Bond on Barrett Specification Type "A" Roofs by THE BARRETT COMPANY without charge in accordance with Note 1 of The Barrett Specifications hereinafter printed. Guarantees and bonds do not keep out water, but The Barrett Guaranty Bond differs from every other roofing guarantee or bond, in that this Company does not apply the roof and has no contractor's profit as a motive for cheapening the roofing.

When applied by experienced and reliable roofing contractors, and carefully inspected by competent inspectors, Barrett Specification Roofs

The *Barrett* Company
TRADE-MARK

applied in accordance with the specifications are just as economical and serviceable without the bond as with it.

THE BARRETT COMPANY has prepared an inspection manual, known as "Requirements Covering Application and Inspection of Barrett Specification Roofs," for use by architects, engineers, and owners where the Company's inspection service is not available.

The Barrett Specification, Type "AA" Roof—for Use over Board Sheathing—5 Plies

Bonded for 20 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—First—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay three (3) plies of Specification Tarred Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping with Specification Pitch the full twenty-two (22) inches on each sheet, so that in no place shall felt touch felt.

Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of felt.

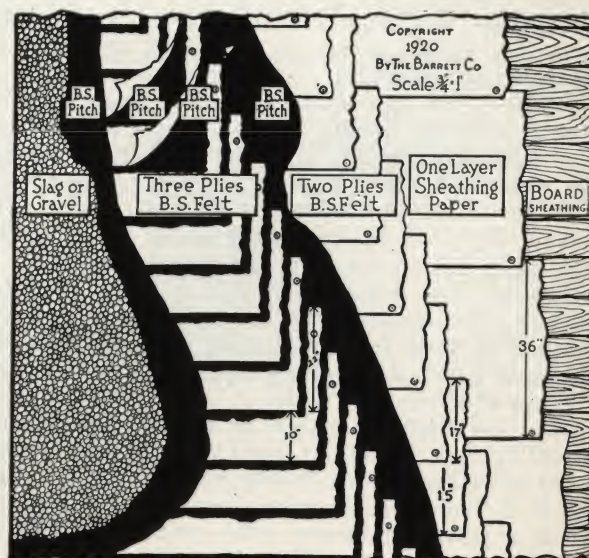


Diagram Showing Barrett Specification, Type "AA" Roof Over Boards
Bonded for 20 years

Barrett Specification Roofs
TRADE-MARK

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and fifty (150) pounds of Specification Pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Co., of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

20-year Guaranty Bond—Note No. 1—THE BARRETT COMPANY will give its 20-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—Roofing—Shall be a Barrett Specification Roof, Type "AA," laid in accordance with The Barrett Specification (for use over Board Sheathing) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for twenty (20) years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "AA" Roof—for Use over Concrete—4 Plies

Bonded for 20 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—First—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay four (4) plies of Specification Tarred Felt, lapping each sheet twenty-four and one-half ($24\frac{1}{2}$) inches over preceding one, mopping with Specification Pitch the full twenty-four and one-half ($24\frac{1}{2}$) inches on each sheet, so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size, dry, and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than two hundred (200) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of twenty (20) years from date of completion, in accordance with Note No. 1.

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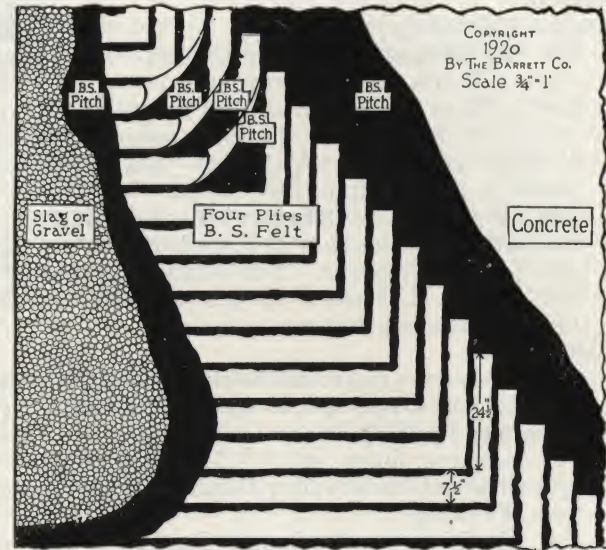


Diagram Showing Barrett Specification, Type "AA" Roof Over Concrete
Bonded for 20 years

The Barrett Specification, Type "A" Roof—for Use over Board Sheathing—4 Plies

Bonded for 10 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds two (2) inches to one (1) foot.

Roof-deck—The roof-deck shall be of seasoned lumber, smooth and free from loose boards, large cracks or knotholes, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—First—Lay one (1) thickness of sheathing paper or unsaturated felt, weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheets at least one (1) inch.

Second—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat the entire surface uniformly with Specification Pitch.

Fourth—Over the entire surface lay two (2) plies of Specification Tarred Felt, lapping each sheet seventeen (17) inches over preceding one, mopping with Specification Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than one (1) ply of felt.

Fifth—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-quarter ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size, dry and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and twenty-five (125) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall fur-

with Specification Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt.

Third—Over the entire surface pour from a dipper a uniform coating of Specification Pitch, into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The

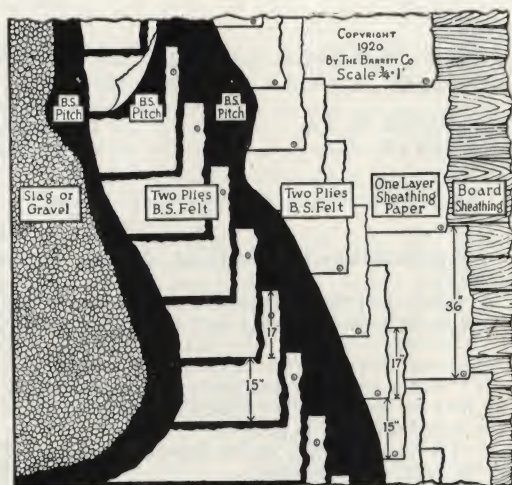


Diagram Showing Barrett Specification, Type "A" Roof Over Boards

Bonded for 10 years

nish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

10-year Guaranty—Note No. 1—THE BARRETT COMPANY will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—Roofing—Shall be a Barrett Specification Roof, Type "A," laid in accordance with The Barrett Specification (for use over Board Sheathing) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty for ten (10) years, in accordance with Note No. 1 of said Specification.

The Barrett Specification, Type "A" Roof—for Use over Concrete—3 Plies

Bonded for 10 years.

See Note 1.

Incline—This Specification shall not be used where the roof incline exceeds one (1) inch to one (1) foot.

Roof-deck—The roof-deck shall be smooth, firm, dry, and free from loose material. If roof-deck is inclined, it shall be properly graded to outlets.

Roofing—First—Coat the concrete uniformly with Specification Pitch.

Second—Over the entire surface lay three (3) plies of Specification Tared Felt, lapping each sheet twenty-two (22) inches over preceding one, mopping

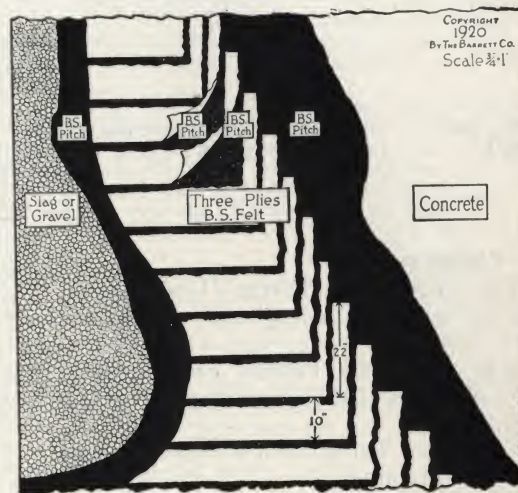


Diagram Showing Barrett Specification, Type "A" Roof Over Concrete

Bonded for 10 years

gravel or slag shall be from one-quarter ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size, dry, and free from dirt.

General—The felt shall be laid without wrinkles or buckles. Not less than one hundred and seventy-five (175) pounds of pitch shall be used for constructing each one hundred (100) square feet of completed roof, and the pitch shall not be heated above 400° Fahr.

The roof shall be applied by a roofing contractor approved by THE BARRETT COMPANY. He shall furnish THE BARRETT COMPANY'S Surety Bond Guaranty issued by the U. S. Fidelity & Guaranty Company, of Baltimore, covering a period of ten (10) years from date of completion, in accordance with Note No. 1.

10-year Guaranty Bond—Note No. 1—THE BARRETT COMPANY will give its 10-year Guaranty Bond on all jobs of 5000 sq. ft. or more, in the United States and Canada, where its Inspection Service is available, providing the roof is laid by a roofing contractor approved by THE BARRETT COMPANY, in strict accordance with the above Specification and subject to Barrett inspection and approval.

Condensed Specification—Roofing—Shall be a Barrett Specification Roof, Type "A," laid in accordance with The Barrett Specification (for use over Concrete) by a roofing contractor approved by THE BARRETT COMPANY. The roofing contractor shall furnish THE BARRETT COMPANY'S SURETY Bond Guaranty for ten (10) years, in accordance with Note No. 1 of said Specification.

Roofing for Steep Surfaces

Barrett built-up steep roofing specifications for saw-tooth, monitor, umbrella, butterfly, hopper, plain hip, and other types of steep roof construction. Bonded for 10 years when applied in accordance with Note No. 1 in Volume II, Architects' and Engineers' Built-up Roofing Reference Series.

AMERICAN TAR PRODUCTS COMPANY

INCORPORATED

Coal Tar Products for Roofing, Waterproofing, Wood Preserving and Paving

GENERAL OFFICES

Union Trust Building
PITTSBURGH, PA.

ST. LOUIS, MO.
UTICA, N. Y.

YOUNGSTOWN, OHIO
MILWAUKEE, WIS.

FOLLANSBEE, W. VA.
BIRMINGHAM, ALA.

CHICAGO, ILL.
ROCKTON, ILL.

PROVIDENCE, R. I.

A.T.P. Products

A.T.P. OLD STYLE PITCH (Underwriters' Label) for built-up roofing and waterproofing.

A.T.P. APPROVED TARRED FELT (Underwriters' Label) for built-up roofing and waterproofing.

A.T.P. No. 3 Tarred Felt for built-up roofing and waterproofing.

A.T.P. Roof Cement, a tough, adhesive, elastic, waterproof cement.

A.T.P. Fiber Coating, for coating old roofs.

A.T.P. Wood Preserver, a pure coal tar creosote, highly refined, for preservation of timber.

A.T.P. Metal Paint, prepared for the preservation and protection of iron and steel.

A.T.P. Sub-floor Tar, prepared to protect floors from decay, vermin, and dampness.

A.T.P. Felts, insulating and deadening.

Tarmac, a scientifically prepared coal tar for the construction, maintenance and repair of roads and streets.



TRADE-MARK

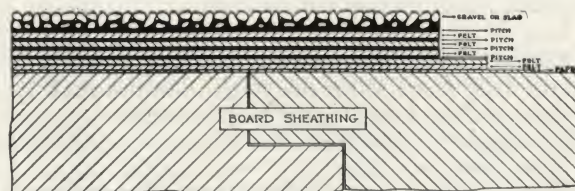
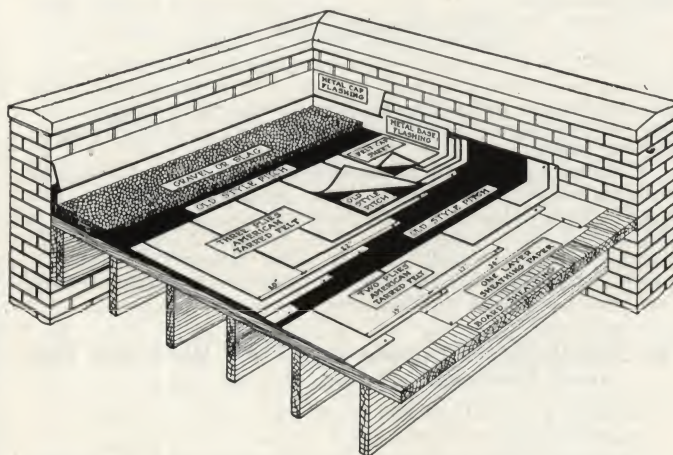
Application—The material shall be applied as follows:

First—Lay the unsaturated felt or sheathing paper, lapping each sheet one (1) inch over the preceding one.

Second—Lay two (2) full thicknesses of A.T.P. Approved Tarred Felt lapping each sheet seventeen (17) inches over the preceding one, and nail as often as may be necessary to hold the sheets in place until the remaining felt is laid.

Third—Coat the entire surface with A.T.P. Old Style Pitch mopped on uniformly.

Fourth—Lay three (3) full thicknesses of A.T.P. Approved Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding one and mopping with A.T.P. Old Style Pitch the full width of the twenty-two (22) inch lap, so that in no place in the last three plies shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of A.T.P. Approved Tarred Felt. Nailing not to exceed three (3) feet apart and about three (3) inches from upper edge of sheet.



Details and Enlarged Section of A.T.P. Built-up Roofing Over Boards (5 Ply)

An A.T.P. Built-up Roof

This is an ideal covering for flat roofs and will withstand the severest weather conditions.

It is a tarred rag felt built-up roof covering surfaced with either gravel, crushed stone or crushed slag.

It is composed of three, four or five layers of 14 lb. A.T.P. Approved Tarred Felt cemented together by A.T.P. Old Style Pitch and surfaced with 400 lb. gravel or crushed stone or 300 lb. crushed slag per 100 sq. ft. of finished roof. It is applicable to roof decks where the incline does not exceed 3 in. to foot horizontal.

It is fire retardant and approved by the Underwriters' Laboratories, Inc.—Standard Class A. It is effective against severe fire exposures, does not carry or communicate fire and possesses no fire brand hazard. It affords a high degree of heat insulation to roof deck.

It represents the maximum of life and minimum of expense in a roof for flat surfaces.

Instructions for Applying an A.T.P. Built-up Roof Covering Five-ply—for Use Over Boards

Incline—Following specification designed for roofs having an incline not exceeding three (3) inches to the foot.

Materials—There shall be used one (1) thickness of unsaturated felt or sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, and five (5) thicknesses of A.T.P. Approved Tarred Felt weighing not less than fourteen (14) pounds per one hundred (100) square feet single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than one hundred and fifty (150) pounds of A.T.P. Old Style Pitch and not less than four hundred (400) pounds of gravel, or three hundred (300) pounds of slag, from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size and free from dirt.

Fifth—Pour over the entire surface a uniform coating of A.T.P. Old Style Pitch into which, while hot, embed gravel or slag.

Alternate—If for any reason it is more convenient to lay the five (5) plies of A.T.P. Approved Tarred Felt at one time, the result will be identically as good as if laid as specified above, provided it is accomplished by lapping each sheet twenty-six (26) inches over the preceding one, thereby providing five (5) full thicknesses of A.T.P. Approved Tarred Felt over the entire roof surface, and mopping with A.T.P. Old Style Pitch the

full width of the twenty-six (26) inch lap so that the entire five (5) thicknesses are cemented solidly together and so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two (2) plies of A.T.P. Approved Tarred Felt.

The nailing is not to exceed three (3) feet apart and about three (3) inches from the upper edge of sheet. In the use of this alternate the first and fifth clauses of the above specification.

Write for instructions describing application of four ply over boards.

Instructions for Applying An A.T.P. Built-up Roof Covering Four-ply—for Use Over Concrete

Incline—This specification should not be used where roof incline exceeds two (2) inches to one (1) foot, and, where incline exceeds one (1) inch to one (1) foot, the concrete must permit of nailing, or nailing strips must be provided. Nailing not to exceed three (3) feet apart and about three (3) inches from upper edge of sheet.

Materials—There shall be used four (4) thicknesses of A.T.P. Approved Tarred Felt weighing not less than fourteen (14) pounds per one hundred (100) square feet, single thickness, and for each one hundred (100) square feet of completed roof there shall be used not less than two hundred

(200) pounds of A.T.P. Old Style Pitch and not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size and free from dirt.

Application—The material shall be applied as follows:

First—Coat the concrete uniformly with A.T.P. Old Style Pitch.

Second—Over the entire surface lay two (2) full thicknesses of A.T.P. Approved Tarred Felt lapping each sheet seventeen (17) inches over the preceding one, mopping with A.T.P. Old Style Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Third—Coat the entire surface uniformly with A.T.P. Old Style Pitch.

Fourth—Over the entire surface lay two (2) full thicknesses of A.T.P. Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding one, mopping with A.T.P. Old Style Pitch the full width of the seventeen (17) inch lap between the plies so that in no place shall felt touch felt.

Fifth—Pour over the entire surface of the roof a uniform coating of A.T.P. Old Style Pitch, into which, while hot, embed gravel or slag.

Alternate—If for any reason it is more convenient to lay the four (4) plies of A.T.P. Approved Tarred Felt, at one time, the result will be identically as good as if laid as specified above, provided it is accomplished by lapping each sheet twenty-four and one-half ($24\frac{1}{2}$) inches over the preceding one, thereby providing four (4) full thicknesses of A.T.P. Approved Tarred Felt over the entire roof surface, and mopping with A.T.P. Old Style Pitch the full width of the twenty-four and one-half ($24\frac{1}{2}$) inch lap so that the entire four (4) thicknesses are cemented solidly together and so that in no place shall felt touch felt. In the use of this alternate the first and fifth clauses of the above specification remain unchanged.

Write for instructions describing application of three ply over concrete.

Tarred Felt

Made from the best quality of dry felt. Saturated with the proper amount of pure dehydrated coal tar, thereby insuring a finished product of uniformity and maximum lasting qualities.

Thoroughly seasoned before shipment.

A.T.P. Approved Tarred Felt, put up in rolls of 432 sq. ft. each, 32 in. wide and weighing approximately 65 lb. per roll. Underwriters' Label.

A.T.P. No. 3 Tarred Felt, put up in rolls of 432 sq. ft. each, 32 in. wide and weighing approximately 55 lb. per roll.

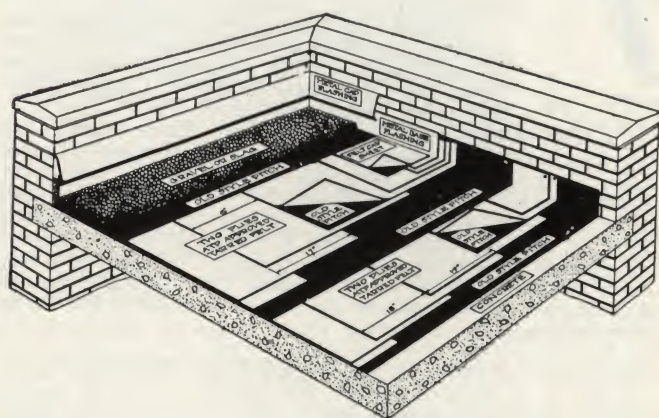
A.T.P. Old Style Pitch

A straight run distillation of coke oven tar—resulting in a pitch of the best quality and highest binding efficiency. The supply of crude tar from large sources insures a uniform product.

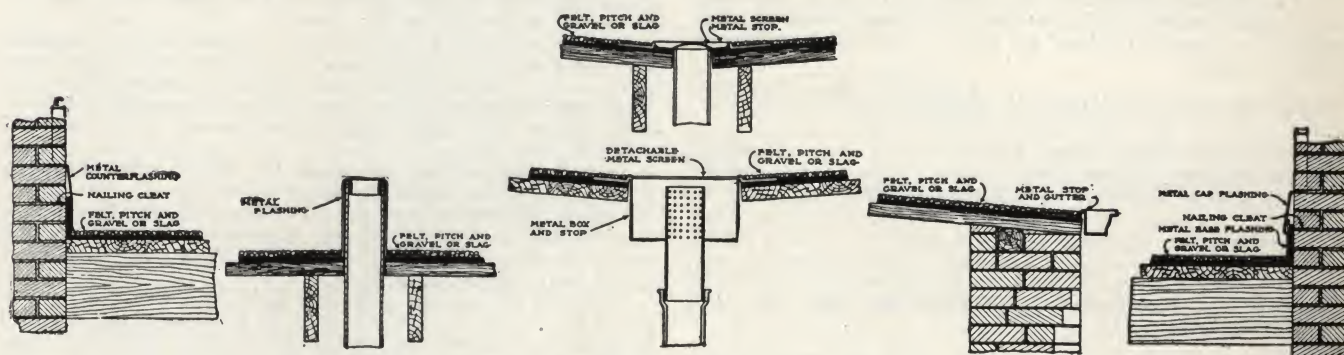
A.T.P. Old Style Pitch is put up in barrels (light or heavy cooperage) weighing approximately 400 to 600 lb. each—also metal drums averaging 350 lb. each. Underwriters' Label.

Inspection

Thorough inspection is made of all felt and pitch before shipment.



Details and Enlarged Section of A.T.P. Built-up Roofing Over Concrete (4 Ply)



Flashing Details

THE BARBER ASPHALT COMPANY

Asphalt Built-up Roofing, Mastic Shingles and Waterproofing
PHILADELPHIA, PA.

NEW YORK, N. Y., Graybar Building
PITTSBURGH, PA., Peoples Savings Bank Building

ST. LOUIS, MO., International Life Building
SAN FRANCISCO, CAL., Phelan Building

KANSAS CITY, MO., Finance Building
CHICAGO, ILL., Union Trust Building

Products

GENASCO STANDARD TRINIDAD LAKE ROOFING ASPHALT.

GENASCO ASPHALT SATURATED FELT.

GENASCO ROLL ROOFINGS, Smooth and Slate Surface.

GENASCO LATITE SHINGLES.

GENASCO WATERPROOFING ASPHALT, Solid and Liquid.

GENASCO WATERPROOFING FELTS and FABRICS.

GENASCO ASPHALT MASTIC.

GENASCO INDUSTRIAL PAINT; GENASCO ACID-PROOF PAINT.

Also producers of Refined Trinidad Lake Asphalt; Trinidad Lake Asphalt Cement; Bermudez Road Asphalt; Refined Bermudez Lake Asphalt; Bermudez Lake Asphalt Cement; Gilonite; Genasco Tile Cement; Genasco Asphalt Pipe Coating; Genasco Asphalt Fibre Coating; Genasco Roof Coating; Genasco Battery Paint; Genasco Battery Seal Asphalt; Genasco Asphalt Putty; Genasco Deadening Felt; Genasco Insulating Paper; Genasco Red Sheathing Paper; Genasco Stringed Felt; Genasco Wall Lining; Genasco Sealbac Shingles (individual and strips); Genasco Elastic Boiler Cement.



Reg. U. S. Pat. Off.



TRADE-MARKS

Roofing Asphalt, heated to a temperature of approximately 400° to 500° F., uniformly mopped, using approximately 30 lb. per 100 sq. ft.

The reinforcing factor shall be Genasco All-rag Standard Felt and Genasco All-rag Extra Heavy Felt (formerly known as Cap Felt), 32 in. wide. The Genasco Standard Felt shall weigh approximately 15 lb. per 100 sq. ft. and the Genasco Extra Heavy Felt shall weigh approximately 30 lb. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—After the roof deck has become thoroughly dry and set hard, prime the concrete with Genasco Concrete Primer, using approximately 10 lb. (1¼ gal.) per square.

Second Operation—Over the concrete thus primed, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 1 layer of Genasco Extra Heavy Felt, lapping each sheet 2 in.

Third Operation—Over the Genasco Extra Heavy Felt thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 2 layers of Genasco Standard Felt, lapping each sheet 17 in., mopping the full width of the lap, using approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square.

Fourth Operation—Over the Genasco Felts thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

1 layer Genasco Concrete Primer.....	10 lb.
4 layers Genasco Trinidad Lake Roofing Asphalt.....	120 lb.
2 layers Genasco Standard Felt.....	30 lb.
1 layer Genasco Extra Heavy Felt.....	30 lb.

190 lb.

This roof contains 162 lb. of waterproofing factor and 28 lb. of reinforcing factor, or 85% waterproofing factor and 15% reinforcing factor.

Specifications for Genasco Economy Trinidad Lake Asphalt Built-up Roof—Over Boards

Materials—The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt heated to a temperature of approximately 400° to 500° F., uniformly mopped, using approximately 30 lb. per 100 sq. ft.

The reinforcing factor shall be Genasco All-rag Standard Felt and Genasco All-rag Extra Heavy Felt (formerly known as Cap Felt), 32 in. wide. The Genasco Standard Felt shall weigh approximately 15 lb. per 100 sq. ft. and the Genasco Extra Heavy Felt shall weigh approximately 30 lb. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—One layer of Genasco Extra Heavy Felt shall be laid on the roof boards, lapping each sheet 2 in. and nailing through the laps and longitudinal center with broad head roofing nails, spaced 12 in. apart.

Second Operation—Over the Genasco Extra Heavy Felt thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 1 layer of Genasco Standard Felt, lapping each sheet 2 in. The laps of the Genasco Standard Felt shall fall midway between the laps of the Genasco Extra Heavy Felt.

Third Operation—Over the Genasco Felts thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, finishing the roof in a uniform and workmanlike manner.

Specifications for Genasco Standard Trinidad Lake Asphalt Built-up Roof—Over Boards

Materials—The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt, heated to a temperature of approximately 400° to 500° F., uniformly mopped, using approximately 30 lb. per 100 sq. ft.

The reinforcing factor shall be Genasco All-rag Standard Felt and Genasco All-rag Extra Heavy Felt (formerly known as Cap Felt), 32 in. wide. The Genasco Standard Felt shall weigh approximately 15 lb. per 100 sq. ft. and the Genasco Extra Heavy Felt shall weigh approximately 30 lb. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—1 layer of Genasco Extra Heavy Felt shall be laid on the roof boards, lapping each sheet 2 in. and nailing through the laps and longitudinal center with broad head roofing nails, spaced 12 in. apart.

Second Operation—Over the Genasco Extra Heavy Felt thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 2 layers of Genasco Standard Felt, lapping each sheet 17 in. and mopping the full width of the lap, using approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square.

Third Operation—Over the Genasco Felts thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT. OF ROOF SURFACE

1 layer Genasco Extra Heavy Felt.....	30 lb.
2 layers Genasco Standard Felt.....	30 lb.
3 layers Genasco Trinidad Lake Roofing Asphalt.....	90 lb.
	150 lb.

This roof contains 122 lb. of waterproofing factor and 28 lb. of reinforcing factor, or 81% waterproofing factor and 19% reinforcing factor.

Specifications for Genasco Standard Trinidad Lake Asphalt Built-up Roof—Over Concrete, Gypsum or Tile Roof Decks

Materials—The primer shall be Genasco Concrete Primer.

The waterproofing factor shall be Genasco Trinidad Lake

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT.
OF ROOF SURFACE

1 layer Genasco Extra Heavy Felt.....	30 lb.
1 layer Genasco Standard Felt.....	15 lb.
2 layers Genasco Trinidad Lake Roofing Asphalt.....	60 lb.
	105 lb.

This roof contains 84 lb. of waterproofing factor and 21 lb. of reinforcing factor, or 80% waterproofing factor and 20% reinforcing factor.

Specifications for Genasco Economy Trinidad Lake Asphalt Built-up Roof—Over Concrete

Materials—The primer shall be Genasco Concrete Primer.

The waterproofing factor shall be Genasco Trinidad Lake Roofing Asphalt, heated to a temperature of approximately 400° to 500° F., uniformly mopped, using approximately 30 lb. per 100 sq. ft.

The reinforcing factor shall be Genasco All-rag Standard Felt and Genasco All-rag Extra Heavy Felt (formerly known as Cap Felt), 32 in. wide. The Genasco Standard Felt shall weigh approximately 15 lb. per 100 sq. ft. and the Genasco Extra Heavy Felt shall weigh approximately 30 lb. per 100 sq. ft.

Application—The roof shall be laid in the following manner, using the above materials:

First Operation—After the roof deck has become thoroughly dry and set hard, prime the concrete with Genasco Concrete Primer, using approximately 10 lb. (1¼ gal.) per square.

Second Operation—Over the concrete thus primed, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 1 layer of Genasco Extra Heavy Felt, lapping each sheet 2 in.

Third Operation—Over the Genasco Extra Heavy Felt thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, into which, while hot, apply 1 layer of Genasco Standard Felt, lapping each sheet 2 in. The laps of the Genasco Standard Felt shall fall midway between the laps of the Genasco Extra Heavy Felt.

Fourth Operation—Over the Genasco Felts thus laid, mop down approximately 30 lb. of Genasco Trinidad Lake Roofing Asphalt per square, finishing the roof in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT.
OF ROOF SURFACE

1 layer Genasco Concrete Primer.....	10 lb.
3 layers Genasco Trinidad Lake Roofing Asphalt.....	90 lb.
1 layer Genasco Extra Heavy Felt.....	30 lb.
1 layer Genasco Standard Felt.....	15 lb.
	145 lb.

This roof contains 124 lb. of waterproofing factor and 21 lb. of reinforcing factor, or 85% waterproofing factor and 15% reinforcing factor.

Specifications for Genasco Membrane Waterproofing

Materials—The primer shall be Genasco Concrete Primer.

The waterproofing factor shall be Genasco Waterproofing Asphalt.

The reinforcing factor shall be Genasco Waterproofing Cloth weighing approximately 8 lb. per 100 sq. ft.

Application—Genasco Membrane Waterproofing shall be laid in the following manner, using the above materials:

First Operation—Prime the surface to be waterproofed with Genasco Concrete Primer, using approximately 10 lb. (1¼ gal.) per square.

Second Operation—Over the surface thus primed, mop down approximately 40 lb. of asphalt per square.

Third Operation—Into the hot asphalt apply 3 layers of Genasco Waterproofing Cloth lapping each sheet two-thirds of its width and mopping the full width of the lap, using approximately 40 lb. of asphalt per square for each mopping.

Fourth Operation—Over the 3 layers of Genasco Waterproofing Cloth thus laid, mop down approximately 40 lb. of asphalt per square, finishing the membrane in a uniform and workmanlike manner.

APPROXIMATE QUANTITIES OF MATERIAL FOR 100 SQ. FT.
OF SURFACE

1 layer Genasco Concrete Primer.....	10 lb.
4 layers Genasco Waterproofing Asphalt	160 lb.
3 layers Genasco Waterproofing Cloth	24 lb.
	194 lb.

Note: For use above ground level where temperatures are variable use Genasco Waterproofing Asphalt "B."

This system contains 185 lb. of waterproofing factor and

9 lb. of reinforcing factor, or 95% waterproofing factor and 5% reinforcing factor.

Where 2 plies are desired, lap cloth one-half of its width.

Specifications for Genasco Asphalt Mastic Floors

Base—The concrete or other base shall be prepared ready to receive the mastic surfacing inches below and parallel to the final finished floor grade with proper slopes established to take care of any required drainage. (If the floor is to be laid over wood, first lay one thickness of building paper and flash at all posts, walls, etc., with a paint coat of Genasco Priming Paint.)

Materials—The block shall be a Genasco Asphalt mastic as produced by THE BARBER ASPHALT COMPANY. The flux shall be Native Trinidad Lake Asphalt of proper penetration for the work involved. The sand shall be fairly sharp, free from loam or any foreign matter of vegetable origin and shall be well graded from coarse to fine, all passing a 10-mesh sieve and not over 3% passing a 200-mesh sieve. The coarse aggregate shall be a gravel, crushed trap rock, crushed gravel or other crushed sound stone, all passing a ¾-in. screen and retained on a 10-mesh sieve.

A formula giving the proportions of mastic block, flux, sand and coarse aggregate for the proposed mixture to be submitted to the engineer or architect, together with a sample of the sand and coarse aggregate which the contractor proposes to use.

Construction—On the base, as above specified, lay a Genasco Asphalt Mastic Floor, not less than inches in thickness, laid in layer. The Genasco Asphalt Block shall be brought to the site of the work, broken and melted in suitable kettles, together with the proper amount of flux, sand and coarse aggregate (the two latter previously dried and heated) in proportions satisfactory to the engineer or architect. (THE BARBER ASPHALT COMPANY will give its opinion, if requested, as to formulae for mastic mixes for various conditions, provided samples of the aggregate to be used for the work are submitted for examination.)

After sufficient heating and stirring, the mixture shall be spread on the established base to a uniform thickness of inches and worked under wooden floats until it is free from voids. A half and half mix of fine sand and portland cement shall then be sprinkled on the floor and the surface rubbed smooth.

The mastic mixture is to be laid in approximately 6-ft. strips. In making joints the hot mastic shall overlap the preceding strip about 4 in. so that the edge of the cold strip will become soft, thus allowing the finisher to make a perfect joint after the surplus material spread over the cold strip has been cut away.

Note: Thickness of mastic to be according to conditions and service to which floor is subjected. Where acid conditions exist Genasco Acid-proof Mastic Block and silicious aggregate must be used. Where mastic is to be more than 1 in. thick, it is to be applied in 2 layers of inches, each with joints in top layer so made as not to coincide with joints in bottom layer. Top layer only to be rubbed with the sand-portland cement mix.

Genasco Latite Asphalt Shingles

Slate surfaced asphalt shingles, of unique and distinctive design. Finished with a double butt, and applied in honeycomb design. Present a "shadow line" and depth of texture not found in ordinary asphalt shingles. Genasco Latite shingles lock together tightly on the roof, by means of a metal band or key in the butt of each shingle, so that wind or rain can not penetrate.

They are particularly adapted for re-roofing operations, being applied directly over old, worn out surfaces. Made in four colors—red, green, blue-black or mix-tone; and in two sizes—16x16 and 12x12 in. "They Weather all Weather."

Our booklet, with illustrations in color and complete data, sent on request.

Genasco Roll Roofings

Made of highest quality commercial rag felt, thoroughly saturated, and then coated on both sides with Trinidad Lake asphalt cement. The waterproof and weatherproof qualities of Trinidad Lake asphalt give them exceptional durability.

Manufactured in several types: smooth surface, medium, heavy and extra heavy, slate surface, red, green or blue-black color. Kant Leak Kleets, the most scientific and efficient roof fastening device made, furnished with each roll.

Genasco Asphalt Paints and Coatings

The several types of Genasco asphalt paints and coatings are manufactured under strict laboratory supervision. Each is designed to meet the exacting requirements of the particular purpose for which it is recommended.

There are Genasco asphalt paints for preserving metal or prepared roofs, for painting machinery or other industrial uses, for resisting acids and gases, for priming, and many other purposes.

THE PHILIP CAREY COMPANY

Manufacturers of Roofing

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products and Services

CAREY BUILT-UP ROOFS.

CAREY FELTS for Waterproofing, Weatherproofing and Roofing purposes.

CAREY ASPHALT PITCH.

Contracts taken to furnish and apply Carey Built-up Roofs in all locations.

For Waterproofing and Dampproofing, see pages A56-57; for Pipe Coverings, see pages A210-211; for Asbestos Shingles, see page A415; for Asphalt Shingles, see page A421; for Flooring, see page B1537.

Experience and Facilities

Established in 1873, THE PHILIP CAREY COMPANY has furnished millions of squares of roofing, distributed and applied to buildings of every description throughout the world.

The Carey mills are modern, and facilities for handling large business are maintained at a high standard.

Carey Roofs

Carey roofs are laid strictly in accordance with the Carey specifications for various weights and thicknesses adapted to meet the requirements of the roof structure, and the conditions to which the roofing will be subsequently exposed.

Selecting the Right Roof

The roof construction of all buildings is not the same.

Various materials are used in constructing the roof base, such as concrete, tile, cement slabs, gypsum, wood, steel, etc.

Roofs are subjected to various conditions of exposure and abuse not all alike, but depending upon the type of building, its location and the circumstances.

It is highly important that the owner of the building be interested in securing a roofing material, built up of the proper kind of felt, and of sufficient weight and thickness to offer the greatest possible resistance to whatever condition may be



Carey Asbestos Built-up Roofing



Applying Carey Built-up Roof



Carey Feltex Built-up Roofing

prevalent, and at the same time insure maximum service and durability.

The Carey method of providing roofs to meet the requirements of each particular building, using felt of the proper kind and weight, has met with universal success and approval of architects and builders everywhere.

Carey Felts

Carey felts consist of the best grade of stock, carefully prepared and saturated in asphalt to insure absolute waterproofing protection and permanent flexibility.

Fiberock (Asbestos Asphalt Impregnated Felt)—Used in Carey built-up roof specifications, also for waterproofing and weatherproofing work. Put up in rolls containing 324 sq. ft.; width, 36 in.; weight about 45 lb. per roll.

Feltex (Asphalt Saturated Felt)—

Used in Carey built-up roofs, waterproofing and weatherproofing work. Furnished in rolls containing 324 sq. ft.; width 36 in.; weight, about 45 lb. per roll.

Manco (Carey Asphalt)

More than forty years' experience in asphalt refining is back of Carey Manco. For roofing purposes no other asphalt has so far equaled its splendid qualities.

Manco is prepared with a high melting point, offering the greatest resistance to high and low temperatures. Its flexible quality also offers all necessary protection when exposed to ordinary expansion and contraction.

If interested in high grade asphalt, write to this company stating requirements.

Correspondence

Information and advice respecting the adaptability of Carey Roof Specifications to meet any particular requirement, will be furnished on request.

Write for samples and further information.

Carey Asbestos Built-up Roofs

Asbestos is used in the construction of roofs exposed to gases, fumes and similar severe conditions. Consideration should be given to the severity of such exposure and the roof prepared with sufficient layers of asbestos and asphalt to insure satisfactory service.

Asbestos Built-up Roofs may be applied over wood or concrete roof construction and the specifications for such roofing should be prepared to meet the conditions as they may be found in each particular case.

Specifications for Carey Roofs

(1) **Work by Other Trades**—Provision for the following work should be included under the proper specification headings:

(2) **Preparation of Wood Surfaces**—Roof surface is to be prepared and made ready for the application of Carey Roofing with dry seasoned sheathing boards of uniform thickness, closely laid. On permanent buildings, tongue and grooved sheathing 6 to 8 in. wide, is recommended. All sheathing boards to be surfaced nailed with at least two nails to each purlin in addition to any blind nailing. Sheathing boards to be placed on building horizontally. Remove or hammer down all projecting nail heads; cover all knotholes, etc., in the sheathing and sweep the sheathing clean before the roofing is applied.

(3) **Preparation of Concrete, Tile or Gypsum Surfaces**—All concrete, tile or gypsum surfaces shall be prepared for the application of Carey Roofing with a comparatively smooth, hard finish, free from holes and loose particles of sand and cement, and the expense of rectifying any extensive irregularities, such as depressions in the plane of the roof surface, which must be filled, shall be chargeable to (—Contractor). All sharp angles to be rounded out so as to avoid rough or sharp edges. On steep surfaces provision shall be made for anchoring the roofing sheets, the anchor strip to consist of a wood strip embedded into the concrete surface at the ridge. All down-spout openings must be sufficient size and the gutters properly graded by the cement contractor, so that water will not stand at any point.

(4) **Sheet Metal Work**—Counterflash all walls with No. 26 gauge galvanized iron, or if preferred, copper or Carey Fiberock counterflashing may be used. Metal counterflashing to be firmly attached to wall with suitable plugs and portland cement. (If furnished by the roofing contractor, both material and labor of installation shall be charged to the acceptor of this proposal as an extra, unless otherwise specifically stated in proposal.)

(5) **Nailing Strips**—(General Contractor) to provide nailing strip in wall for roof flashings not more than 12 in. nor less than 6 in. above roof line.

General Notes

(1) **Work Proposed**—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work included.) Sheathing must be dry before applying the roofing.

Carey Feltex Built-up Roofs

Constructed of Carey high grade Feltex (Asphalt Saturated Felt). For the general class of building, Feltex makes an ideal roofing material for the reason of its great tensile strength and its ability to stretch and adjust itself to meet ordinary contraction and expansion.

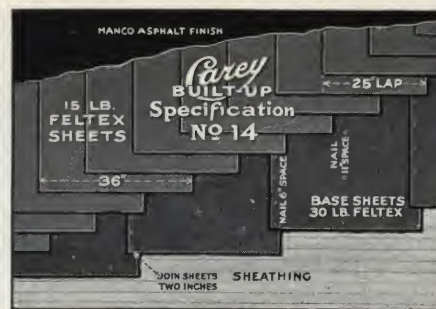
Feltex Roofs are built up from two to six plies in thickness depending upon the conditions to be met. Manco Asphalt is used in the construction of all Carey Built-up Roofs as a binder between sheets and surface finish.

Specification No. 14—Carey Feltex Built-up Roof (For Application to Wood Sheathing)

(1) **Work Proposed**—Use paragraph 1, General Notes.

(2) **Materials**—Carey Feltex 30 lb. per square, Carey Manco Asphalt 25 lb. per square, Carey Feltex 15 lb. per square, Carey Manco Asphalt 25 lb. per square, Carey Feltex 15 lb. per square, Carey Manco Asphalt 25 lb. per square, Carey Feltex 15 lb. per square, Carey Manco Asphalt 25 lb. per square, 7/8 or 1 in. large head nails 1 lb. per square.

Weight per square, when applied, to be approximately 176 lb.



Carey Feltex Built-up Roof Specification No. 14 Over Wood Sheathing

(3) **Application**—The roof shall be covered with sheets of Carey Feltex 36 in. wide, weighing about 30 lb. per square; lap the sheets not less than 2 in., then nail the sheets at the joints with large head 7/8 or 1-in. nails on 6-in. centers, with one additional row of large head nails spaced 11 in. apart lengthwise through center of sheet.

After the 30-lb. Feltex sheets have been completed in accordance with the above instructions, proceed to cover the same with 3 layers of Carey Feltex, weight about 15 lb. per square each, cementing solid between sheets and joining same to the 30-lb. sheet, so that at no place shall felt touch felt, each sheet to overlap the previous sheet so that 11 in. are left exposed, making a continuous 3-ply built-up over the 30-lb. base Feltex sheet (no nails to be used through the top sheets except where necessary to anchor on steep surfaces).

(4) **Gutters**—Use paragraph 4 specification No. 5.

(5) **Flashing**—Use paragraph 5 specification No. 5.

(6) **Counterflashing**—Use paragraph 6 specification No. 5.

(7) **Roof Finish**—Use paragraph 7 specification No. 5.

Specification No. 15.—Carey Asbestos Built-up Roof (For Application to Wood Sheathing)

(1) **Work Proposed**—Use paragraph No. 1, General Notes.

(2) **Materials**—The materials for each square used in the construction of this roof shall be as follows:

One roll (110 sq. ft.) Carey Asbestos Asphalt Impregnated Roofing Felt, weight approximately 65 lb. Two sheets (weight 15 lb. per square each) Carey Fiberock (Asbestos Impregnated Felt). 80 lb. Carey Manco Asphalt. Nails and flat tin caps. Weight per square, when applied, to be approximately 175 lb.

(3) **Application**—The roof surface shall be covered with Carey Asbestos Asphalt Impregnated Roofing, lapping the sheets so that there will be a lap of not less than 3 in., cementing between the laps with Manco Asphalt, and secure with nails and caps, spacing the nails along the lap 4 in., also secure through the center of sheets with two rows of nails and flat tin caps, staggered, spacing nails crosswise of sheet 11 in., and lengthwise of sheet 15 in. This surface to be mopped with Carey Manco Asphalt into which, while hot, shall be laid 2 layers of 1-ply Fiberock (Asphalt Impregnated Asbestos Felt), cementing solid between sheets, so that at no place shall felt touch felt, each sheet to overlap the previous sheet, leaving 17 in. exposed. All sheets shall be laid crosswise of the sheathing boards and so lapped that at no place shall one lap or cross-seam occur upon another.

(4) **Valleys and Gutters**—Line all gutters in the same manner as described under "Application," using sheets full length and cut to a width of not over 18 in. After the base sheet of heavy asbestos roofing has been nailed in position, then cement 2 sheets of 1-ply Fiberock over the base sheet, breaking joints in the usual manner.

Note: We recommend, wherever possible, adding an additional sheet of 1-ply Fiberock in all valley and gutter construction.

All valley and gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets, the heavy base sheet of asbestos roofing shall extend on all vertical surfaces approximately 2 1/2 in., the extension to be uncemented.

Note: All concrete or brick walls to be flashed shall be primed (Carey Asphalt Primer) to full height of flashing.

(5) **Flashing**—The general contractor or owner to provide suitable nailing strips in the walls at the time of construction, or raggle block, together with necessary cant strips,

nailing strips, etc., to enable the roofing contractor to properly construct flashing work.

Note: Height of flashing, width of cant strip and flashing materials may be regulated to suit height of wall, and other conditions prevailing.

(6) Counterflashing—See under "Work by Other Trades."

(7) Roof Finish—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt, applied in a light thin coat, less than $\frac{1}{8}$ in. thick, and spread to a uniform finish.

Specification No. 3—Carey Asbestos Built-up Roof (Over Wood Sheathing)

(1) Work Proposed—Use paragraph 1, General Notes.

(2) Materials—One roll (108 sq. ft.) 2-ply Fiberock Roofing, weight 40 lb. 30 lb. Carey Fiberock Asphalt Impregnated Asbestos Felt. 80 lb. Carey Manco Asphalt Pitch. 1 lb. $\frac{7}{8}$ -in. nails. $\frac{3}{4}$ lb. flat tin caps.

(3) Application—Roof surface shall be covered with 2-ply Fiberock Asbestos Roofing, laid next to sheathing boards. All joints to be lapped 2 in., cap-nailing sheets at joints securely

to the sheathing board every 6 in. with one additional row of nails and caps 11 in. apart through the center of the sheet. This surface to be mopped with Carey Manco Asphalt and on to this surface shall be laid 2 layers of 1-ply Fiberock Asphalt Impregnated Asbestos Felt, cementing solid between these sheets so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 17 in. are left exposed. After these materials are applied spread over the entire surface a coating of Carey Manco Asphalt in an even, uniform manner.

(4) Flashing—The 2-ply Fiberock base sheet shall extend from main deck to lap the full height of cricket. A strip of 2-ply Fiberock (18 in. wide, more or less, depending on conditions) shall be nailed to top edge of nailing strip in wall and this asbestos strip to be thoroughly cemented over cricket and same to lap on to main roof deck at least 4 in. The final 2 plies of Fiberock from main roof are then run to top edge of flashing, each being cemented in solid over cap sheet. Height of flashing, width of cricket and flashing material, may be regulated to suit height of wall and other prevailing conditions.

(5) Counterflashing—See under "Work by Other Trades."

Specification 4-Ply—Carey Asbestos Built-up Roof (Over Concrete or Tile)

(1) Work Proposed—This specification contemplates furnishing all material and labor required to apply the roofing and base flashing and line the gutters. (No metal work included.) The concrete, or roof base, must be thoroughly dry and clean before the roofing is applied.

(2) Materials—1 gal. Carey Asphalt Primer. 60 lb. Carey Fiberock Asphalt Impregnated Asbestos Felt. 140 lb. Carey Manco Asphalt.

(3) Application—The roof surface shall first be coated with Carey Asphalt Primer applied cold and thoroughly brushed in. Then mop entire surface with Carey Manco Asphalt, into which, while hot, embed 4 layers of Carey Fiberock (Asphalt Impregnated Asbestos Felt) each layer of which is thoroughly bonded with Manco Asphalt so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 9 in. are left exposed. After proper application of such materials the entire surface is given a light coating of Carey Manco Asphalt, spread in an even, uniform manner.

(4) Flashing—All walls to be flashed shall be given a coat of Carey Asphalt Primer. Cement strip of Fiberock Felt 6 in. wide in angle of wall, 3 in. to wall and 3 in. to flat deck. The Fiberock sheets from main roof to be cut so they will extend up on all fire walls, skylights and other vertical surfaces to a height of 6 in.; this extension to be cemented to vertical surface. A cap sheet of Fiberock Felt cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck.

(5) Counterflashing—See under "Work by Other Trades."

Specification No. 5—Carey Feltex Built-up Roof (Over Wood Sheathing)

(1) Work Proposed—Use paragraph 1, General Notes.

(2) Materials—Carey Feltex, 30 lb. per square. Carey Manco Asphalt, 25 lb. per square. Carey Feltex, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square. $\frac{7}{8}$ or 1-in. large head nails, 1 lb. per square.

Weight per square, when applied, to be approximately 96 lb.

(3) Application—The roof surface shall be covered with 1 sheet of Carey Feltex, 36 in. wide, weighing about 30 lb. per square. Lap the sheets not less than 2 in., then nail the sheets at the joints with large head $\frac{7}{8}$ or 1-in. nails on 6-in. centers, with one additional row of large head nails spaced 11 in. apart lengthwise through the center of the sheet. After the 30-lb. Feltex sheet has been completed in accordance with above instructions, proceed to cover the same with 1 layer of Carey Feltex, 36 in. wide and weighing about 15 lb. per square. The 15-lb. sheet to be cemented with Manco Asphalt securely to the 30-lb. sheet, lapping the top sheets not less than 2 in. between the joints of the lower sheet—no nails to be used through the top sheet (except steep surfaces).

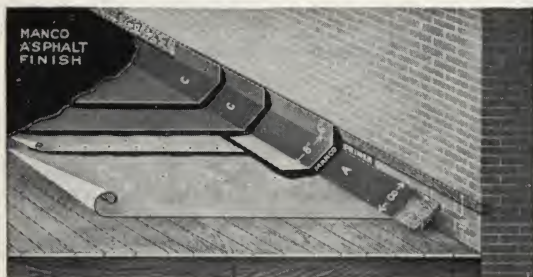
(4) Gutters—Line all gutters in the same manner as described under "Application."

In certain types of construction it is desirable to reinforce all gutters and valleys with an extra sheet of felt, weighing not less than 15 lb. per square, well mopped with Manco Asphalt. (This extra reinforcement, if required, to be charged for as an extra on time and material basis.)

Note: All concrete or brick walls to be flashed should be primed to full height of flashing.



Application of Carey Asbestos Built-up Roof for Wood—Specification No. 3



Method of Flashing Carey Asbestos Built-up Specification No. 3 for Wood



Carey Fiberock Built-up Specification 4-Ply Over Concrete

CAREY ASBESTOS BUILT-UP ROOF

(5) **Flashing**—(General Contractor or Owner) to provide suitable nailing strips in the walls at time of construction—usual size about 2x4 in.; also provide cant strip for bridging angle of wall and roof deck.

Note: Height of flashing, width of cant strip and flashing materials may be regulated to suit height of wall and other conditions prevailing.

(6) **Counterflashing**—See under "Work by Other Trades."

(7) **Roof Finish**—The entire surface of the roof applied shall be mopped with Manco Asphalt, applied hot and spread to a uniform finish.

Specification No. 7—Carey Feltex Built-up Roof (Over Wood Sheathing)

(1) **Work Proposed**—Use paragraph 1, General Notes.

(2) **Materials**—Carey Feltex, 30 lb. per square. Carey Manco Asphalt, 25 lb. per square. Carey Feltex, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square. Carey Feltex, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square. $\frac{7}{8}$ or 1-in. large head nails, 1 lb. per square.

Weight per square, when applied, to be approximately 136 lb.

(3) **Application**—The roof surface shall be covered with sheets of Carey Feltex, 36 in. wide, weighing about 30 lb. per square. Lap the sheets not less than 2 in., then nail the sheets at the joints with large head $\frac{7}{8}$ or 1-in. nails on 6-in. centers, with one additional row of large head nails spaced 11 in. apart lengthwise through center of sheet.

After the 30-lb. Feltex sheets have been completed in accordance with the above instructions, proceed to cover the same with 2 layers of Carey Feltex, weight about 15 lb. per square each, cementing solid between sheets and joining same to the 30-lb. sheet so that at no place shall felt touch felt, each sheet to overlap the previous sheet so that 17 in. are left exposed, making a continuous 2-ply built-up over the 30-lb. base Feltex sheet—no nails to be used through the top sheets.

(4) **Gutters**—Use paragraph 4, Specification No. 5.

(5) **Flashing**—Use paragraph 5, Specification No. 5.

(6) **Counterflashing**—Use paragraph 6, Specification No. 5.

(7) **Roof Finish**—Use paragraph 7, Specification No. 5.

Specification No. 8—Carey Feltex Built-up Roof (Over Concrete, Tile or Gypsum Block)

(1) **Work Proposed**—Use paragraph 1, Specification 4.

(2) **Materials**—Carey Asphalt Primer (1 gal.), 9 lb. per square. Carey Manco Asphalt, 50 lb. per square. Carey Feltex Felt, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square. Carey Feltex Felt, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square. Carey Feltex Felt, 15 lb. per square. Carey Manco Asphalt, 25 lb. per square.

Weight per square, when applied, to be approximately 179 lb.

(3) **Application**—The concrete shall be coated with Carey Asphalt Primer, applied cold, and thoroughly brushed in. The surface shall be mopped with Carey Manco Asphalt, into which, while hot, embed 3 layers of Carey Feltex (Asphalt Saturated Felt), cementing solid between the sheets so that at no place shall felt touch felt; each sheet to overlap the previous sheet so that 11 in. are left exposed, making 8 courses of asphalt and felt.

(4) **Gutters**—Apply 3 layers of Carey Feltex Felt lengthwise with the gutter. Each sheet to overlap the previous sheet so that one-third of its length is left exposed. (Use sheets cut to uniform length.)

All gutter sheets shall extend on the roof surface sufficiently to be properly lapped with the main roofing sheets and are to be applied as specified under "application."

Note: All concrete or brick walls to be flashed should be primed to full height of flashing with Carey Asphalt Primer.

(5) **Flashing**—Cement strip of Feltex 6 in. wide in angle of wall, 3 in. to wall and 3 in. to flat deck. The Feltex sheets from main roof to be cut so they will extend up on all fire walls, skylights and other vertical surfaces to a height of 6 in.; this extension to be cemented to vertical surface. A cap sheet of Feltex cut 12 in. wide to be cemented in 6 in. to wall and 6 in. to flat deck.

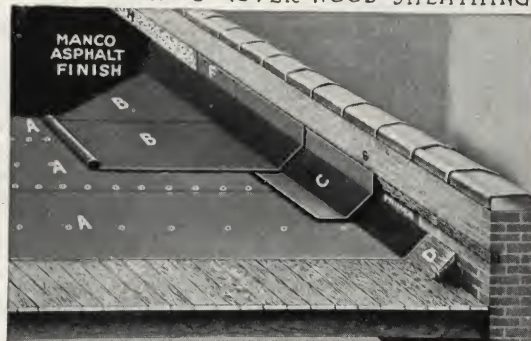
General Contractor to leave opening in the walls for inserting counterflash.

(6) **Counterflashing**—See under "Work by Other Trades."

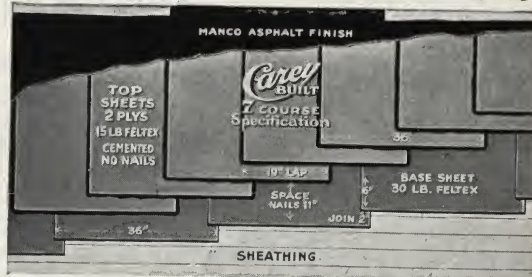
(7) **Roof Finish**—The entire surface of the roofing applied shall be mopped with Carey Manco Asphalt, applied hot, evenly spread to a uniform finish.



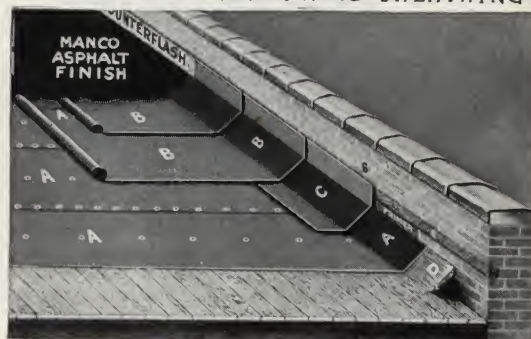
CAREY FELTEX BUILT-UP ROOF — SPECIFICATION NO. 5 (OVER WOOD SHEATHING)



METHOD OF FLASHING CAREY FELTEX ROOF — SPECIFICATION NO. 5



CAREY FELTEX BUILT-UP ROOF — SPECIFICATION NO. 7 (OVER WOOD SHEATHING)



METHOD OF FLASHING CAREY FELTEX ROOF — SPECIFICATION NO. 7



CAREY FELTEX BUILT-UP ROOF — SPECIFICATION NO. 8 (OVER CONCRETE, TILE, OR GYPSUM)

CAREY FELTEX BUILT-UP ROOF

CERTAIN-TEED PRODUCTS CORPORATION

ROOFING DIVISION

100 East 42nd Street, NEW YORK, N. Y.

For Branch Offices and Mills, see page B1341

Products

ASPHALT ROOFING (smooth surfaced and slate surfaced).

ASPHALT SHINGLES [Universal, Individual (standard size), Jumbo Individual, 4-width, Cut-out, Hexagonal Slabs], red, green, blue-black, or color-blend slate surfaced.

INSULATING PAPER.

ASPHALT FELT.

SHEATHING PAPER.

DEADENING FELTS.

ASPHALT ROOF COATING.

Also, Tarred Felts, Slaters' Felts, Stringed Felts, Asphalt Cement, Pitch, Lap Cement.

For Gypsum Products, see pages B1341-1343; for Linoleum, see pages B1594-1595; for Paints and Varnishes, see pages B1618-1619.

Facilities and Distribution

Certain-teed products are handled by jobbers and dealers throughout the United States and in principal countries throughout the world.

Certain-teed—Highest Quality

Nothing is omitted which can safeguard the quality of Certain-teed products. They are manufactured according to tried and proved formulas under the watchful supervision of experts. Only the best materials are used and each is carefully tested to make certain that it is of the required quality. You can rely on products bearing the Certain-teed label—it is a sure guide to satisfaction.

There is a Certain-teed roofing for every type of building—from temporary shelters to the most expensive structures.

Certain-teed Roofing—Talc Surfaced

Certain-teed roofing is the first grade product manufactured by the CERTAIN-TEED PRODUCTS CORPORATION. Millions of squares are giving satisfactory service in all parts of the world under all conditions—from the extreme cold of the northern frontiers to the intense heat of the tropics.

There are many large important buildings throughout the country that are sheltered by Certain-teed roofs. Certain-teed was the choice for the roofs of the Pullman shops, the General Motors Company at St. Louis, Mo., etc.

Owners, architects and builders of such roof areas as these insist upon knowing before it is laid that the roofing will give long years of protection. They can rely on Certain-teed, the highest quality possible to manufacture, as long years of service and world-wide use have proved.

Put up in rolls of 108 sq. ft. Nails and cement are enclosed in the roll. Packed one square per roll—enough to cover 100 sq. ft. of roof surface with 8 sq. ft. for laps.

- No. 1, light, about 35 lb. per square, guaranteed 5 years.
- No. 2, medium, about 45 lb. per square, guaranteed 10 years.
- No. 3, heavy, about 55 lb. per square, guaranteed 15 years.
- No. 4, extra heavy, about 65 lb. per square, guaranteed 15 years.

Certain-teed Slate Surfaced Roll Roofing

Made from the same high grade felt used in Certain-teed talc surfaced roofing. Surfaced with non-fading red, green, blue-black and color-blend crushed slate. It is widely used on residences, bungalows, garages, etc., where a decorative roof at minimum expense is desired. Guaranteed ten years. Put up in rolls of 108 sq. ft. Weight 85 to 90 lb.

Certain-teed Asphalt Felt

It is used extensively under slate, tile, asbestos shingles and other roofing materials requiring a waterproof sheathing or liner. It is extensively used for all sheathing and insulating purposes as it is absolutely waterproof and verminproof. It is also preferable to tarred felt as the felt layer in built-up roofs. It has the advantage of longer life than tarred felt.

Certain-teed asphalt felt is made in the following weights:

- No. 12, 432 sq. ft., about 48 lb. per roll.
- No. 15, 432 sq. ft., about 65 lb. per roll.
- No. 20, 216 sq. ft., about 44 lb. per roll.
- No. 30, 216 sq. ft., about 60 lb. per roll.

Certain-teed Shingles

The modern roof for homes is one that is both attractive and economical. Certain-teed shingles give such a roof. Their red, green, blue-black and color-blend tones harmonize perfectly with any surroundings and give to the finished structure an added touch of beauty. Surfaced with natural crushed slate, the colors do not fade.

Color-blend is an harmonious blending of several colors on each shingle.

Certain-teed shingles are economical. They save not only in the cost of material, but also on the superstructure necessary to support the roof, as they are lighter in weight than most other forms of decorative roofing. The upkeep cost of Certain-teed shingles is practically nothing.

Certain-teed Hexagonal Slab Shingles—A shingle of beauty and strength. Gives the effect of hexagonal shaped shingles. The beauty of the variegated effect obtainable is enhanced by the prominent shadow line.

Designed to give extra protection against weathering.

Red, green, blue-black or color-blend. Size, 11½x36 in., 86 shingles per square (2 bundles per square).

Weight about 160 lb. per square.

Certain-teed 4-width Shingles—Four shingles in one. The slate surfacing is separated into four equal areas by ½-in. black strips from which slate has been removed. Complete directions for laying. Made in the following sizes:

- Approximately, 10 x36 in.; wt., about 200 lb. per square (two packages).
- Approximately, 12½x36 in.; wt., about 255 lb. per square (three packages).

Certain-teed Cut-out Shingles—Standard square-butt cut-out shingle. Cut-outs are 4-in. deep. Put up two packages per square. Made in following sizes:

- Approximately, 10 x36 in.; wt., about 200 lb. per square (two packages).
- Approximately, 12½x36 in.; wt., about 245 lb. per square (three packages).

Certain-teed Universal Shingles—A distinctively improved type of asphalt shingle, unique in artistic design. Because of the interlocking feature an interwoven thatched like shadow line stands out giving exceptional beauty and texture. May be laid in three courses, 7½, 6 and 4½-in. exposure.

Red, green, blue-black or color-blend. Size, 16x18 in. Weight, approximately 68 lb. per bundle.

- 7½-in. exposure requires 2 bundles per square.
- 6-in. exposure requires 2½ bundles per square.
- 4½-in. exposure requires 3½ bundles per square.

Certain-teed Individual Shingles—Beautiful vari-colored effects may be had by blending shingles of the red, green and blue-black surfacings. Each color is packed separately and blending may be done to suit individual requirements.

- Regular size: 9x12½ in.; wt. about 245 lb. per square (4 packages).
- Jumbo size: 12x16 in.; wt. about 300 lb. per square (4 packages).

Certain-teed Insulating Paper

For insulating and sheathing against heat, cold, sound or moisture. A product superior to ordinary sheathing paper which is not moisture-proof, tarred saturated paper, etc. Saturated and coated; jet black and has a glossy finish. Waterproof and verminproof. When used for house lining, between double floors, etc., it saves fuel in winter and keeps out heat in summer. Used for residences, stores and industrial structures. Also used for refrigerator linings in dairies, refrigerators and icehouses and for packing cases, etc. 36 in. wide, put up in rolls containing, approximately, 500 sq. ft. Made in two weights: Medium, about 35 lb. per roll; Heavy, about 50 lb. per roll.

Certain-teed Sheathing Paper (Red Rosin Sized)

An inexpensive, non-waterproof sheathing paper used as a liner under clapboards, shingles, siding, etc. Put up in rolls 36 in. wide of approximately 500 sq. ft. in the following weights:

- No. 20 about 20 lb.; No. 25 about 25 lb.; No. 30 about 30 lb.;
- No. 35 about 35 lb.; No. 40 about 40 lb.

Certain-teed Deadening Felt

A thick felt for laying between double floors and in walls for insulating against sound, heat and cold. It is made in 50 yard rolls 36 in. wide in the following weights:

- No. 40, about 40 lb. to roll.
- No. 50, about 50 lb. to roll.
- No. 75, about 75 lb. to roll.

Certain-teed Asphalt Roof Coating

For re-saturating asphalt roofing (smooth surfaced). Renews the life of the roofing and, if applied at intervals of from three to five years, will preserve the roofing almost indefinitely.

For waterproofing exterior of basement walls. Cellar walls may be waterproofed by applying the coating on the outside of the walls below grade. The walls should be free from dirt or other foreign substance before applying.

THE RUBEROID CO.

Manufacturers of Genuine Ruberoid Weatherproofing Products

95 Madison Avenue
NEW YORK, N. Y.

CHICAGO, ILL.

BOSTON, MASS.

Products

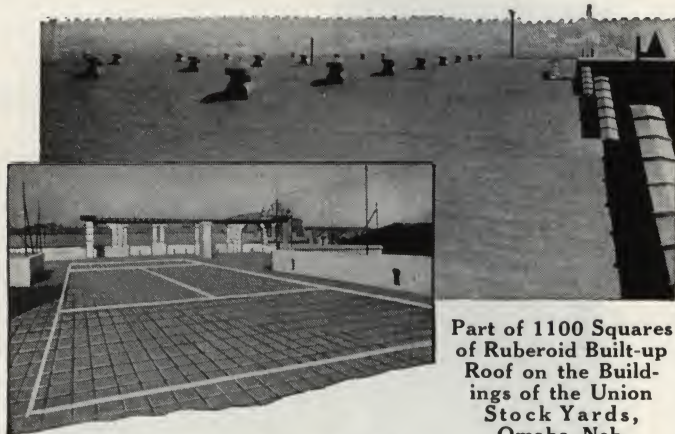
BUILT-UP ROOFING; ASBESTOS SLATES; ASPHALT SHINGLES (Massive Units and Massive Hex-strips, Standard Units, Standard Strips—Hexagonal, Octagonal and Square-tab); WATER-PROOFING COMPOUND.

Also, Roll-roofing (Smooth-surfaced and Mineralized); Building Paper; Felts.

Samples and descriptive literature of any Ruberoid product will be gladly sent upon request.

Genuine Ruberoid Built-up Roofing

A Ruberoid Built-up Roof consists of one layer of Ruberoid Asphalt Felt and two layers of Ruberoid Cap-sheet bonded together with Ruberoid Roofing Asphalt. Every part is made of time-tested materials.



Ruberoid Roof Showing Special Tile Finish

Part of 1100 Squares of Ruberoid Built-up Roof on the Buildings of the Union Stock Yards, Omaha, Neb.

Ruberoid Cap-sheet in itself is a mechanically perfect barrier against the ravages of the weather. The felt, saturant and coating are the same as those used in Ruberoid Roll-roofing which has stood the test of service for more than 30 years. The fact that the asphalt coating is applied by machine in our factories reduces the risk from human error or negligence in application, and permits the use of a tougher, denser and more durable asphalt than could possibly be handled on the job by labor.

The heavy weather coating of Ruberoid Cap-sheet makes it unnecessary to apply a special surfacing. If special finishes are desired, however, Ruberoid Built-up Roofs are adaptable to a wide range of treatments. They may be painted with green or red Ruberoid Roof-coating or finished with slag, gravel, tile, etc.

The bonding material, Ruberoid Roofing Asphalt, is 98.5% pure. It is practically smokeless and free from dirt. Roofers' kettles seldom need cleaning until the job is finished. It heats readily to mopping consistency but will stand unusually high temperatures without flashing or altering in composition.

Specifications—There are several specifications for Ruberoid Built-up Roofs—a quality roof to meet all requirements and every appropriation. *Send for a bound set for your files.*



TRADE-MARK

Ruberoid Asbestos Slates

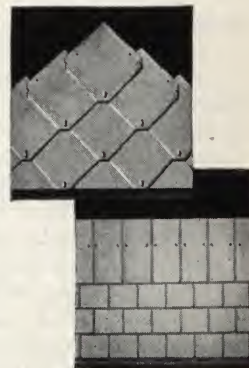
Ruberoid Asbestos Slates are made from ingredients long recognized for durability—*asbestos and cement*. They will not warp, crack or decay and are as fire-retardant as any materials known and used for roofing.

They may be obtained in two styles—the Hexagonal and the American.

The Hexagonal type is in two sizes: 16 by 16 and 12 by 12 in. and in colors of Apple-green, Venetian-red, Natural-gray and Blue-black.*

The American type is 8 by 16 in. and comes in the same colors as the 12 by 12 in. Hex—also Variegated-green, Variegated-brown and Mottled-brown.

*16 by 16-in. Hex does not come in Blue-black.



Ruberoid Asbestos Slates

Genuine Ruberoid Massive Unit and Massive Hex-strips

In Ruberoid Massive Unit Shingles or Massive Hex-strips, you have a choice of two substantial roof coverings. While widely different in design, they are identical in quality. Each is 40% thicker than the usual shingle of its type. Each can be secured in a variety of rich, non-fading colors and blends. The Hex-strips can also be had in 4-tones, packed pre-assorted, ready to apply.



Ruberoid Massive Hex-strips



Ruberoid Massive Units

Either of these extra-thick shingles give pronounced depth of shadow line—the roof massiveness you have heretofore looked for in asphalt shingles, but seldom found. In addition, the extra thickness assures greater protection and longer roof life. Due to labor-saving features, this finished roof costs no more than one laid with ordinary composition shingles.

Ruberoid Waterproofing Compound

Ruberoid Cement Waterproofing, when mixed with portland cement, makes leaky cellars or pits bone dry. Its use in stucco entirely eliminates "hair cracking." It differs from other waterproofing compounds in that it does not delay the set or reduce the strength of the mortar.

SAMUEL CABOT, INC.

Stained Shingles

141 Milk Street
BOSTON, MASS.

For Branch Offices and Agencies, see page B1614

Products

CABOT'S CREOSOTE-STAINED SHINGLES.

For Building Insulation, see pages A182-183; for Paints, Stains and Wood Preservatives, see pages B1614-1615.

Cabot's Creosote-stained Shingles

Description—Grade A, U. S. Dept. of Commerce Standard, red cedar shingles, ready-stained with Cabot's Creosote Shingle Stains.

Sound live wood; uniform thickness; straight grain; even butts; do not warp or curl. Thoroughly preserved by complete immersion in Cabot's Creosote. Sold in original bundles, as packed at the mill, guaranteeing full count.

The warmest, the most economical and the most picturesque house finish.

Standard Colors—*Weathering Browns, Light and Dark Bungalow Browns, Bark Brown, Warm Brown; Light and Dark Tile Reds, Maroons, etc.*—A complete range of these handsome and durable colors for roofs and walls.

Light, Dark and Medium Moss-Greens—Our moss greens have a richness and depth of color such as



Roof Stained with Cabot's Creosote Stains, Walls and Chimney with Cabot's Old Virginia White
CHARLES A. PLATT, Architect, New York

can only be produced by the strongest and purest pigments.

Weathered Grays—Our grays give the true natural seashore gray tones.

White Shingles—Cabot's Shingles are also furnished ready-stained with No. 1166 White Primer, to be finished after the shingles are laid, either with (1) a brush coat of No. 1166, (2) one or two brush coats of

Cabot's Old Virginia White or (3) one or two coats of Cabot's Double-White. See pages B1614-1615 for description of these materials.

Blended Roofs—Every variety of blended or variegated roof coloring easily produced in Cabot's Stained Shingles.

Samples

Samples of standard colors sent on request.

Deliveries

Prompt deliveries from staining plants in Boston, Chicago, Baltimore, Philadelphia, Omaha, Newark, New Rochelle, Dayton, Cleveland, Los Angeles, etc., and from warehouses at all central points.



Cabot's Creosote Stained Shingles

Sizes

24-in. "Royals," 18-in. "Perfections" and 16-in. "XXXXX," the highest grade shingles made, are used exclusively for Cabot's Creosote-stained Shingles.

"Royals" for walls, laid with 10 to 12-in. exposure, are much more artistic than dressed siding, much warmer and the cost is actually lower. "Perfections" and "XXXXX" are the standard regular sized shingles for walls and roofs.

COVERING CAPACITY OF CABOT'S CREOSOTED SHINGLES, SQUARE FEET PER SQUARE AT VARIOUS EXPOSURES—STANDARD GRADES—RANDOM WIDTHS

	Approx. weights per square, lb.	4-in. exp.	4½-in. exp.	5-in. exp.	5½-in. exp.	6-in. exp.	6½-in. exp.	7-in. exp.	7½-in. exp.	8-in. exp.	8½-in. exp.	9-in. exp.	10-in. exp.	11-in. exp.	12-in. exp.
1 square of 16 in. (4 bun. 20/20 pack)	160	80	90	100	110	120	130	140	150	...	...	...	...	...	...
1 square of 18 in. (4 bun. 18/18 pack)	180	...	...	...	100	109	120	129	138	148	157	...	...	...	...
1 square of 24 in. (3 bun. 14/14 pack)	167	...	...	...	...	...	...	...	75	80	85	90	100	110	120

Note: This table is based on 100 sq. ft. to each square. But Cabot's Shingles are all sold in the original bundles as packed at the shingle mills under the Official Grading and Packing Rules of the Shingle Manufacturers Association and the tables of the Red Cedar Shingle Bureau show that our square actually covers from 3% to 8% more than our table claims.

THE CONSOLIDATED SHINGLE MILLS OF BRITISH COLUMBIA, LTD.

Manufacturers of Red Cedar Shingles

VANCOUVER, B. C.

Edgwood Shingles

Made from western red cedar, grown in British Columbia, where red cedar attains its greatest degree of perfection owing to soil, drainage and climatic conditions.

Manufactured only by certain British Columbia mills which have inaugurated a rigid inspection service. This inspection ensures that every Edgwood Shingle is cut edge-grain and positively will not warp, cup or curl. This is the essential difference between Edgwood Shingles and the ordinary red cedar shingles which are cut slash-grain from inferior timber. The Edgwood trademark is a guarantee of a red cedar shingle that is as near perfect as it is humanly possible to make it—it is cut edge-grain, free from knots, shakes and sap.

They may be had natural or stained.

Methods of Application

Edgwood Shingles are made in three lengths—16, 18 and 24 in. 16-in. shingles are generally laid $4\frac{1}{2}$ to 5 in. to the weather; 18-in. are laid $5\frac{1}{2}$ in. to the weather; and 24-in. are laid $7\frac{1}{2}$ in. to the weather.

Roof boards (1x3 or 1x4 in.) spaced $4\frac{1}{2}$ to $7\frac{1}{2}$ in. center to center, depending on weather exposure of shingles. Tight sheathing adds warmth to the roof.

If shingles are not to be stained, wet thoroughly with water before applying. Starting at eaves, lay first course two-ply, allowing $1\frac{1}{2}$ -in. projection over crown mould and 1-in. projection at gables. The 16-in. shingles that measure 5 butts to 2 in. or thicker should be laid not to exceed 5 in. to the weather. The 18-in. shingles should be laid not to exceed $5\frac{1}{2}$ in. to the weather. The 24-in. shingles should be laid not to exceed $7\frac{1}{2}$ in. to the weather. All shingles should be side-spaced at least $\frac{1}{8}$ in. apart, seeing that no break comes directly over another on any three consecutive courses. This covers all nails and is extremely essential for a serviceable roof.

Nails

Nail roof boards with 8d nails.

Do not use anything but zinc-clad, pure zinc or copper nails. The ordinary steel wire shingle nail has an average life of seven to twelve years. Edgwood Shingles should last forty years, or more. Use nails that will not rust—that will last as long as the shingles.

Re-roofing Over Old Roofs and Re-finishing Sidewalls

It is unnecessary to remove old roofs or sidewalls in order to apply Edgwood Shingle roofs and side walls. It is much cheaper, saves much litter and annoyance, simply to apply Edgwood Shingle roofs and sidewalls over the old roofs and sidewalls. Send for working details.

Cracked, discolored and unsightly old stucco sidewalls are just as easily refinished with Edgwood Shingles as with top boards and siding. Send for working details.



Durability

Edgwood Shingles on roofs or sidewalls should last forty years, or more. Red cedar is endowed by nature with time-resisting qualities which make it impervious to decay.

Economy

Edgwood Shingle roof and sidewall economy is twofold: it consists not only of the first-cost saving—the original cost being considerably lower to cover exterior surfaces—but, owing to its remarkable durability, its economy, based on the life of the structure, is still more striking.

Insulation

Heating engineers have made tests which prove that Edgwood Shingles have greater insulating qualities than many other exterior roof or sidewall materials. Detailed information supplied on request.

Beauty

The broken lines and overlapping butts of Edgwood Shingles on roofs and sidewalls give high-lights and shadows that result in a rhythm of scale and texture which is impossible of attainment in most other building materials. They may be applied in various patterns by variation of exposures. They may be applied in their natural state, or stained to harmonize beautifully with lawns and foliage.

Ease of Alterations and Additions

Buildings protected with Edgwood Shingle roofs and sidewalls may be altered or enlarged as circumstances require, with a minimum of labor. Such alterations do not leave a "patchy" appearance and, if made with ordinary care, defy detection.

Specifications for Roofs and Side Walls

Roof Shingles—All roof surfaces shall be covered with Edgwood Shingles, as manufactured by THE CONSOLIDATED SHINGLE MILLS OF BRITISH COLUMBIA, LTD., each bundle to bear the Edgwood quality mark. (Here insert length and thickness of shingles.) Roof shingles shall be laid with well broken joints, in. weather exposure.

Sidewalls—All sidewall surfaces shall be covered with Edgwood Shingles, as manufactured by THE CONSOLIDATED SHINGLE MILLS OF BRITISH COLUMBIA, LTD., and each bundle of shingles shall bear the Edgwood quality mark. (Here specify length and thickness of shingles.) Sidewall shingles shall be laid with well broken joints and shall have in. exposure to the weather.

Nails—Shingles shall be nailed with (here specify type of nails required). Each shingle shall be nailed with at least two nails, well covered by the next course.

Note: Always specify zinc-coated, pure zinc or copper nails.

Service to Architects

THE CONSOLIDATED SHINGLE MILLS OF BRITISH COLUMBIA, LTD., are prepared to supply architects with complete and specific information. Samples of Edgwood Shingles and technical literature, on application.

CREO-DIPT COMPANY, INC.

STANDARD STAINED SHINGLE COMPANY

Manufacturers of Stained Shingles

GENERAL OFFICES

NORTH TONAWANDA, N. Y.

FACTORIES

NORTH TONAWANDA, N. Y.

MINNEAPOLIS, MINN.

KANSAS CITY, MO.

VANCOUVER, B. C.

SALES OFFICES IN PRINCIPAL CITIES

CANADA: CREO-DIPT COMPANY, LTD., General Office, TORONTO, ONT.

Products

Originators and sole manufacturers of genuine CREO-DIPT STAINED SHINGLES for roofs and sidewalls.

CREO-DIPT THATCH STAINED SHINGLES to produce the thatched effect.

CREO-DIPT BRUSHCOAT SHINGLE STAINS.

CREO-DIPT DIXIE WHITE STAIN.

CREO-DIPT PRESERVING OIL.

Leading Lumber Dealers Everywhere Carry Stock

Creo-Dipt Stained Shingles are carried in stock by lumber dealers in all parts of the United States and Canada. Shipments are made from our plants at North Tonawanda, N. Y., Minneapolis, Minn., Kansas City, Mo., and Vancouver, B. C.

Co-operative Service

A Service Department is maintained to co-operate with architects, contractors and home builders. We go over plans carefully, criticizing them if requested and offering suggestions giving approximate quantity of Creo-Dipt Stained Shingles required for the thatch effect and other unusual roof treatments. There is a trained Creo-Dipt salesman in every locality, who will welcome the opportunity to serve you.

Superiority of Creo-Dipt Stained Shingles

Genuine Creo-Dipt Stained Shingles are made only from selected cedar with the grain of the wood running 100% straight from top to bottom of each shingle. This means that they will lay flat and will not split. They come stained, bundled, and ready

CREO-DIPT

TRADE-MARK
(Reg. U. S. Pat. Off.)

to lay in grades 16, 18 and 24-in. long.

Genuine Creo-Dipts are preserved by the exclusive Creo-Dipt process, which protects them against rot and covers the entire shingle surface with a thorough coating of color and creosotive oils.

Creo-Dipt Stain is made from the strongest pigments ground to the finest possible condition in linseed oil in our own mills. Excepting Dixie White, Creo-Dipt Shingles do not require brushcoating after they are on the building. (See the paragraph on Dixie White.)

Stain for Retouching, Patching and Cutting

With every order of Creo-Dipt Shingles, a small can of Creo-Dipt Stain is shipped for retouching the shingles which have to be trimmed or cut to fit flashing, valleys and other conditions.

Sizes and Styles of Creo-Dipt Stained Shingles

Note: In specifying, give the name indicating the thickness in addition to the length of the shingles.

Thatched Effect—Special Creo-Dipt Stained Shingles are furnished for thatch roofs ready for application. Complete instructions and details will be supplied to architects and builders.

Graduated Exposure—The best effect is secured by starting at the eaves with the large Creo-Dipt Aristocrat at wide exposure, working through thinner grades at decreasing exposures up to the ridge.

Graduated Color Treatment—Unusual artistic results can be obtained by using several shades of the same color starting with the darkest shade at the eaves, working to the lightest shade at the ridge.



Flat Grain

Vertical Grain



Flat Grain Shingle
After a few years' service it curls, splits and rots



100% Vertical Grain Shingles
Sound and free from imperfections, they will not rot, split nor curl

Comparison of Flat Grain and Vertical Grain Shingles

Variegated Effects—Creo-Dipt Shingles can be furnished packed promiscuously in each bundle in any proportion of the various shades which you select.

Dixie White—Creo-Dipt Dixie White is a soft velvety white shingle stain. Two brushcoats give the desired Colonial White effect to the Creo-Dipt Stained Shingles after they are laid—the shingles having been creosoted and stained at our factories with a special preparation, color No. 207, which acts as a filler, primer, binder and preservative. Special samples on request.

Creo-Dipt Aristocrats—24 inches long; random widths; 1 inch in thickness at the thick end.

Creo-Dipt Pilgrims—(Hand split) 22 to 24 inches long; random widths; $\frac{1}{2}$ to $1\frac{1}{4}$ inches in thickness at the thick end.

Creo-Dipt Ambassadors—(Shakes) 24 inches long; random widths; $\frac{1}{2}$ inch thick; corrugated face to give effect of old hand-split shingles.

Creo-Dipt Royals—24 inches long; random widths; $\frac{1}{2}$ inch in thickness at the thick end.

Creo-Dipt Perfections—18 inches long; random widths; 5 shingles will measure $2\frac{1}{4}$ inches in thickness at the thick end.

Creo-Dipt Eurekas—18 inches long; random widths; 5 shingles will measure 2 inches in thickness at the thick end.

Creo-Dipt XXXXX—16 inches long; random widths; 5 shingles will measure 2 inches in thickness at the thick end.

Creo-Dipt XXX—16 inches long; random widths; 6 shingles will measure 2 inches in thickness at the thick end.

Covering Capacity of Creo-Dipt Stained Shingles

All shingles are sold on the basis of the square (100 square feet).

The table below gives the covering capacity of a square of shingles at various exposures:

Name	Length in.	Exposure to the weather, inches									
		5	5½	6	6½	7	7½	8	10	10½	11
Aristocrats*	24	...	...	...	...	...	75	...	100	105	110
Pilgrims*		...	...	...	...	70	75	...	100	105	110
Ambassadors*		...	...	...	...	...	75	...	100	105	110
Royals*		...	...	...	...	...	75	...	100	105	110
Perfections	18	...	100	111	120	129	138	148	...	...	...
Eureka		...	100	111	120	129	138	148	...	...	...
XXXXX	16	100	110	120	130	140	...	...	...	...	...
XXX		100	110	120	130	140	...	...	...	...	...

*These shingles usually laid 10 inches to the weather on sidewalls and 7 or 7½ inches on roofs. Pilgrims, being hand-split, require a water-tight sub-roof.

Shades

Creo-Dipt Stained Shingles are manufactured in any color or combination of colors. A color pad, showing a wide choice of shades, will be sent on request. We will make special shades or submit samples without charge.



Creo-Dipt Color Pad

Do Not Be Mis-led

Do not be mis-led into thinking that any stained shingles are Creo-Dipt. The trade-mark, "CREO-DIPT" on every bundle protects you and your client. The quality of Creo-Dipt Shingles has no substitute. Be sure to get real Creo-Dipt.



Home at Scarsdale, N. Y.

Designed by W. STANWOOD PHILLIPS, New York, N. Y.
Showing how the true Thatched Roof effect is obtained with Creo-Dipt stained shingles



Home at Riverside, N. Y.

DWIGHT J. BAUM, Architect, Riverdale-on-Hudson, N. Y.
24-inch Creo-Dipt stained shingles used on sidewalls for wide shingle exposure. Color, Dixie White for true Colonial white effect. 16-inch 5X Creo-Dipt stained shingles used on roof. Color, moss green

WEATHERBEST STAINED SHINGLE COMPANY, INC.

Manufacturers of Red Cedar Hand Dipped Stained Shingles

NORTH TONAWANDA, N. Y.

FACTORIES: NORTH TONAWANDA, N. Y. AND ST. PAUL, MINN.

Products

WEATHERBEST EDGE GRAIN RED CEDAR STAINED SHINGLES for roofs and sidewalls; WEATHERBEST 24-IN. COLONIAL WHITE STAINED SHINGLES; WEATHERBEST THATCHED EFFECT STAINED SHINGLES; WEATHERBEST "DOUBL-THIK" STAINED SHINGLES; WEATHERBEST GENUINE HAND RIVED SHAKES.



Used on Roofs and Sidewalls

WEATHERBEST stained shingles are used on sidewalls as well as roofs and are adaptable to practically every type and style of building—from the small cottage or bungalow to the stately country home. The soft, semi-transparent colors add much to the attractiveness of a home. WEATHERBEST stain emphasizes the grain in the wood just enough so that the flat tone of a painted surface is absent. WEATHERBEST stained shingle sidewalls cost 30% to 50% less than walls of bevel or Colonial siding and will last fully as long. A WEATHERBEST stained shingle roof laid with zinc coated nails will give perfect service for over 50 years.

Reliability

WEATHERBEST stained shingles and stain have been on the market for the past 16 years and can be thoroughly relied upon to give entire satisfaction. Each bundle of WEATHERBEST stained shingles carries the green WEATHERBEST label and is our guarantee of perfect material and lasting colors.

Quality of Weatherbest Shingles

Only the finest grade of all clear, strictly 100% edge (vertical) grain, red cedar is used in the manufacture of WEATHERBEST stained shingles. Every shingle is perfect from tip to butt. Extreme care is exercised that all shingles are entirely free from any trace of dampness before being subjected to the WEATHERBEST process of staining.

Quality of Weatherbest Stain

WEATHERBEST stain consists of the strongest color pigments obtainable, high grade wood creosote preservatives and pure linseed oil as binder. These ingredients are mixed in our factories by our color and oil experts in the correct proportion to insure colors that are rich and soft in tone, and, above all—durable.

Weatherbest Staining Process

All shingles are unbundled at our factories and stained separately—not bundle-dipped as is the case with many other stained shingles. The WEATHERBEST process treats each shingle so thoroughly and perfectly that additional brush coating after they are laid is unnecessary. After staining, the shingles are dried and rebundled ready to lay.

Always Lie Flat

Because they are 100% edge (vertical) grain and because of the WEATHERBEST preserving solution, WEATHERBEST stained shingles always lie flat. They will not check, crack or curl during their many years of service. The edge grain is also, to a large degree, responsible for the exceptionally long life of WEATHERBEST colors, as edge grain allows the color pigments to enter deep into the pores of the wood.

Weatherbest Variegated Color Roofs

WEATHERBEST stained shingles in several shades of one color, or different colors, may be used on roofs with decidedly pleasing results. For this purpose, there are standard WEATHERBEST variegated color schemes in browns, greens, reds, grays, etc.,

worked out to just the correct proportion of colors. No extra labor is required to lay as the different colored shingles are mixed and then re-bundled at our factories so that the carpenter lays them as received. Ask for panels in miniature showing variegated color schemes.

Sizes, Colors and Covering Capacity

WEATHERBEST stained shingles are furnished in following sizes:

12 in. WEATHERBEST	XXXXX	5 butts to 2 in.
16 in. WEATHERBEST	XXXXX	5 butts to 2 in.
16 in. WEATHERBEST	XXX	6 butts to 2 in.
16 in. WEATHERBEST	"Doubl-Thik"	5 butts to 3½ in.
18 in. WEATHERBEST	Eurekas	5 butts to 2 in.
18 in. WEATHERBEST	Perfections	5 butts to 2½ in.
24 in. WEATHERBEST	No. 1 Royals	½ in. butts
24 in. WEATHERBEST	"Doubl-Thik" No. 1 Royals	1-in. butts

The standard WEATHERBEST colors consist of 20 different shades of greens, browns, reds and grays. WEATHERBEST stained shingles are also furnished in a color combination similar to weathered straw for WEATHERBEST thatched effect roofs, and in many variegated color schemes. Special colors are also furnished without extra charge. Color samples on request.

NUMBER OF SQUARE FEET A SQUARE OF WEATHERBEST STAINED SHINGLES WILL COVER WHEN LAID AT VARIOUS EXPOSURES

Size of shingles, inches	Exposure to the weather, inches									
	4½	5	5½	6	6½	7	7½	8	10	11½
12	84	92	100	100	100	100	100	100	100	100
16	90	100	110	121	131	141	151	161	171	181
18	100	110	120	130	140	150	160	170	180	190
24	100	110	120	130	140	150	160	170	180	190



Residence of Architect Joseph Norman Hettel, Merchantville, N. J.

Designed by LACKEY & HETTEL, Camden, N. J.
Roof: 16-in. Green WEATHERBEST Stained Shingles. Walls: 24-in. WEATHERBEST in Colonial White

Weatherbest Genuine Hand Rived Shakes

To those desiring the beauty of the oldtime shakes, or hand split shingles, we recommend WEATHERBEST Genuine Hand Rived Shakes (U. S. Patent, March 23, 1926). These shakes come in two sizes. The 24-in. length shakes are resawn one side to provide the taper. The 37-in. length shakes are tapered and show the hand rived surface on both sides. Either size is adaptable to roof or sidewall and is furnished in any color desired.

Write for illustrated literature giving full descriptions of WEATHERBEST Genuine Hand Rived Shakes and color suggestions. Full size samples will gladly be sent on request.

24-in. Weatherbest Colonial White Shingles

The large 24-in. heavy butt, WEATHERBEST Colonial white stained shingles are used extensively on sidewalls for the wide course effect. The wide exposures possible (10 in. and 11½ in.), and the pure, non-glaring white of WEATHERBEST Colonial white stain combine to make a sidewall that is far more attractive than the monotonous white of a painted clapboard siding. WEATHERBEST Colonial white stained shingles are first treated at our factories with a filler coat of our No. 500 white preserving stain. After they are laid on the sidewalls, the shingles should then receive two light brush coats of WEATHERBEST Colonial white stain to produce the true whitewashed effect.

Weatherbest Standard Specifications

To guard against substitution of inferior material, we advise incorporating the following in specifications:

Shingles: To be (insert size and color) WEATHERBEST, all clear, all edge grain stained shingles, as manufactured by WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y., and St. Paul, Minn.

Weatherbest Thatched Straw Effect Roofs

Combining attractiveness with long life, a WEATHERBEST thatched effect stained shingle roof offers the means of a radical but artistic departure from the conventional sharp angle roof.

WEATHERBEST thatched stained shingles are furnished ready for application. They come bent with the grain (lengthwise) to a 20-in. radius for the rounded surface of hips and valleys and for capping the ridges; bent with the grain to a 10-in. radius for the curves or roll at rakes; bent to a 20-in. radius against the grain (crosswise) for the curve at eaves and rounding of ridges, and flat for the flat surfaces of the roofs. On all WEATHERBEST thatched stained shingles except for the double first course at eaves, butts are specially sawn so that when laid, irregular, wavy courses will result.

Weathered Straw Color

Colored in three shades of weathered straw with an occasional spot of dull red and brownish green, the WEATHERBEST color scheme is a true reproduction of weathered straw. The different colored shingles come properly mixed and are laid as received. WEATHERBEST thatched stained shingles are also furnished in other color combinations if desired. One very pleasing color treatment is the WEATHERBEST method of graduating colors so that a roof may be green at eaves and gradually shade into a brown at ridges.

Thatched Effect Instruction Book and Service

Full information for constructing a WEATHERBEST thatched effect stained shingle roof is given in our book, "The Construction of WEATHERBEST Thatch Roofs," which is furnished on request. This book is complete in

every respect, showing actual photographs of WEATHERBEST thatched effect roofs, working drawings showing rafter construction, furring, blocking, and method of laying shingles to secure the true thatched effect.

When thatched effect roofs are specified we ask that a set of plans be sent to us in order that we may estimate the quantities required of the different shingles.

Standard Specifications for a Thatched Effect Roof

The following specifications are standard for a WEATHERBEST thatched effect roof and should form part of the general specifications when this type roof is planned. Adherence to these specifications will insure complete satisfaction in finished roof by avoiding substitution of improperly bent, inferior flat grain shingles.

Special Rafter Construction—All rafter construction at ridges, rakes or gable ends, hips, valleys and eaves is to be in accordance with the instructions and detail drawings appearing in the book, "Construction of WEATHERBEST Thatch Roofs," furnished on request by the WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y.

Furring of Rafters—(While desirable to accentuate the convex appearance of the roof, it is not entirely essential and may be omitted.) Main rafters to be furred to a height of 5 to 6 in. midway between eaves and ridges, diminishing to nothing at eaves and ridges where it merges with curves. Ridge board to be furred to height of 5 or 6 in. at center of roof diminishing to nothing at apex of gables.

Shingle Lath—Rafters at eaves and ridges and blocking at valleys, hips, rakes or gable ends to be covered with 1x2-in. shingle lath, spaced 1 in. apart, running parallel with rafters at rakes or gable ends, hips and valleys and at right angles to rafters at eaves and ridges.

Roof Shingles—All roof surfaces shall be covered with WEATHERBEST thatch stained shingles as manufactured and supplied by the WEATHERBEST STAINED SHINGLE COMPANY, INC., of North Tonawanda, N. Y., and St. Paul, Minn.

At eaves lay one double course of square butt WEATHERBEST stained shingles bent against the grain. Cover the curve at eaves with WEATHERBEST thatch stained shingles bent against the grain. Flat WEATHERBEST thatch stained shingles are to be used on all flat surfaces of roof and those bent with the grain to a radius conforming with curve for hips and valleys. Cover roll at rakes or gable ends with WEATHERBEST thatch stained shingles bent with the grain to a 10-in. radius. Cover curve of roof on each side of ridge board with WEATHERBEST thatch stained shingles bent against the grain, capping the ridge with those bent with the grain to a 20-in. radius.

Exposure of Shingles—Lay all shingles in irregular, wavy courses following procedure given in WEATHERBEST instruction book. Exposure to be from 1 to 3 in. (average 2 in.) on curve at eaves and 1 to 5 in. (average 3 in.) on all other sections of roof.

Nailing—Nail all shingles bent against the grain (at eaves and ridges) with 6d zinc coated nails, nailing 3 in. from the butt. Shingles on all other portions of the roof to be nailed with 3½d zinc coated nails in regular manner.

Color of Shingles—Color of shingles to be WEATHERBEST weathered straw. (If other color scheme is desired change to color number shown in our samples, or "to match.....")



Weatherbest Thatched Straw Effect Roof, Residence of A. G. Sharp, Ottawa Drive, Youngstown, Ohio

M. M. MILEY and LEO CROELL, Architects
Color: Dark Straw

THE EDHAM COMPANY, INC.

Sole Manufacturers of Edham Kolored Shingles

GENERAL OFFICE

MINNESOTA TRANSFER, ST. PAUL, MINN.

MILL: VANCOUVER, B. C.

FACTORIES: MINNESOTA TRANSFER, ST. PAUL, MINN., TORONTO, ONT., and VANCOUVER, B. C.

SALES OFFICES IN ALL PRINCIPAL CITIES

Products

Sole manufacturers of EDHAM KOLORED SHINGLES for roof and sidewall covering, made in 31 colors, in addition to any variegated or mixed color effect. Special colors to order, as specified.

EDHAM KOLORED THATCH SHINGLES, to produce thatched effect.

Edham Kolored Shingles

They are manufactured from red cedar, which wood contains a natural preservative, and attains its greatest degree of perfection in the forests of the Canadian Province of British Columbia, owing to soil properties, rain fall and drainage peculiar to that region. Edham Kolored Shingles are cut from these forests and manufactured in one of British Columbia's most modern mills, located in Vancouver, B. C. They are 100% clear and edge grain—they cannot warp, cup or curl.

Following their manufacture they are placed in slow drying kilns that remove all excess moisture and make them receptive to color and oil without affecting the strength or lasting qualities of the wood. They are then distributed to our staining operations, where their treatment is completed.

A roof is no stronger than its weakest shingle. The illustrations we use here show the difference between the edge grain shingle and the flat grain shingle.

**Edham
KOLOR
Shingles**



The stain used in the treatment of Edham Kolored Shingles is manufactured from the raw color to the finished product in our own mills. The color used is made, in all cases, from 100% pure earth pigments ground with linseed oil in stone mills until they are of liquid smoothness. The pigments are then mixed in a vehicle of linseed oil containing sufficient creosote and other oils to insure maximum penetration.

The process of treatment adopted is what is referred to as the *hand dipping* process—the bundles, after the shingles have been thoroughly dried and are free from moisture, are broken open and each shingle treated separately and individually. Then, after the color has dried and thoroughly set, the shingles are repacked into bundles, tagged and piled on trucks ready for loading. This treatment insures unusually permanent colors which will not rub off, check or peel.

Edham Kolored Shingles have demonstrated that they will last two or three times as long as shingles that have been brush coated, painted or treated in any other manner on the job where they have first been exposed to the weather and dampness.

Samples submitted without charge. Color pads and miniature panels showing the different variegated effects obtainable will be sent to architects upon request.



A Flat Grain Shingle—It Will Warp

Note the uneven grain of the wood, which indicates uneven stresses and strains that will cause warping, cupping and curling



Edham Kolored Edge-grain Shingles Will Not Warp

Note the parallel and vertical grain of this Edham Edge-grain shingle. It positively cannot warp, cup or curl

Edham Kolored Variegated Effects—The variegated effects are obtained by using two or more shades of Edham Kolored Shingles. The shingles are packed promiscuously in the bundles ready for the workmen to lay. Many artistic effects are thus achieved which would be impossible to secure in any other way.

They Save Labor—A considerable saving in labor can be effected by the use of Edham Kolored Shingles, as compared with shingles stained on the job. The bundles, in both straight colors and in variegations of two or more shades, are packed ready to lay, and can be carried in pack to any position required, in this way greatly reducing the cost of handling.

They save the labor of dipping and of additional brush-coating which is often necessary for shingles stained under other conditions.

Adaptable to Many Styles of Architecture—Architects know that the beauty of a house is largely dependent upon certain essentials of good design—rhythm and repose; proportion and scale; texture and color. One architect summed up the possibilities of Edham Kolored Shingles in this respect, in the following manner:

"The great variety of color schemes possible with Edham Kolored Shingles, combined with the harmonious blending of each shingle and surface in general give, on wall or roof, life and interest and the essentially distinctive color values."

Sizes and Covering Capacity—Edham Kolored Shingles are procurable in every grade, thickness and length manufactured. Standard grades and colors are carried in lumber yards in most cities.

Where we have no local representative, we will be glad to arrange for delivery of material upon request from architect.

Sizes—*Edham Kolored Supremes*—24 in. long; random widths; 1 in. thick at the butt.

Edham Kolored Process Shakes—24 in. long;

random widths; $\frac{9}{16}$ and 1 in. thick at the butt. Sawn to produce the hand split effect.

Edham Kolored Royals—24 in. long; random widths; $\frac{1}{2}$ in. thick at the butt.

Edham Kolored Perfections—18 in. long; random widths; 5 shingles will measure $2\frac{1}{4}$ in. at butt.

Edham Kolored Eureka's—18 in. long; random widths; 5 shingles will measure 2 in. at butt.

Edham Kolored XXXXX—Clears—16 in. long; random widths; 5 shingles will measure 2 in. at the butt.

Edham Kolored XXX—Clears—16 in. long; random widths; 6 shingles will measure 2 in. at butt.

Edham Kolored Thatch Shingles—16 in. long; random widths; 5 shingles will measure 2 in. at the butt; sawn in patterns to specifications.

Covering Capacity—All shingles are sold on the basis of the square (100 sq. ft.). The table following gives the covering capacities in square feet of the square of shingles on various exposures:

Name	Length, in.	*Exposure to weather, in.									
		5	5½	6	6½	7	7½	8	10	10½	11
Supremes Royals Process Shakes	24	...	...	...	...	...	75	...	100	105	110
Perfections Eureka's	18	...	100	111	120	129	138	148	...	...	...
XXXXX Clears XXX Clears	16	100	110	120	130	140	...	...	...	...	...

*In choosing amount of exposure, due consideration should be given to location, i.e., steep roofs, rather flat roofs, side walls, etc.

24-in. Supremes, 5 $\frac{8}{16}$ course bundles constitute one square.

24-in. Shingles, 3 $\frac{13}{14}$ course bundles constitute one square.

18-in. Shingles, 4 $\frac{18}{18}$ course bundles constitute one square.

16-in. Shingles, 4 $\frac{20}{20}$ course bundles constitute one square.

Edham Kolored 24-in. Shingles for Sidewalls

Many architects have specified the Edham Kolored 24-in. Shingles for sidewalls, during the past year. They desire to give the effect of the old-fashioned shingle of Colonial days, and these shingles are especially



Thatch Roof of Edham Kolored Shingles

applicable to the Colonial style of architecture. Shingles are generally laid 10 in. to the weather on sidewalls and $7\frac{1}{2}$ in. on the roof.

Prompt Shipment

Edham Kolored Shingles are shipped promptly to all parts of the United States and Canada, from our factories at Minnesota Transfer, St. Paul, Minn., Toronto, Ont., and Vancouver, B. C.

Architectural Service

We are always glad to send architects, on request, specific information, samples and special literature. Edham Kolored Shingles are nationally advertised for the purpose of creating consumer acceptance. All Edham Kolored Shingle advertising recommends that the homebuilder employ the services of an architect.

Specifications for Roofs and Sidewalls

Shingles—All roof and sidewall surfaces shall be covered with Edham Kolored Shingles (here specify grade and color), as manufactured by THE EDHAM COMPANY, INC., Minnesota Transfer, St. Paul, Minn., and bearing the Edham Kolored red tag and Edham Kolored band-stick. Shingles shall be laid with well broken joints with....in. exposures to weather.

Nails—Shingles shall be nailed with (here specify type of nails required); each shingle shall be nailed with at least two nails under cover of the following course.

Note: We recommend zinc-clad, pure zinc or copper nails.

Standard Specifications for Edham Kolored Shingles Laid Irregularly for Thatch Effects

Shingles—All roof surfaces to be covered with Edham Kolored bent or straight shingles manufactured by THE EDHAM COMPANY, INC., of Minnesota Transfer, St. Paul, Minn., in the following grades and colors (here clearly specify grades and colors required).

Preparation of Roof—All surfaces and angles of the roof timbers, including eaves, gables, hips and ridges, valleys, etc., to be furred and blocked or shaped to present rounded, cambered or hollowed surfaces, to carry out the intention of the drawings, and to produce the thatch effect in the finished roofs.

Nails—All shingles to be nailed with (specify hot-dip zinc-clad, pure copper or zinc nails), using the 3d ordinary $1\frac{1}{4}$ -in. nail for bent shingles, and 3d fine for flat surfaces, and an occasional 6d nail at quick bends.

Note: On high class work, the architect is recommended to specify copper nails; and in specifications for sheet metal work, is urged to specify copper flashings and eaves troughs, etc.

Working Specifications—The standard working specifications or recommendations and the standard illustrative details of THE EDHAM COMPANY, INC., are to be read as a part of this specification.

(Copies of the standard working specifications

for Edham Kolored Thatch Roofs may be had on request to THE EDHAM COMPANY, INC., Minnesota Transfer, St. Paul, Minn.)



Red Cedar Attains This Marvelous Degree of Perfection in British Columbia As a Result of Soil Properties, Rainfall and Drainage

We own and operate our own mills in British Columbia



Edham Shingled Home of W. W. Gretchell, 4506 Woodale Avenue, Minneapolis, Minn.
KENNETH B. WORTHEN, St. Paul, Minn., Architect



Edham Shingled Home Designed and Constructed by Art Kenyon, Elgin, Ill.

THE PHILIP CAREY COMPANY

Manufacturers of Careystone Asbestos-Cement Shingles and Sheathing

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND OHIO, AND PLYMOUTH MEETING, PA.

Products

CAREYSTONE ASBESTOS-CEMENT SHINGLES.

CAREYSTONE ASBESTOS-CEMENT SHEATHING.

CAREYSTONE ASBESTOS-CEMENT WALL BOARD.

CAREYSTONE CORRUGATED ASBESTOS-CEMENT ROOFING and SIDING.

For Waterproofing and Dampproofing Materials, see pages A56-57; for Pipe Coverings, see pages A210-211; for Built-up Roofing, see pages A400-403; for Asphalt Shingles, see page A421; for Flooring, see page B1537.

Careystone Asbestos-Cement Products

Careystone Asbestos-Cement Building Materials, made of asbestos and special portland cement—two of the most durable fire-resistant materials known—are vermin-proof, dampproof, dustproof and fireproof. They will not rot or rust. They are manufactured in a new million dollar plant, recently added to the Carey manufacturing resources at Lockland, Cincinnati, Ohio. The guaranteed quality of these asbestos products is backed by the Carey reputation—a reputation based on over fifty years of service to the building trades.

Careystone Asbestos-Cement Shingles

Furnished in a variety of shapes for application by the French or American method.

For the French method, two shapes are available, with two sizes for each shape—16x16 in. and 12x12 in.

For application by the straight, or American method, four shapes are available with two sizes for each shape—8x16 in. and 6x12 in., or 16x16 in., and 12x12 in.

Colors—Careystone Asbestos-Cement Shingles, in all shapes and sizes, are available in six colors—brown, pottery red, blue-black, slate gray, purple and green.

Advantages—Careystone Asbestos-Cement Shingles can be laid over old wooden shingles as easily as on new roof construction. They will outlive the building itself, for they actually grow stronger with age. They are fire-

Careystone
ASBESTOS-CEMENT
PRODUCTS
TRADE-MARK

proof, weatherproof, and require no painting. They are light enough to need no special supporting construction. And the variety of shapes, sizes and colors give the architect an unlimited field for designing a roof to meet individual tastes.

Rating—When laid French method, Careystone Asbestos-Cement Shingles take a Class "B" rating of the Underwriters' Laboratories, Inc. With the American method, they take a Class "A" rating.

Asbestos-Cement Sheathing

Careystone Asbestos-Cement Sheathing can be sawed, joined and fitted very easily by any ordinary mechanic, no special knowledge or skill being required to get excellent results. It is fireproof, tough and practically indestructible. And it is sufficiently elastic to permit expansion and vibration without breaking or cracking. It can be grained, veneered or painted to a beautiful finish, making it particularly desirable for interior as well as exterior use. It is supplied in the natural color of slate gray in thicknesses of from $\frac{1}{8}$ to 1 in. Standard sizes are: 42x48 in., 42x96 in., 48x48 in., 48x96 in.

Asbestos-Cement Wall Board

The fireproof composition of Careystone Asbestos-Cement Wall Board makes it an ideal material for lining and fireproofing all classes of buildings. The only tools needed for its application are an ordinary hammer and saw. The material cuts and nails like ordinary lumber. It can be washed, scrubbed and cleaned with ease, and can be painted, grained or stained to represent natural wood.

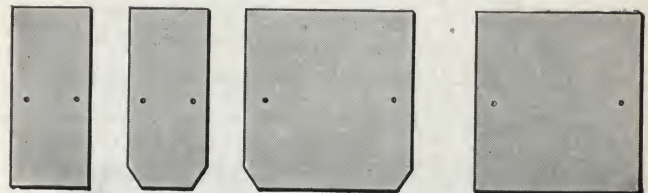
Made in two standard sizes, each with a standard thickness of $\frac{3}{16}$ in., as follows: 48x48 in.; 48x96 in.

Application Manual and Reference Book

Our new Application Manual and Reference Book contains complete information about the Carey line of Asbestos Building Materials. A copy will be sent on request.



French Method Are Furnished in These Two Shapes



American Method Are Furnished in These Four Shapes

Careystone Asbestos-Cement Shingles

ASBESTOS SHINGLE, SLATE & SHEATHING CO.

MAIN OFFICE

AMBLER, PA.

FACTORIES: AMBLER, PA. and ST. LOUIS, MO.

BRANCH OFFICES

BOSTON, MASS.	CHICAGO, ILL.	DETROIT, MICH.	MILWAUKEE, WIS.	NEW YORK, N. Y.	PHILADELPHIA, PA.
BUFFALO, N. Y.	CLEVELAND, OHIO	HAVANA, CUBA	MINNEAPOLIS, MINN.	OMAHA, NEB.	PITTSBURGH, PA.
	WASHINGTON, D. C.		WILKES-BARRE, PA.		
SOUTHWESTERN DISTRIBUTER: R. V. AYCOCK Co., Kansas City, Kan.; Tulsa, Okla.; Houston, Tex.			WESTERN DISTRIBUTER: FARRINGTON ENGINEERING Co., Los Angeles, Calif.		
SOUTHERN DISTRIBUTERS: DIXIE ASBESTOS Co., Birmingham, Ala.; BERRY ASBESTOS Co., Atlanta, Ga.			PACIFIC COAST DISTRIBUTER: H. G. SPERRY Co., Seattle, Wash.; Salt Lake City, Utah		

Products

AMBLER ASBESTOS SHINGLES for roofs and side-walls, AMBLER ASBESTOS CORRUGATED ROOFING and SIDING; AMBLER ASBESTOS ROOFING TILE.

Also Ambler Asbestos Roofing Cement.

For Ambler Linabestos (Asbestos) Board, Ambler Linabestos (Asbestos) Siding, and Ambler Asbestos Lumber, see page B1260.

The Company and Its Products

This Company supplies all the necessary appurtenances required in the installing of its products. All nails, clips, etc., exposed to the weather are heavy gauge copper, and the concealed nails are triply galvanized. Copper driving nails supplied if desired.

Ambler Asbestos Shingles

Ambler asbestos shingles are absolutely fireproof and waterproof, made of selected asbestos fibers and portland cement scientifically combined in water and formed under enormous hydraulic pressure. They are made in two general styles—uniform thickness, and tapered.

American Method No. 9—A $\frac{1}{4}$ -in. shingle of uniform thickness, 9 in. wide and 18 in. long. The approximate weight per square is 675 lb. Furnished in straight butts, except when broken butts are specified. The colors are: *Newport gray*, Pearl gray, Indian red, Tuscan red, Spanish brown, purple, buff, blue black and green veneer.

American Method No. 16—A $\frac{5}{8}$ -in. shingle of uniform thickness, 8 in. wide, 16 in. long. Approximate weight per square 425 lb. Furnished in broken butts if so specified; otherwise straight butts furnished. Made in the following colors: *Newport gray*, pearl gray, red, brown and slate black in solid colors, and also red and green veneer.

Honeycomb Method No. 4—A $\frac{5}{8}$ -in. shingle of uniform thickness, 16 in. square, with the lower corners cut off so that when laid they produce a honeycomb or hexagonal effect. Weight approximately 290 lb. per square. Furnished in the same colors as American Method No. 16, listed above.



Tapered Ambler "English Thatch" Asbestos Shingle Roof

French or Diagonal Method No. 3—The same size, weight and colors as the Honeycomb Method No. 4. The lower corners are not cut off, however, and when laid produce straight diagonal lines.

Tapered English Thatch Method—A tapered shingle, $\frac{1}{2}$ -in. butt, $\frac{1}{8}$ -in. upper end. Rough surface, edges and butts. Random widths, 6 to 18 in., 20 in. long. Approximate weight per square, 978 lb. Made in a variety of reds, browns, purples, greens, buffs and grays, and in black.

Tapered Colonial Method—A tapered shingle, $\frac{1}{2}$ -in. butt, $\frac{1}{8}$ -in. upper end. Random widths, 6 to 17 in., 19 in. long. Smooth surface; edges and butts cut square—designed for use where ordinary wood shingles might be specified, but where the architect desires to obtain a fireproof roof. Approximate weight per square, 930 lb. Colors same as for Tapered "English Thatch."



Tapered Ambler "Colonial" Asbestos Shingle Roof

Specifications for American Method of Laying Ambler Asbestos Shingles

Sheathing—All roofs specified to be covered with asbestos shingles, to be tightly sheathed with well seasoned boards, free from loose knots and to be well spiked to the rafters.

Felt—Over roof boards lay 1-ply slater's felt, weighing 15 lb. to the square, tacked on with 4-in. lap, and on hips and valleys with at least 1-ft. lap.

Ambler Asbestos Shingles—

Note: The following specification is written for both the $\frac{5}{8}$ -in. No. 16 and the $\frac{1}{4}$ -in. No. 9 shingle. To specify the No. 16, omit bracketed items; for No. 9, use bracketed items, omitting the others.

Over the felt, apply Ambler Asbestos Shingles (give color), as manufactured by the ASBESTOS SHINGLE, SLATE & SHEATHING Co., according to the American, or straight laid, method, following the manufacturer's details. Nail $\frac{1}{8}$ x 1-in. cant strip flush with the lower edge of roof board. Apply 1 course of No. 16A [No. 9A] shingles end to end laterally, overhanging the eaves $1\frac{1}{2}$ to $1\frac{3}{4}$ in. Over this lay 1 course of No. 16 [No. 9] shingles with long edge at right angles to eave line breaking joints. Lay next course in same way, allowing 6-in. exposure. Balance of roof to be covered with No. 16 [No. 9] shingles 8x16 in. [9x18 in.] laid perpendicularly, breaking joints and exposed 7 in. [8 in.] to the weather. Each shingle to be nailed with two $1\frac{1}{4}$ -in. galvanized iron needle point nails as indicated by the nailhole in the shingles, nails not to be driven down too tight. Hips and ridges to be covered with Ambler Asbestos Ridge and Hip Roll, properly flashed and fastened to hip or ridge pole of sufficient height, rabbeted to fit hip or ridge, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge roll. (Hip and ridge can be covered according to regular Boston hip scheme, if desired.)

Flashing—At all hips, valleys, chimneys, and against all abutting sidewalls, except as otherwise specified, flash and counterflash with each course of Ambler Asbestos Shingles, using

Specifications for Honeycomb, and French or Diagonal Methods of Laying Ambler Asbestos Shingles

Sheathing—See specifications for American Method.

Felt—See specifications for American Method.

Note: The following specifications cover both Honeycomb and French Methods. To specify the Honeycomb, omit bracketed items; to specify French, use bracketed items, omitting the others.

Ambler Asbestos Shingles—Over the felt, apply Ambler Asbestos Shingles (give color), as manufactured by the ASBESTOS SHINGLE, SLATE & SHEATHING CO., according to the Honeycomb [French] Method. Apply 1 course of No. 16-B [No. 3] end to end overhanging the eaves $1\frac{1}{2}$ to $1\frac{3}{4}$ in., over which lay a course of No. 4 [No. 3-A] entirely covering the No. 16-B [No. 3], exposed 13×13 in. to the weather. Each shingle to be nailed with two $1\frac{1}{4}$ -in. galvanized iron, needle-point nails, and the No. 4 [No. 3-A] to be fastened down at the tip with patented copper "Storm" nails. Hips and ridges to be covered with Ambler Asbestos Ridge and Hip Rolls, fastened in place to hips or ridge poles of sufficient height and rabbeted to fit hips or ridges, with regular copper fasteners made for this purpose. All hips and ridges to be made watertight previous to the application of the ridge rolls.

Flashing—See specifications for American Method.

Specifications for "English Thatch" or "Colonial" Tapered Ambler Asbestos Shingles

Note: The following specifications are written to cover both the "English Thatch" and "Colonial" Tapered Ambler Asbestos Shingles, as sold by the ASBESTOS SHINGLE, SLATE & SHEATHING CO., Ambler, Pa. When specifying the "English Thatch" omit the items in brackets; for "Colonial" substitute those bracketed and omit the others.

Felt—Apply the sheathing boards so that the distance between same shall not be more than $\frac{1}{4}$ in.; then apply a 30-lb. saturated asphalt felt over entire roof surface. This felt should be lapped 6 in. on all joints and a double thickness should be used on all hips, ridges and in valleys.

Starting Course—Asbestos starters, 9×18 in. \times $\frac{1}{4}$ in. thick, designated as No. 9-A, shall be laid end to end laterally, covering the eaves and projecting over the edge of the roof boards $1\frac{1}{2}$ or 2 in. However, before these starters are applied, a wood strip $1\frac{1}{4} \times \frac{1}{4}$ in. shall be nailed to the roof flush with the eaves, to give the starters and shingles the proper cant.

Shingles—Over top of and flush with the starters, "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles shall be applied. Details regarding the random exposures and various widths shall be supplied by the architect in charge of construction. We, however, recommend that none of these "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles be applied with less than a 3-in. headlap.

Nails—We recommend that copper nails be used, of sufficient length so that they will be driven into the wood sheathing boards at least 1 in. Care should be taken in application to eliminate the possibility of nailing the shingles too tightly to the roof as there is a certain amount of expansion and contraction in a cement product and this must be considered. Galvanized nails can be used in place of copper if desired.

Hips and Ridges—All hips and ridges shall be covered with "English Thatch" ["Colonial"] Tapered Ambler Asbestos Shingles 6 in. wide (or any other width desired), and applied according to the Boston Method (or, if desired, the last course of shingles may be mitered on hips and ridges and thus eliminate additional covering).

Flashing—All metal flashings and counterflashings shall be 16-ounce soft, cold rolled copper and sufficient shall be used so as to guarantee a watertight application. Lead may be used in place of copper if desired.

Ambler Asbestos Corrugated Roofing and Siding

This material is made of asbestos-fiber and hydraulic cement and is the same as Ambler Asbestos Shingles in its structure and quality. It is made in two widths of sheets, $27\frac{1}{2}$ in. and 42 in.

**These specifications also cover the application of No. 20, 12×12 in. Honeycomb shingles, using No. 21 Under Eave and No. 20 second starter.*

The $27\frac{1}{2}$ -in. material is $\frac{1}{8}$ in. thick on the ridges and in the valleys, and $\frac{1}{4}$ in. thick at center of slope. Corrugations are $2\frac{1}{2}$ in., center to center. Sheets are available in lengths of from 4 to 10 ft., inclusive. Weight, $3\frac{1}{2}$ lb. per sq. ft.

The 42-in. material is $\frac{1}{4}$ in. thick on the ridges and in the valleys, and $\frac{3}{8}$ in. thick at center of slope. Corrugations are 2½ in., center to center. Sheets are available in lengths of 4, 5, 6, 7, 8 and $8\frac{1}{2}$ ft. Weight, $3\frac{3}{4}$ lb. per sq. ft.

A separate catalogue covering this commodity more completely will be furnished on request.

Ambler Asbestos Roofing Tile

Ambler asbestos roofing tile lays up 200 pieces per square (100 sq. ft.). When no definite number of top and pan tile is specified an equal number of each is shipped.

Weight of tile, laid on roof, per square, 775 lb.

Weather exposure of tiles, $13\frac{1}{2}$ in.

Ambler asbestos roofing tile is supplied in red veneer and green veneer only.

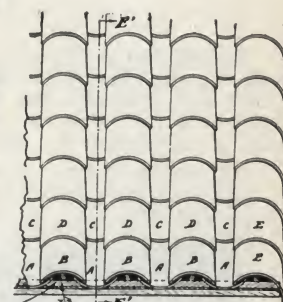
Specifications for Ambler Roofing Tile

Entire roof to be sheathed tight, and when completed to have an even surface over the entire roof. All chimneys and walls above roof line to be completed before tiling is commenced. All gutters or gutter brackets for hanging gutters to be installed before starting the tile work.

Strips 1×3 in., known as field strips, to be nailed on roof at 11-in. centers and at right angles to the eaves. At hips and ridges a 1×5 -in. strip is used, known as a hip or ridge strip. Care must be taken in the application of these strips not to puncture the valley flashing.

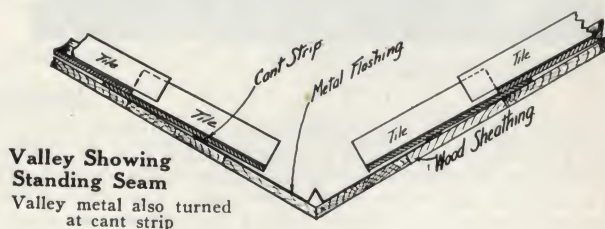
Tiles shall be neatly cut and laid at the valleys, keeping the line of cut 3 in. from the center of the valley. Each and every tile must be cut to the proper length, and must also be cut so the edge terminates at right angles from the roof, and must also show a straight line when sighting up the valley. A snake or jagged edge will not be tolerated.

Along hips and ridges, cut tile so they miter as nearly as possible with the wood nailing strips. Apply hip and ridge tiles (regular top tiles) nailing same to the hip or ridge strips, as the case may be, with the top of the tiles.



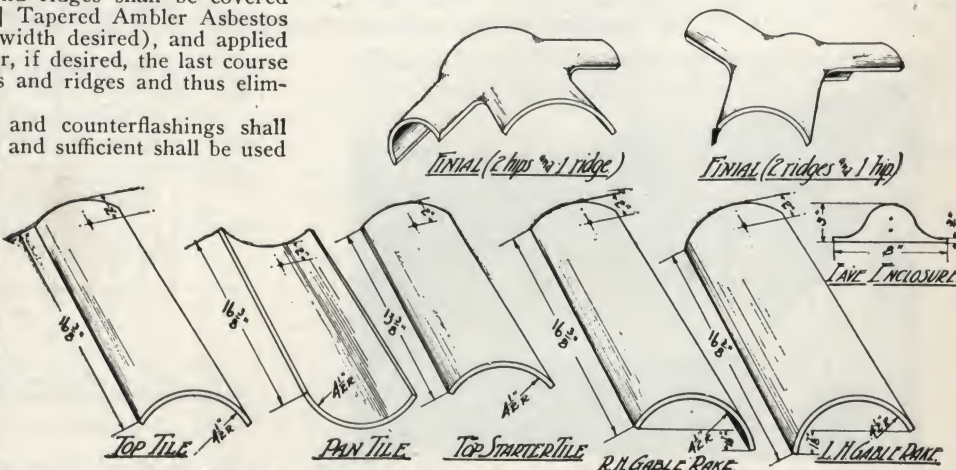
Elevation of Roof

A—First course pan tile
B—Top starter tile
C—Second course pan tile
D—Second course top tile
E—Right-hand gable rake



Valley Showing Standing Seam

Valley metal also turned at cant strip



Various Types of Ambler Asbestos Roof Tile

ETERNIT, Inc.

Asbestos Shingles, Asbestos Lumber and Asbestos Corrugated Sheets

PHILADELPHIA, PA.

BRANCH OFFICES

BOSTON, MASS. ST. LOUIS, MO. JACKSONVILLE, FLA. NEW ORLEANS, LA. HOUSTON, TEX. SAN FRANCISCO, CAL.

Products

ETERNIT ASBESTOS SHINGLES, rigid shingles made of portland cement and asbestos fibre.

ETERNIT ASBESTOS LUMBER, a fireproof insulating board made of the same materials as ETERNIT Shingles, but furnished in large sheets.

ETERNIT ASBESTOS CORRUGATED SHEETS, made of the same materials as ETERNIT Lumber and Shingles.

Eternit Asbestos Shingles

Eternit Asbestos Shingles are made of asbestos fibre and portland cement, two practically indestructible materials. The cement and asbestos fibre are combined by the Eternit process of laminating or building up the materials, layer upon layer, after which the mass is submitted to great hydraulic pressure and thoroughly seasoned before the final operation of trimming and punching. The shingles are die cut and all necessary nail-holes and notches are provided for convenient application.

Eternit

TRADE-MARK

Eternit Asbestos Shingles have been given highest ratings by the Underwriters' Laboratories, Inc., which is supported by the National Board of Fire Underwriters.

Colors—Colonial Gray, Indian Red, Quarry Blue, Autumn Brown, Copper Green and the Heather blends.

Specification for the Preparation of Sheathing

Tongue and groove sheathing of good grade and uniform thickness shall be laid, breaking joints. Slater's felt (.... oz.) shall be laid over the sheathing, parallel with the eaves, with a 2-in. lap and a reinforcing sheet at all hips and valleys. This felt shall be securely nailed with large head roofing nails and kept absolutely free from holes. A $\frac{3}{8}$ -in. cant strip shall be provided along the eaves.

Hips and Ridges—To be covered with Eternit Ridge Roll fastened to the hip or ridge pole by copper nails and special Eternit ridge roll clips.

Flashing—Valleys, chimneys and against abutting side walls, except as otherwise specified, flash and counterflash with each course of Eternit Asbestos Shingles, using 16-oz. copper.

Horizontal Method

Specification—The first course of shingles is laid parallel with the eaves and protruding 1 in. Each shingle is laid with a side lap of 4 in. The second and succeeding courses of shingles lap the top of the preceding course 3 in. and the copper hook is nailed into the sheathing at the joint and holds the

lower edge of the shingle above securely down in place. Use $1\frac{1}{4}$ -in. copper roofing nails (or galvanized nails). These shingles shall be laid in accordance with the manufacturer's instructions which are attached to the specifications.

Note: Include the general specifications on the preparation of sheathing when using the above method.



The above is a typical installation of the new Horizontal Method 12x24 in. laid 9x20 in. exposed

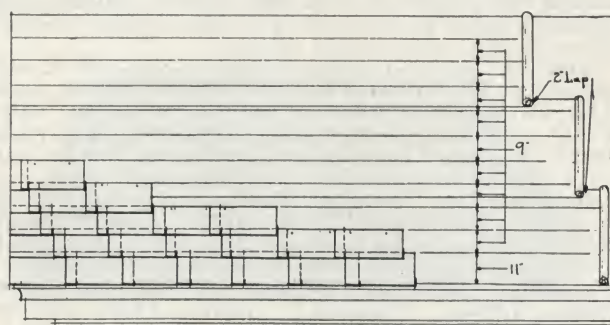


Illustration shows guide lines snapped horizontally on roof, method of laying shingles, and the laps

Hexagonal Method

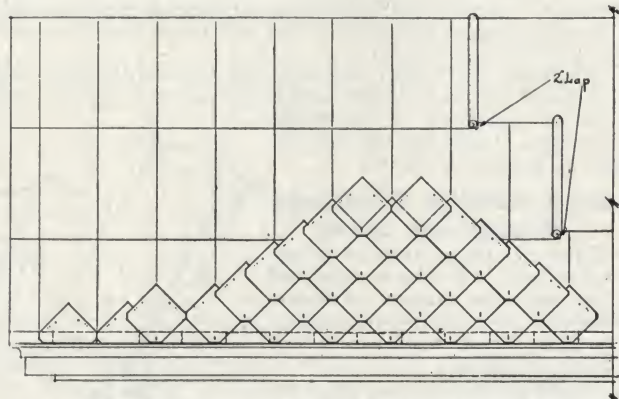
Specification—Over the slater's felt apply Eternit Asbestos Shingles, 16x16-in. [12x12-in.] Hexagonal Method, color. Apply 4x16-in. Eternit First Starters, allowing the lower edge to protrude 1 in. below the edge of the roof. Over the starting course apply a course of Eternit Second Starters with the lower edge flush with the edge of the first starters. The balance of the roof is to be covered with standard shingles as specified

above, laid in accordance with the manufacturer's specifications and directions. Use $1\frac{1}{4}$ -in. copper roofing nails (or galvanized nails). The tip of each shingle is to be fastened down by Eternit Copper Storm Nails as shown by the manufacturer's instructions.

Note: Include the general specification on the preparation of sheathing, hips and ridges, flashing, etc., when using the above method.



The Hexagonal Method is typically shown in the above illustration. Made in two sizes: 16x16-in. laid 13x13-in. exposed, and 12x12-in., laid 9x9-in. exposed.



The first starters, second starters and Hexagonal Method shingles are applied as indicated by the above drawing. Guide lines are snapped vertically up the roof

American Method

Specification—Over the slater's felt apply $\frac{1}{4}$ -in. thick by 9x18-in. [8x16-in.] American Method Eternit Asbestos Shingles, color. The first course of shingles shall be laid horizontally at the eaves, with the edge of the starting course overhanging the eave 1 in. Over this starting course lay the second course of shingles vertically, the lower edge of the shingle flush with the lower edge of the starting course. The next course will be laid in the same way, breaking the vertical joints and allowing an exposure of 8x9 in. (If 8x16-in. shingles are used,

exposure is 7x8 in.) Continue up the roof in the same manner, breaking joints, allowing the same exposure with a minimum head lap of 1 in. $1\frac{1}{2}$ -in. copper roofing nails shall be used (galvanized needle point nails can be substituted if desired). The nails are not to be driven down too tight, but just sufficient to hold the shingles in place.

Note: Include the general specification on the preparation of sheathing, hips and ridges, flashing, etc., when using the above method.



Furnished in two thicknesses and sizes: Standard thickness in 8x16-in. size; $\frac{1}{4}$ -in. thickness in 9x18-in. size. $\frac{1}{4}$ -in. size furnished in Heather blend combinations

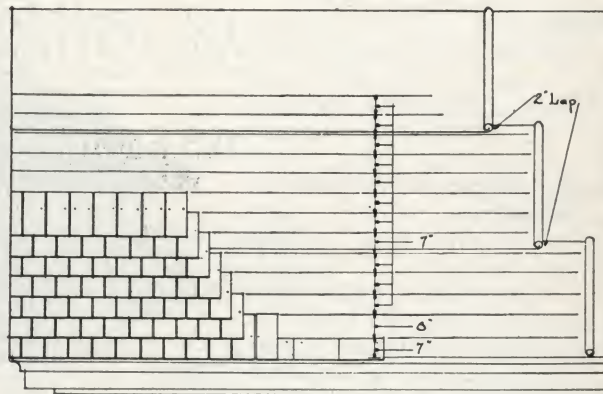


Illustration shows how the guide lines are snapped on the roof, method of laying the shingles, and the laps. The dimensions are for the 8x16-in. American Method

Eternit Asbestos Lumber and Corrugated Asbestos Sheets

Asbestos Lumber—Eternit Asbestos Lumber is made of the same materials and by the same process employed in making Eternit Asbestos Shingles. It is recommended for use in place of wood for all types of fireproof construction. It *resists* all extremely high temperatures without warping, disintegrating, igniting or showing any sign of being affected by the heat. Eternit Asbestos Lumber is *immune* to the effects of acids and chemicals. There are no organic materials to rot. Under transverse load its strength is great. It is easily cut, drilled, finished or painted. Nails can be driven through it, and screws hold better in it than in wood.

Uses—Ceilings, walls, partitions, acid fume ducts, laboratory equipment, switch panels, heat insulation with dielectric qualities, fire doors, elevator shaft fireproofing, industrial roofing, siding on residences, imitation tile.

Thicknesses— $\frac{5}{32}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 in.
Standard Sizes—42x48, 42x96, 48x48 and 48x96 in. Size 36x72 in. can be furnished on orders shipped direct from factory.

Special Sizes and Shapes—Material will be cut to special sizes to meet requirements. Cutting charges are quoted on each particular job.

In addition to flat sheets, pattern shapes can be made by the factory on order for special purposes, such as heater linings, tank covers, etc.

Asbestos Corrugated Sheets—This is made of the same materials and by the same process employed in making Eternit Asbestos Shingles and Lumber. This material is particularly adapted for industrial roofing, because it is impervious to acid fumes and absolutely fireproof. It can be easily and economically applied.

Instructions, Samples, Literature and Service Department

Complete instructions for the application of Eternit Asbestos Shingles, including full information on flashings, valleys and curved surfaces, will be sent to any architect upon request. These instructions are illustrated with drawings and this work represents one of the most complete texts on shingle roofing.

Small samples in the various colors or full size samples will be sent to any architect upon request.

Literature, illustrating the different designs and colors and giving more detailed information, is available to any architect.

The Service Department gladly co-operates with architects to secure special color schemes or to solve any roofing problems that might arise.

This service is free and may be had by any architect.

MOHAWK ASBESTOS SLATE CO., INC.

GENERAL OFFICE
UTICA, N. Y.

FACTORY: ONEIDA, N. Y.

SALES OFFICES

NEW YORK, N. Y., 120 East 41st Street
PHILADELPHIA, PA., 630 Real Estate Trust Building

PITTSBURGH, PA., 508 Second Avenue
CLEVELAND, OHIO, Builders Exchange, Rose Building

Products

TAPERED ASBESTOS SHINGLES.

FLOOR TILES and FLAGGING.

Mohawk Tapered Asbestos Shingles

Made in thicknesses of $\frac{3}{8}$, $\frac{5}{8}$ and $\frac{7}{8}$ in. at butt. Standard size, 8x16 in. Random widths, 4, 8, 12 and 16 in. Seven color tones, gray, dark gray, browns, purples, buffs, reds, and black.

Plain butt and Rustic Colonial type (rough butt).

The exceptional beauty of a Mohawk roof lies in the distinctive characteristics and architectural qualities of the Mohawk Shingle. Their taper produces a thick butt that casts a pleasing shadow line. Rough texture and mottled surface afford soft shades that blend beautifully into a colorful and picturesque effect that enhances the charm of the home or building on which they are used.



Method of Laying Mohawk Shingles

The hand hewn butts of the Rustic Colonial type lend a weatherworn appearance, as if aged by the very elements, and a tapestry effect. Graduated effects in random widths to express individuality and maintain the character of the structure in the roof are possible with the three thicknesses of shingle and the random widths. Color blends that harmonize or contrast with the exterior can be adopted.

The service of a Mohawk roof is everlasting. Composed of portland cement and selected asbestos fibers and moulded under heavy pressure, they are impervious to all climatic conditions and absolutely fire-proof. Will not crack or exfoliate from natural causes, but rather harden and strengthen with age. Their resiliency takes care of any slight contraction or expansion on the roof. They have a considerable insulation value and help to keep a more even temperature in the interior.

The Mohawk Shingle has the advantage of being comparatively light in weight. The $\frac{3}{8}$ -in. thickness

MOHAWK
TAPERED
ASBESTOS SHINGLES

weighs approximately 650 lb. per square, the $\frac{5}{8}$ -in. 800 lb. per square and the $\frac{7}{8}$ -in. 1300 lb. per square.

Mohawk Asbestos Hip and Ridge Roll

Made of same materials as the shingles, and in same colors; sections 16 in long. 93 sections of ridge roll cover 100 lin. ft. of ridge or hip.

Mohawk Asbestos Saddle Hip Tile—for Hips Only

Made of same materials as shingles and in same colors. Exposed $4\frac{1}{2}$ in., meet and break joints on each shingle course.

Approximately, 3 pieces required for each lineal foot.

Shingle Specifications

All roof surfaces shall be covered with Mohawk Tapered Asbestos Shingles (specify thickness and type), as manufactured by the MOHAWK ASBESTOS SLATE Co., INC., of Utica, N. Y.

Note: In Carpenter's Specification specify that roof boards shall be laid in the usual manner, breaking joints and nailing securely at every bearing, leaving no loose ends. All roof sheathing shall be of narrow width and well seasoned.

Over all roof sheathing lay one thickness of good quality slater's felt as furnished by the MOHAWK ASBESTOS SLATE Co., INC., making laps not less than 4 in., except on hips and valleys, where laps must be not less than 10 in.

At edge of eaves provide cant strips, using $\frac{3}{8}$ -in. thick laths for this purpose.

The starting course at eaves shall be Mohawk Tapered Asbestos Shingles, cut 11 in. from butt as starters, laid parallel with and overhanging the eaves $1\frac{1}{2}$ in.

The second course shall be standard size (random widths) Mohawk Tapered Asbestos Shingles, covering the first course and breaking joints with it.

Proceed with laying the shingles in precisely the same manner as with natural slate, exposing the asbestos shingles 7 in. (except where staggered effect is desired, specify "staggered") to the weather except that the Mohawk Shingles having beveled edges should be laid close together instead of separated as with natural slate.

All nails shall be galvanized needle point or copper roofing nails ($1\frac{1}{4}$ in. for $\frac{3}{8}$ -in., $1\frac{1}{2}$ in. for $\frac{5}{8}$ -in., or 2 in. for $\frac{7}{8}$ -in. shingles) as furnished by the MOHAWK ASBESTOS SLATE Co., INC. The nails shall be driven flush with the asbestos shingle surface, but not down too tight.

For all hips and ridges provide Asbestos Ridge Rolls, or saddle hip tile for hips only, manufactured by the MOHAWK ASBESTOS SLATE Co., INC.

Mohawk Asbestos Flooring and Flagging

Of the same composition as shingles, and likewise moulded under heavy pressure. Affords a wearproof material, that will not dust, disintegrate or exfoliate. Either wet or dry it is *non-slip*, muffles sound, and is easily cleaned. For interior flooring its varied color tones, soft and subdued, harmonize with textured wall effects. For exterior use it allows the color scheme of the house and roof to be carried into the porch flooring and garden walks. Made in 1 in., $\frac{3}{4}$ in. and $\frac{1}{2}$ -in. thicknesses, sizes 16x16, 8x16 and 8x8 in.

THE PHILIP CAREY COMPANY

Manufacturers of Asfaltslate Shingles

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

Products

CAREY SHINGLES.

For Waterproofing and Damp-proofing Materials, see pages A56-57; for Pipe Coverings, see pages A210-211; for Built-up Roofing, see pages A400-403; for Asbestos Shingles, see page A415; for Flooring, see page B1537.

Carey Shingles

Asfaltslate, Cork-insulated and Strip Shingles are produced in the same factories from the highest obtainable grades of material.

Carey Asfaltslate Shingles—

Composed of a heavy rag felt base, thoroughly saturated with a highly refined asphalt saturant and coated on both sides with a uniform layer of pure asphaltic cement.

Carey shingles are surfaced with a uniform layer of natural crushed slate thoroughly rolled into the hot coating under roller pressure.

Asfaltslate shingles are made in two sizes—8x12 $\frac{3}{4}$ in. and 10x15 $\frac{3}{4}$ in. The regular size is laid 4 in. to the weather, and weighs, approximately, 240 lb. per square. The large size is exposed 5 in. to the weather and weighs, approximately, 300 lb. per square.

Carey Cork-insulated Shingles—Are made in the same manner as the regular Carey Asfaltslate shingle with a layer of granular cork added to the underside.

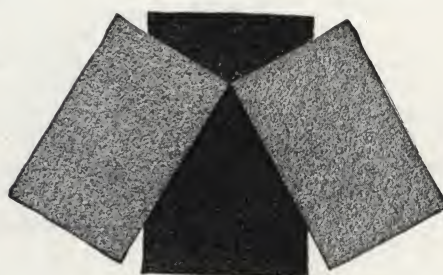
Tests made by Mellon Institute of Industrial Research show that when these shingles are laid in the regular way (three thicknesses) they are equivalent in insulating value to: $\frac{1}{2}$ in. of fibre insulating material, $4\frac{1}{2}$ in. of slate, 10 in. of sandstone, 8 in. of concrete and are 231% better heat insulators than ordinary felt shingles.

They are 50% thicker than the ordinary shingle and cast deep dark shadow lines giving texture to the roof, an effect wholly lacking when thin shingles are used.

Carey Cork-insulated shingles are made in the same two sizes as the regular Carey Asfaltslate shingle—the large size weighing approximately 350 lb. per square and the regular size weighing approximately 290 lb. per square.

Carey Strip Shingles—Square Tab Strip shingles, 4 in 1, 2 sizes: 36x10 in., 190 lb. per square; 36x12 $\frac{1}{2}$ in., 240 lb. per square. Hexagonal Strip shingles, 2 sizes: 10x40 in., 160 lb. per square; 12 $\frac{1}{2}$ x36 in., 200 lb. per square.

Carey
SHINGLES
TRADE-MARK



Carey Shingles
Furnished in three colors
Red, green and blue-black

Package

Carey individual shingles are packed in bundles containing one-eighth square, or metal strap packages containing one-quarter square. One square of shingles packed for shipment occupies 7 cu. ft. of space. Carey strip shingles 36x10 in. are packed two bundles per square; 36x12 $\frac{1}{2}$, three bundles per square.

Underwriters' Label

Carey shingles are tested and accepted as standard by the Underwriters' Laboratories, Inc.

All Carey shingles bear the underwriters' Class "C" label.

Specifications

Shingles shall be Carey (state brand here) shingles, and shall be delivered on the job in packages bearing Carey labels.

Sheathing boards must be thoroughly dried, not over 6 in. wide and laid parallel with eaves. Line valleys with valley lining, 18 in. wide, nailing 4 in. in from either side (nails 12 in. apart); do not nail in center. Lay 9-in. wide starter strips along eaves, extending over $\frac{1}{2}$ in. Nail 1 in. from lower edge, nails 6 in. apart.

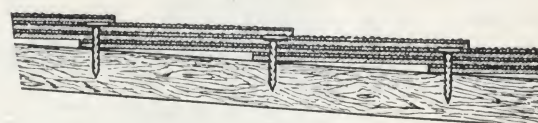
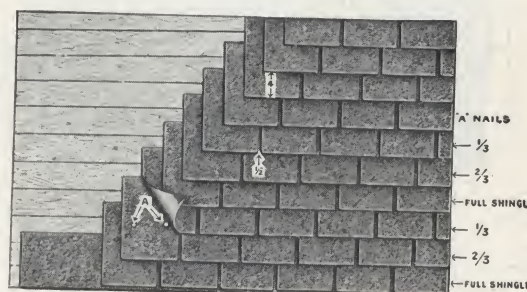
Begin with full sized shingle parallel to and flush with outer edge of roof, lower end flush with lower edge of starter strips. Use large headed 1-in. galvanized nails, 2 nails to each shingle, 4 $\frac{1}{2}$ in. from lower end and 1 in. from sides. Allow $\frac{1}{2}$ in. space between shingles.

Start second row using two-thirds width shingle, leaving 4 in. of first row exposed.

Start third row using one-third width shingle, same spacing. In starting fourth row use a full size shingle and continue as shown in sketch below.



Carey Cork-insulated Shingles



Method of Applying Carey Asfaltslate Shingles

BIRD & SON, inc.

Manufacturers of Roofings, Building Papers and Wall Board

MILLS AND GENERAL OFFICES

EAST WALPOLE, MASS.

CHICAGO OFFICE AND PLANT: 1472 West 76th Street

NEW YORK OFFICE: 295 Fifth Avenue

HAMILTON, ONTARIO, CANADA: BUILDING PRODUCTS LTD., BIRD & SON DIVISION

Products

BIRD'S ASPHALT SLATE SURFACED SHINGLES, PAROID ROOFING, BIRD'S BUILT-UP ROOFS, NEPONSET WALL BOARD, NEPONSET BLACK BUILDING PAPER and other Waterproof Building Papers.



Bird's Standard Individual—8x12½ inches, laid 4 inches to the weather. A high grade individual shingle of standard dimensions. Recommended for residential work.

Giant Individuals—10x15½ inches, laid 5 inches to the weather. An unusually heavy and massive giant shingle giving an impression of thickness and weight adequate for the more expensive residences.

Application—Bird's Asphalt Shingles should be applied over dry roof boards laid close together, sheathed with Neponset Black Building Paper; roofer to follow instructions enclosed in each bundle of shingles.

Experience and Facilities

BIRD & SON, inc., was established in 1795, and after years of experience in paper manufacturing became one of the pioneers in specializing in the manufacture of waterproof building paper and asphalt roofings.

The highest quality of materials is maintained through the most up-to-date machinery and methods and a highly efficient personnel. The several mills and warehouses of the company provide for prompt shipment anywhere.

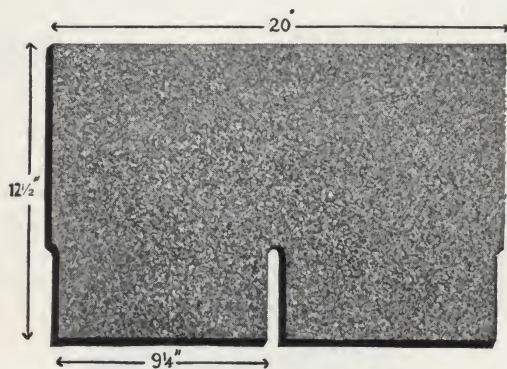
Bird's products have been distributed and applied to buildings of every description throughout the world and have long been known to be of the highest grade.

Bird's Asphalt Shingles

Bird's Asphalt Shingles are distinctive. They are made in a variety of styles suitable for all sorts of buildings, from the low price house to the costly residence.

They are surfaced with crushed slate direct from the quarries.

Bird's Asphalt Shingles are made in plain shades of red, green and blue-black. They are also made in an unusually attractive and colorful effect, produced by a selection of several shades of brown, reds and russets, known as "Bird's Art-Blende."



Neponset Twin Shingle

The following types of shingle are particularly recommended for the architect's specifications. All but the Standard Individual are available in the Art-Blende color.

Neponset Twin Shingles—12½x20 inches, laid 4 inches to the weather, giving a ½-inch overlap beyond three layers.

Bird's Super Twin Shingles—12x20 inches, laid 5 inches to the weather. An extra heavy twin shingle combining the features of Neponset Twins with extra weight and massive appearance.

Paroid Roll Roofing

Paroid Roll Roofing is of the highest quality, protected with a coating on both sides and with a special talc surfacing of bright gray color.

Paroid is most satisfactory for specifications for large roof surfaces, such as: barns, freight sheds, train platforms, garages, etc. It may also be specified for low pitch roofs on porches and dormers of all types of residences.

Paroid comes in rolls of either 108 or 216 square feet with lap cement and nails. Made in three weights, 45, 55 and 65 pounds per square. Roofer should apply according to directions enclosed in each roll.

Neponset Black Building Paper

Neponset Black Building Paper has been known and specified by architects for years as a waterproof building paper of the highest grade. A strong bodied paper thoroughly saturated with asphalt, protected with asphaltic coating on both sides, giving an absolutely waterproof paper. Recommended particularly for use:

- (1) Under all kinds of roofing.
- (2) Behind clapboards and shingles or stucco on the walls of buildings.
- (3) Between floors.
- (4) Between double floors that extend over an open porch.
- (5) Within walls of house, store or factory in place of backplaster.
- (6) For cellar lining.
- (7) For cold storage work.

Put up in rolls 36 inches wide containing 500 square feet, weighing 50 pounds per roll.

Specifications for use of Bird's Neponset Black Waterproofing Building Paper—

Beneath Clapboards and Shingles—Underneath the clapboards or shingles shall be applied 1 layer of Bird's Neponset Black Waterproof Building Paper, lapped not less than 2 inches and tacked to hold in place.

Beneath Roofing—Underneath the roofing, 1 layer of Bird's Neponset Black Waterproof Building Paper shall be applied; paper to be lapped not less than 2 inches and tacked along the seams, sufficient to hold in place.

Back of Stucco—Over the sheathing boards 1 layer of Bird's Neponset Black Waterproof Building Paper lapped not less than 2 inches. Hold paper in place with furring strips spaced about 16 inches on center. Nail metal lath firmly to furring strips and apply stucco to the lath.

Beneath Double Floors—Between the double floors or underneath the parquetry shall be placed 1 layer of Bird's Neponset Black Building Paper. Paper to be lapped not less than 2 inches and tacked sufficiently to hold in place.

Neponset Wall Board, Cream White Finish

Neponset Board is a high grade laminated fibre board that will not chip or crack. The finish is a beautifully embossed cream white surface thoroughly moisture-proofed. The reverse is a tan color, waxed to keep out moisture. The cream white surface may be painted for any desired effect. Neponset Board comes in sheets 48 inches wide, 7 to 12 feet long. Nailhole positions are indicated by dents along the edge of the boards.

Bird's Paroid Built-Up Roof

Bird's Paroid *Built-Up* Roof, built up of successive layers of asphalt felt, asphalt compound applied hot, and Paroid Cap Sheet, gives a heavy, impenetrable mass of absolutely weatherproof materials, capped with the well-known Paroid Smooth Surfaced Roofing. There is no slag or gravel to fall off and clog the gutters.

The illustration and specification which follow are for the most usual type of Paroid Built-Up Roof over sheathing boards. We will furnish on request specifications as follows:

- (1) Bird's Paroid Built-Up Roof, light, over sheathing boards.
- (2) Bird's Paroid Built-Up Roof, standard, over sheathing boards. (See specification below.)
- (3) Bird's Paroid Built-Up Roof, extra heavy, over sheathing boards.
- (4) Bird's Paroid Built-Up Roof, light, over non-combustible roof decks.
- (5) Bird's Paroid Built-Up Roof, standard, over non-combustible roof decks.
- (6) Bird's Paroid Built-Up Roof, extra heavy, over non-combustible roof decks.

Specifications for Bird's Paroid Built-Up Roof, Standard for Application over Sheathing—

Preparation of Sheathing—The roof shall be laid upon seasoned sheathing preferably tongued and grooved, not over 6 inches in width. All rubbish and projections shall be removed from the roof by the contractor preceding the roofer. The ends of all sheathing boards shall rest on rafters or purlins, properly nailed and secured. The sheathing shall be reasonably free from knots and holes, and where holes do occur these shall be covered with metal securely nailed. The roof shall be properly graded to outlets and all drainage connections set to permit the free flow of water. All this work to be done by the general contractor preceding the roofing contractor. Triangular wood strips about 2 inches high shall be installed by

owner or general contractor in all angles formed by the roof and a vertical surface.

Flashings—All brick or concrete walls, etc., shall be primed with Bird's Asphalt Primer before flashing with the roofing material. Where not otherwise shown on plans, walls and all elevations above the roof such as skylights, curbs, etc., shall be flashed at least 6 inches high. The flashings to be built up in the same manner and of the same material as the roof itself. Flashings shall be reinforced by a base flashing of Bird's Cap Sheet 9 inches wide, mopped 6 inches up the wall and 3 inches on the roof. An approved metal counterflashing shall extend down over the wall flashing at least 4 inches, and where pipes, vents, etc., come through the roof, they shall be flashed with a lead collar, both to be furnished and installed by the general contractor or owner.

Material—Materials required per 100 square feet of completed roof surface—gross weights:

2 layers Bird's 14-lb. Asphalt Felt (36-inch width)	31	pounds
2 layers Bird's Built-Up Roof Compound....	50	pounds
1 layer Bird's Paroid Cap Sheet (coated one side only, 36-inch width)	37½	pounds
Flexible extra large head roofing nails (¾ inch long)	1	pound
Total weight of finished roof.....	119½	pounds

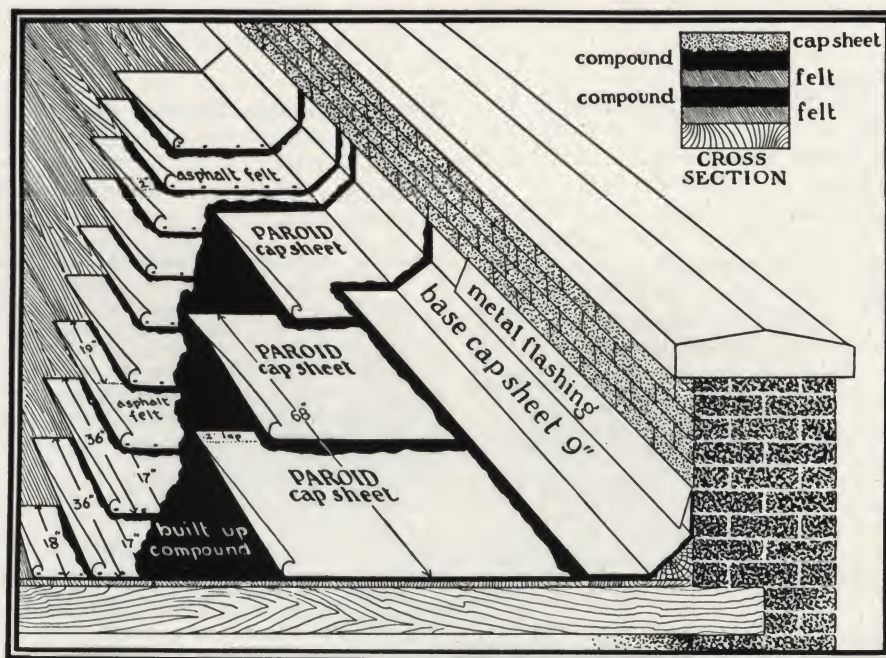
The quantities above stated do not include the material necessary for flashings nor do they include wastage.

Note: Many roofers recommend the use of a layer of sheathing paper to be used next to the sheathing boards. This is especially good over roof boards that contain pitch or sap.

Application—First: A sheet of Bird's Asphalt Felt 18 inches wide shall be laid along the lowest edge of the roof. This felt shall be mopped with Bird's Compound heated to not less than 400° F. and while hot a second sheet of asphalt felt 36 inches wide shall be rolled into same. Similarly succeeding sheets of asphalt felt 36 inches wide shall be laid lapping each sheet 19 inches until the surface of the roof shall be covered with two layers of asphalt felt mopped together with hot compound, so that felt does not touch felt. Flexible large head roofing nails shall be used, nailing 4 inches apart along the lower edge of each sheet, as applied.

Second: The Bird's Asphalt Felt along the lower edge 36 inches wide shall be mopped with Bird's Compound heated to not less than 400° F. and while hot a sheet of Bird's Paroid Cap Sheet 36 inches wide rolled into same. The cap sheet must follow mop closely to insure a perfect bond. In a similar manner the second and succeeding sheets of Bird's Cap Sheet 36 inches wide shall be mopped in, overlapping the preceding sheet 2 inches. All cross laps of the cap sheet shall be mopped and lapped 4 inches.

The surfaced side of Bird's Cap Sheet shall be laid to the weather.



Bird's Paroid Built-Up Roof, Standard Over Sheathing

ALUMINUM COMPANY OF AMERICA

Manufacturers of Aluminum Roofing
PITTSBURGH, PA.



Products

ALUMINUM ROOFING including Shingles, Flashings, Hip and Ridge Coverings, Valleys, Gutters, and Downspouts.

For Aluminum and Aluminum Alloys, see page A741; for Aluminum Paint, see page B1609.

Aluminum Shingles

Aluminum shingles, as manufactured by the ALUMINUM COMPANY OF AMERICA, are fabricated from No. 24 B & S. gauge (.0201 in.) aluminum sheets, in plain and ribbed patterns. Size, $9\frac{1}{4} \times 24\frac{7}{8}$ in. over all.

There is no exposed nailing and an air space beneath each shingle permits the drying of condensed moisture and affords a desirable heat insulation layer of dead air.

Colors

Aluminum shingles are made in natural finish which weathers to a soft, neutral, silver-gray tone; also in two standard colors (dark red and light green), or in special colors. The colors are sprayed on, not dipped, a special grade of paint being used.

Advantages of Aluminum Shingles

Resistance to Corrosion—Aluminum shingles successfully resist the effects of moisture, salt-laden air, sulphur, sulphuric acid fumes, certain organic acids, and other corrosive agents found in the atmosphere.

Light Weight—Aluminum shingles weigh 50 lb. per square (100 sq. ft.), which is considerably less than the weight of other roofing materials in general use.

Durability—In addition to their durability because of their non-corrodable properties, aluminum shingles are more rigid than some other metal shingles, and the durability is further increased by the use of thick metal (.0201 in.). Possible damage from snow, hail, ice, tree branches, falling bricks, and the like is greatly reduced. Extreme cold does not make aluminum shingles brittle; they retain their strength, rigidity, toughness, and ductility in all kinds of weather.

Easily Worked—Aluminum shingles are easily bent and cut without cracking and, once formed, hold their shape. This speeds up work of application and reduces expense.

Pleasing Appearance—The appearance of an aluminum shingle roof is pleasing with its silver-gray

Oakmont (Pa.) Country Club
Aluminum shingles applied over old wood shingles

tint and pronounced relief. The $\frac{5}{8}$ -in. butts and heavy vertical ridges give a light-and-shadow texture without approaching an ornate pattern.

Non-staining—Aluminum forms no colored salts, consequently it will not discolor adjoining materials from drip or splash of watershed.

Weathertight—Weather sealing and expansion and contraction are taken care of in aluminum shingle roof construction. A roof with a pitch as low as 3 in. to 1 ft. is practicable with aluminum shingles.

How Aluminum Shingles Are Laid

Aluminum shingles are laid 8×24 in. to the weather, giving $1\frac{1}{4}$ in. horizontal and $\frac{3}{4}$ in. vertical interlocking joint connection with complete provision for expansion and contraction, drainage, and waterseal against capillary attraction. The height of the butt is $\frac{5}{8}$ in.

Seventy-five full size ($9\frac{1}{4} \times 24\frac{7}{8}$ in.) aluminum shingles are required to lay one square (100 sq. ft.).

One-third pound of 1-in. No. 12 gauge aluminum roofing nails are required to lay one square of aluminum shingles on a new roof and one-half pound of $1\frac{1}{2}$ -in. No. 12 gauge nails over a wood shingle roof.

Other Aluminum Roofing Materials

In addition to shingles, aluminum roofing materials are also available in the form of flashings, hip and ridge coverings, valleys, gutters, and downspouts to form a complete, non-corrodable, durable, light weight roofing job.

How to Specify Aluminum Shingles

All roof surfaces shall be covered completely with full size aluminum shingles, three-quarter size starter shingles, eaves starting strips, right and left-hand side finish pieces, valley sheets and valley flashing, ridge cover and ridge flashing, hip cover and counterflashing, around all walls, chimneys, etc., as required to produce a roof of proper mechanical construction in accordance with the manufacturers' standard instructions.

All aluminum shingles and flashing to be fastened with aluminum nails, also $\frac{7}{8}$ -in. hip and ridge boards, for properly applying hip and ridge covering.

Sheathing—All roof sheathing shall be good common boards of equal thickness laid horizontally or diagonally without open joints and securely nailed and properly spaced to insure secure nailing.

Entire roof sheathing shall be covered with 15-lb. asphalt saturated felt, lapped 2 in. and secured with 1-in. aluminum roofing nails.

Note: No felt is required when laying aluminum shingles over wood shingles.

COPPERCLAD SHINGLES

MANUFACTURED BY THE ANACONDA COPPERCLAD COMPANY

GENERAL DISTRIBUTORS

THE FLINTKOTE COMPANY

NEW YORK, N. Y. BOSTON, MASS. CHICAGO, ILL. CINCINNATI, OHIO NEW ORLEANS, LA.

THE RICHARDSON ROOFING COMPANY: CHICAGO, NEW YORK, BOSTON, CINCINNATI, NEW ORLEANS

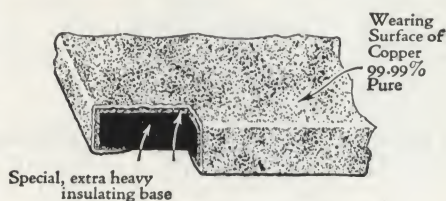
THE CHATFIELD MANUFACTURING CORPORATION: CINCINNATI, NEW YORK, BOSTON, NEW ORLEANS, CHICAGO

Products

COPPERCLAD SHINGLES; THICK BUTT COPPERCLAD SHINGLES.

Copperclad Shingles

Copperclad is a copper roofing in a new and economical shingle form. To a special extra heavy insulating base of felt, impregnated with asphalt, is added a wearing surface of copper 99.99% pure. The copper covers completely all the exposed surface of the shingle. Thus the entire wearing surface of pure copper is continuous and is integral with the insulating and waterproofing base. Both copper and asphalt are recognized as superior roofing materials. When combined, no chemical action of any kind takes place. Hence the combination is ideal for roofing purposes. The inexpensive asphalt provides an entirely suitable base for the copper and, in addition, has insulating qualities which are highly desirable.



Cost

The cost of Copperclad is about one-third to one-half the cost of a sheet copper roof. It is less expensive than a good grade slate or tile, and only slightly more expensive than the best asphalt or wooden shingles.

Life

Copper roofs have lasted for centuries with practically no expense for maintenance or repair. Copperclad Shingles are capable of resisting for long periods, without failure, ordinary deteriorating influences. They are guaranteed for twenty years.

Color

Copperclad Shingles are supplied in copper green, and in the natural copper red. The green is similar in appearance to the permanent natural patina which copper normally acquires after exposure. The applied green, while not permanent, will, under ordinary conditions, last until the natural patina forms.

The natural copper color darkens on exposure to the air, gradually acquiring beautiful blending "shadows" of brown and green.

Fire Resistance

The Standard Copperclad has been tested and approved by the Underwriters' Laboratories, Inc., of the National Board of Fire Underwriters, and carries their Class "A" label.

Application

Copperclad Shingles are self-spacing and self-aligning—easily and quickly applied. By reason of these merits, the cost of applying them is less.

No allowance in application has to be made for expansion or contraction as with other metal shingles. Copperclad Shingles may be cut at valleys and hips with ordinary tinner's snips. Large head copper nails are used and copper only should be used for base and cover flashings, hip flashings and valleys. Detailed instructions for laying are in each bundle.

Anaconda-Flintkote Copperclad Hip and Ridge Shingles (individual, size 10x12 in.) are also available for use on hips and ridges.

Dimensions—Length of strip, 32 in.; width of strip, 12 in.; exposure to weather, 5 in.; number of strips per square, 90; bundles per square, 3; average weight per square, 230 lb. (thick butt weight 270 lb.); number of nails used per square, 360. Trim: use only copper nails and copper trim.

Specifications

Copperclad Shingles and Thick Butt Copperclad Shingles, as furnished by the above companies, are laid in accordance with the instructions contained in each bundle.

How Obtainable

The 6000 distributors of these companies can furnish Copperclad Shingles.

Prices, literature, samples and lists of installations are obtainable from the offices of THE FLINTKOTE COMPANY, the Richardson Roofing Company and the Chatfield Manufacturing Corporation, or their representatives.

Thick Butt Copperclad Shingles

Standard Copperclad Shingles are ideal for most roofing purposes. When an extra play of shadows and a heavier shingle is desired, the Thick Butt style is recommended. Thick Butts have an extra coating of asphalt in which is firmly embedded an additional surface of crushed minerals. This heavier type of shingle affords all the charm of the hand wrought, producing unusually beautiful effects.

Manufacture

The copper is electrolytically applied by the Anaconda Copperclad Co., Rutherford, N. J., a subsidiary of the Anaconda Sales Company and of THE FLINTKOTE COMPANY.

The special base is made by THE FLINTKOTE COMPANY. The result is a long life roofing shingle with great strength and adequate rigidity.

Recommended Uses

For all roofing purposes Copperclad Shingles have the advantage of strength, flexibility and the distinctive beauty characteristic of copper.

Copperclad Shingles can be used where the pitch exceeds 4 in. to the foot; they are suitable for residences, churches, schools, hospitals, clubs and other buildings where permanency, fire safeness, waterproofing, and beauty are required in a roof.

Reroofing Over Old Shingles

Copperclad can be applied directly over old wooden shingles. Applied in this way or to the roof boards after the wooden shingles have been removed, Copperclad makes a permanent roof of long life and lasting beauty.

THE AMERICAN BRASS COMPANY

Manufacturers of Sheet, Roll and Strip Copper

GENERAL OFFICES
WATERBURY, CONNECTICUT

MILLS AND FACTORIES

ANSONIA, CONN.
BUFFALO, N. Y.

TORRINGTON, CONN.
DETROIT, MICH.

WATERBURY, CONN.
DETROIT, MICH.

HASTINGS-ON-HUDSON, N. Y.
KENOSHA, WIS.

CANADIAN MILL: ANACONDA AMERICAN BRASS LIMITED, NEW TORONTO, ONTARIO

OFFICES AND AGENCIES

NEW YORK, N. Y., 25 Broadway
NEWARK, N. J., Military Park Building
BOSTON, MASS., 201 Devonshire Street
PROVIDENCE, R. I., 131 Dorrance Street
PHILADELPHIA, PA., Widener Building
PITTSBURGH, PA., Oliver Building

CLEVELAND, OHIO, Union Trust Building
CINCINNATI, OHIO, Dixie Terminal Building
CHICAGO, ILL., 111 W. Washington Street
ST. LOUIS, MO., Planters Building
NEW ORLEANS, LA., Hibernia Bank Building
SAN FRANCISCO, CAL., Rialto Building

Products

ANACONDA SHEET COPPER, ROLL COPPER and ECONOMY STRIP COPPER.

For Anaconda Extruded Architectural Bronze Mouldings, etc., see pages A746-747; for Anaconda Brass and Copper Pipe and Benedict Nickel Pipe, see page C2301.

Quality of Anaconda Sheet Copper

Anaconda Sheet Copper is 99.9% pure, and guaranteed by THE AMERICAN BRASS COMPANY, the world's largest and most experienced manufacturers of copper and brass products. Manufacturing processes, developed during more than a hundred years of practical experience, insure uniform temper and accurate gauge.

Copper in a More Convenient Form

For valleys, flashings, gutters, gutter linings and similar purposes, THE AMERICAN BRASS COMPANY has developed Economy Strip Copper.

This product is furnished perfectly flat, with edges parallel, in lengths of from 5 to 10 feet, inclusive, widths of 6 to 16 inches, and in 16-ounce weight. Economy



Strip Copper is correctly tempered for forming. Its use eliminates the labor cost of flattening, cutting and trimming standard sheets. In addition, because of standardized production in large volume, Economy Strip Copper costs less than standard sheet copper.

Economy Strip Copper Is Trade-marked

As a permanent mark of identification, every length of Economy Strip Copper (Trade-mark Reg. U. S. Pat. Off.) carries the Anaconda trade-mark rolled in the metal. This mark is an assurance of full weight and a guarantee of 99.9% pure copper.



Anaconda Service is Nationwide

Large stocks of Anaconda Copper Sheets, Rolls and Strips at Ansonia, Conn., Buffalo, N. Y., Detroit, Mich. and Kenosha, Wis., enable distributors to meet any unusual requirement. The convenient location of these shipping points means prompt service and a saving in freight.

RECOMMENDED SIZES AND WEIGHTS OF COPPER FOR SHEET METAL WORK

Anaconda Economy Strip Copper should be used for all purposes where the required width does not exceed 16 inches. Where the required width exceeds 16 inches Anaconda Standard Sheet Copper should be used.

Purpose	Designation	Temper	Weight, oz.	Sizes	Number strips packed to crate	Area or length covered
Roofs	Flat seam	Soft	*16	14 x 20-in.	112	180 sq. ft.
				10 x 14-in.		82 sq. ft.
	Standing seam	Soft	*16	20 x 96-in.	25	284 sq. ft.
				30 x 96-in.		448 sq. ft.
	Ribbed seam	Soft	*16	20 x 96-in.	25	284 sq. ft. outside of battens
				30 x 96-in.		448 sq. ft. outside of battens
Flashings and Gutter Linings	Base	Soft	*16	6 in. x 6, 8, or 10-ft.	25 or 50	50 lin. ft., 8 sq. ft. for 2 x 3-in. ribs
				12, 14, 16, or 18-in. x 6, 8, or 10-ft.		150, 200, 250, 300, 400 or 500-lin. ft.
	Cap	Soft	*16	10 in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
				18 in. x 6, 8, or 10-ft.		150, 200, 250, 300, 400 or 500-lin. ft.
	Gutter linings	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
				12, 14, 16, or 18-in. x 6, 8, or 10-ft.		150, 200, 250, 300, 400 or 500-lin. ft.
	Skylight base	Soft	*16	12, 14, 16, or 18-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.
	Window heads, etc.	Soft	*16	6 or 8-in. x 6, 8, or 10-ft.	25 or 50	150, 200, 250, 300, 400 or 500-lin. ft.

Note: For flat seam roofs use 4 cleats to each sheet with 2 nails to each cleat.

For standing seam roofs use 9 cleats to each sheet with 2 nails to each cleat.

For ribbed seam roofs use 10 cleats to each sheet with 2 nails to each cleat.

*16-oz. copper meets all ordinary conditions, but in special cases heavier or lighter weights are sometimes used.

MILWAUKEE CORRUGATING CO.

Metal Building Specialties

MILWAUKEE, WIS.

BRANCH FACTORIES and WAREHOUSES: CHICAGO, ILL.; KANSAS CITY, MO., and LA CROSSE, WIS.

Products

"TITELOCK" SPANISH METAL TILE.

"TITELOCK" AMERICAN METAL TILE.

METAL SHINGLES and
"SLATE."

"INVISIBLE JOINT"
METAL CEILINGS and
WALLS.

VENTILATORS, SKY-
LIGHTS.

For Metal Lath, Corner Beads, etc., see pages B1300-1301.

Also Marquees, Architectural Ornaments, Eaves Trough, Rain Pipe, Furnace Pipe and Fittings, Stove Pipe and Elbows, and other Sheet Metal Products.

MILCOR

TRADE-MARK
(Registered)

Catalogues Available

8½x11 in. to fit your files.

No. 20-C—"The Milcor Manual" (80 pages) on metal lath and allied products, standard architectural specifications for fire-safe constructions.

No. 20-D—"Reinforcing Rib Lath—¾-in. Stay-Rib No. 3" (16 pages).

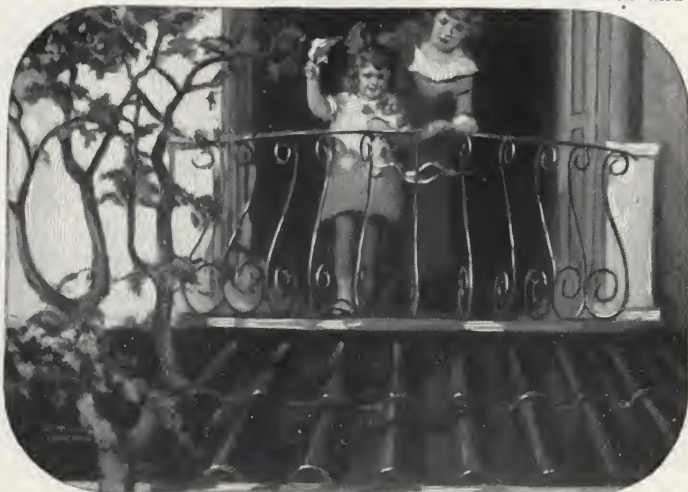
"Modern Modes in Better Plastering" (32 pages).

No. 24—"Milcor Architectural Sheet Metal Guide" on roofing and cornices, architectural ornaments, ventilators, etc.

No. 25—Furnace Pipe and Fittings Catalogue (56 pages).

No. 26—"Invisible Joint" Metal Ceiling Catalogue (288 pages).

No. 27—Milcor Sheet Metal Handbook (144 pages).



Metal Tile Roofing

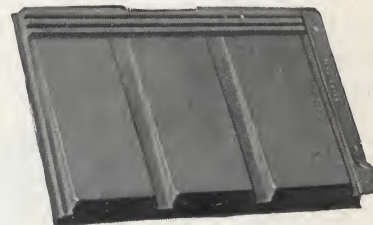
Ideal for all types of residences and for the visible portions of roofs of apartment buildings, hotels, churches, theaters, hospitals, schools, libraries and other public buildings, railway stations, garages, filling stations, etc.

Provides a watertight, stormtight, lightningproof, fire-safe roof that is economical, light in weight, very durable and architecturally beautiful.

Available in Anaconda copper, pure zinc, steel, "coppered metal," or rust-resisting Armco Ingot iron.



Ingot Iron



American Metal Tile

A pleasing style, heavily ribbed, to produce desirable shadows. Practical, safe, good looking. Paint any color desired.



Spanish Metal Tile

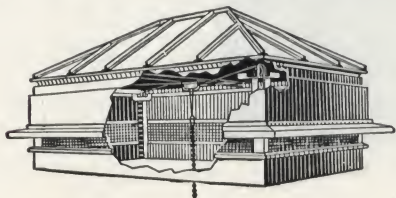
All the charm of the spanish tile made practical in metal. May be painted in any color desired.

Ventilators and Skylights

From stationary ventilators of the most simple type, to ball bearing revolving syphon type ventilators (Alpinas) the Milcor line embraces efficient ventilation units for all types of buildings including offices, apartments, residences, etc., up to the larger buildings and industrial plants. Also barn ventilators of special design.

Ventilating skylights and all standard types of skylights (puttyless or puttied) are available in the Milcor line.

Milcor "NuAir" Ventilators possess great exhaust capacity and strength. Designed so as to absolutely prevent down-drafts. Made in standard sizes from 10 to 48 in. Write for specifications.



Metal Ceilings and Walls

Milcor "Invisible Joint" metal ceilings and walls need no introduction. 288-page catalogue No. 26 is ready. Write for it. Write for important new Milcor development in ceilings

Sheet Metal Products for All Types of Buildings

For industrial buildings, office buildings, skyscrapers and all types of homes and other buildings, Milcor Sheet Metal Building Products are available. For interior requirements and for exterior needs these products are designed to give the maximum of service.

Whether it be ordinary flat sheets for air ducts, ventilating systems, cabinets, chutes, etc., or corrugated sheets for roofing or other purposes, or architectural sheet metal cornices, marquees, style roofing, etc., or metal lath and allied products, or rain carrying equipment, or warm air heating equipment, look to Milcor for advice and service.



TAUNTON-NEW BEDFORD COPPER CO.

(A ROLLING MILL FOR ONE HUNDRED YEARS)

Brass, Copper and Yellow Metal Rolling Mills
TAUNTON, MASS.

BRANCH SALES OFFICES AND WAREHOUSES

NEW YORK, N. Y., 35 Howard Street

BOSTON, MASS., 61 Batterymarch Street

MILLS: TAUNTON AND NEW BEDFORD, MASS.

Products

EAGLE BRAND COPPER, BRASS, COMMERCIAL BRONZE, YELLOW (MUNTZ METAL) in Sheets, Shapes and Rods as used by the building trade—also Copper Shingles, cut Copper, Brass and Bronze Nails and Tacks.

Trade-mark

Since 1826 the TAUNTON-NEW BEDFORD COPPER Co. has supplied non-ferrous metals for the building trade. The products have been marketed under the Eagle Brand trade-mark and name which have become synonymous with quality and service.



EAGLE BRAND

Its physical and chemical characteristics make it the outstanding metal for long service under severe conditions.

Because there are no appreciable maintenance costs its service value increases with age.

Durability of Copper Roofs

A roof of pure sheet copper will last for generations, possibly for centuries. Numerous important buildings, as well as fine residences in the United States have copper roofs over a hundred years old; in Europe and

Asia are countless examples which have lasted for centuries.

Copper for Roofs

Copper is regarded as the leading material for general sheet metal purposes—particularly for roofing, eaves troughs, gutters, leaders, flashings, ridge rolls, ridge caps, leader heads, cornices, etc.

Copper retards appreciably the corrosive action of acid fumes and is a most effective material for use under extreme atmospheric conditions such as are found in manufacturing localities and cities. Even near the sea coast its durability is unquestioned.



Bristol County Courthouse, Taunton, Mass., Roofed with
Taunton-New Bedford Eagle Brand Copper

The green carbonate coating which appears on copper after exposure to the atmosphere not only acts as a shield against deterioration, but also makes it a most beautiful roofing material. Other color effects can be produced and can be made permanent. Wherever used on a building copper adds beauty, dignity and character.

Light Weight of Copper Roofs

The non-corrosive properties of copper make it possible to use a thin sheet, and its use in construction work without the necessity of heavy supporting structures. However, it is not fair to a good material to use too thin a sheet. There is no question as to durability in the thinner gauges, but the matter of extraneous damage must be considered.

Copper sheet weighing 1 lb. per sq. ft., commonly known as 16-oz. copper, has been considered the standard sheet sufficiently strong to withstand extraneous injury.

A certain variation in the weight of sheet copper is to be expected in practice. This is usually figured at 3%.

The use of 16-oz. material is consistent with good practice and insures a satisfactory roof.

Economy of Copper Roofs

Freedom from repairs or maintenance expense, combined with durability and absolute protection against the weather under all conditions, makes copper one of the most economical and best roofing materials obtainable. It does not require painting or special protective treatment of any kind. First cost is the only expense involved in the use of copper for building purposes.

Fundamentals in Sheet Copper Roof Construction

There are a few fundamental requisites in applying a sheet copper roof, the observance of which cannot be over-emphasized.

Use soft copper sheets only. Soft copper will give the most satisfactory results. Hard (cornice temper) sheets, though sometimes used, are not recommended. The soft sheet is, as can be readily understood, more easily workable, especially for flashings, where bends are necessary.

Never drive a nail through a copper sheet. Always secure the copper sheet in position by means of copper cleats, the cleats only being nailed to the roofing boards, the battens or wood ribs. Never use nails or iron or steel to fasten copper at any place or under any circumstances.

If possible, never use copper in contact with another metal, but if the plan of construction requires the use of iron or steel, by all means see that the iron or steel device is heavily tinned, or that sheet lead is in-

serted between the copper and the other metal. The use of brass devices is recommended.

Nails holding the roofing boards in position should be well set before the paper is applied.

The temperature at the time the work is done must be taken into consideration by the contractor in allowing for expansion and contraction. A roof laid in July needs little room for expansion, as it is being laid in a high temperature. It does, however, require ample provision for the contraction which comes with cold weather. The reverse is, of course, true when a roof is laid in cold weather and under these circumstances the contractor must be particularly careful to provide ample room for expansion.

As soon as a portion of the roof is finished it should be carefully cleaned of all flux, scraps and dirt.

Cut Brass, Bronze and Copper Nails

Nails are seldom given the consideration they deserve. Every one concedes that "a chain is as strong as its weakest link"; yet nails made of a metal extremely susceptible to corrosion continue to be used for uniting longlife materials. Nails that are *everlasting* are readily obtainable upon demand, and their use adds but slightly to the total cost of the job.

The owner is fast realizing the fallacy of using anything but copper and bronze or brass where metal is exposed to the weather or other corroding action.

Eagle Brand cut brass nails are strong and stiff and drive easily. They are made from a special mixture of metals and are guaranteed to last as long as the roofing material they hold in place.

Extruded Shapes

Eagle Brand non-ferrous extruded shapes afford the architect, and the manufacturer of building details, suitable and economical material for the construction of exterior or interior finish and hardware. Extruded shapes are much stronger than cast shapes, in consequence a great saving in weight and cost may be effected by the reduction that may be made in the thickness of the walls of the desired section. It is only necessary to bear in mind that while some shapes may be extruded with a thickness of $\frac{3}{8}$ in. it is desirable to so arrange the design that $\frac{1}{8}$ in. is the minimum thickness of metal in any part of the cross section.

Estimates on Extruded Shapes

Upon the receipt of drawings showing the desired cross section, estimates will be cheerfully made and, if necessary, suggestions given in order that the architect and fabricator may enjoy to the fullest extent the many advantages obtained by the use of Eagle Brand extruded shapes.

THE NEW JERSEY ZINC COMPANY

ESTABLISHED 1848

Makers of Rolled Zinc for Roofing and Roofing Accessories

PRODUCTS DISTRIBUTED BY

THE NEW JERSEY ZINC SALES COMPANY

160 Front Street
NEW YORK, N. Y.Marquette Building
CHICAGO, ILL.Oliver Building
PITTSBURGH, PA.Guardian Building
CLEVELAND, OHIOMerchants Exchange Building
SAN FRANCISCO, CAL.

Products

HORSE HEAD ROLLED ZINC.

FLAT SHEET ZINC.

STANDING SEAM HORSE HEAD ZINC ROOFING.

CORRUGATED SHEET ZINC ROOFING and SIDING.

For Paint Pigments and 40-40-20 Paint, see page B1648.

Uses

For roofing (standing seam, batten or ribbed seam, shingles and corrugated), siding, conductor pipes, eaves troughs, valleys, flashings, and all exposed sheet metal work.

Advantages of Zinc

Durability—Zinc is a metal (not an alloy of other metals) which is extremely resistant to the corrosive action of the elements. It rapidly acquires a very adherent protective coating which will always form whenever any raw zinc is exposed.

Color—This protective coating has a light battleship gray color which will darken with age and approach the color of slate.

No Stain—Zinc sheet metal work can not stain marble, stucco or light colored surfaces.

Cost—The cost of zinc is approximately halfway between that of copper and galvanized steel of equal thickness.

Weight—The weight of zinc per square foot is less than that of copper, lead, galvanized iron, or steel, of an equal thickness.

Painting—Zinc does not require paint as a protection against the elements, but paint can readily be used if other than the natural color of zinc is desired.

Wood Shingles—Since most wood shingles, notably redwood and red cedar, exude acids which are harmful, the use of zinc for sheet metal work is not recommended on buildings covered with this material.

Roofing—Specifications (Condensed)

(1) **Shingles**—Shall be made from Horse Head Rolled Zinc not less than 0.018 inches thick and laid in accordance with the manufacturer's specifications. Minimum slope 4 inches per foot.

(2) **Standing Seam**—Use the standard Standing Seam



Horse Head Zinc Roofing installed in accordance with the specifications sent with each square of roofing. Minimum slope 2 inches per foot.

(3) **Batten or Ribbed Seam**—Roofs of this type shall be made from either Horse Head Rolled Zinc (2) or New Jersey Sheet Zinc. The metal used shall be not less than 0.024 inches thick for battens spaced not more than 18 inches on centers. For wider batten spacings, heavier metal shall be used. Minimum slope 3 inches per foot.

Valleys—All valleys shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick and shall be attached to the roof by zinc clips. The nails holding the roofing material must not pass through the valleys.

Note: Horse Head Rolled Zinc is not manufactured wider than 20 inches.

Flashings—All flashings shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick. When used on masonry, concrete, or stucco, they shall be laid on a good grade of waterproof sheathing paper. The reglet for the cap flashing shall be pointed up with elastic roofing cement.

Conductor Pipes and Eaves Troughs—These shall be made from Horse Head Rolled Zinc not less than 0.024 inches thick. The eaves troughs shall be hung on galvanized shank and circle hangers spaced not over 2 feet on centers. Conductor pipes shall be supported by galvanized rack and pin pipe fasteners securely soldered to the pipe.

Corrugated Sheet Zinc Specifications (Condensed)

The New Jersey Corrugated Zinc Sheets have corrugations $2\frac{1}{2} \times \frac{7}{8}$ inches deep. These are furnished both for roofing and siding in standard widths and specified lengths.

(1) **Roofing Sheets**—Corrugated Zinc Roofing Sheets shall be not less than 0.024 inches thick when used over a fully sheathed surface and not less than 0.032 inches thick when used over open purlins not over 40 inches on centers. For wider purlin spacings, heavier gauge sheets shall be used.

(2) **Siding Sheets**—Corrugated Zinc Siding Sheets shall be not less than 0.024 inches thick.

Write for Detailed Specifications

Further and more detailed specifications on any zinc work will gladly be furnished on request. Our engineering services are always available in connection with the uses of our materials. Please do not hesitate to consult us.



A Zinc Shingle Roof on a Wisconsin Church

Zinc is, in many ways, the most economical metal roofing available



Fort Jay Y. M. C. A., Governor's Island, New York Harbor

One of the many Y. M. C. A. buildings protected for life by Standing Seam Horse Head Zinc Roofing



Stamford (Conn.) Hospital Roofed with Horse Head Zinc, Batten Seam

As each additional unit of this hospital is erected it is roofed with the same material. The older units have proved the economy of this roofing



A Permanent Industrial Structure in Pennsylvania

Corrugated Sheet Zinc Roofing and Siding insure freedom from repair or replacements. The first cost is the last cost

HOYT HARDLEAD PRODUCTS

UNITED LEAD CO.
HOYT HARDLEAD PRODUCTS DIVISION
111 Broadway
NEW YORK, N. Y.

Products

LEADER PIPES, LEADER HEADS, GUTTERS, FINIALS, SPANDRELS, STATUARY; GARDEN ORNAMENTS; ORNAMENTAL LEAD WORK of every description; LEAD SHEETS for roofing purposes, X-ray rooms and fume ducts, and all purposes where sheet metal is practical.

For Lead Cames, see page B1703.

Hoyt Hardlead

Hoyt Hardlead has a much greater tensile strength than soft lead, which permits its use in comparatively thin sheets making it thoroughly practical and adaptable to modern building construction. It can be stamped, formed or cast in any shape desired. When exposed to the atmosphere it takes on a soft gray, non-staining patina that brings out the true value of adjacent materials and gives a balance to these materials that can not be obtained with other metals. It will lend dignity and character to any structure where permanence and beauty is desired.

Catalogue

Our catalogue illustrates a more complete line of architectural and ornamental lead work. Will be sent to architects on request.



Lead Statuary, Howard Henry and Foulke Dormitory, Princeton University, Princeton, N. J.
ZANTZINGER, BORIE & MEDARY, Architects, Philadelphia, Pa.
Cast in Hoyt Hardlead



Hoyt Hardlead Spire, First Presbyterian Church, Utica, N. Y.

CRAM & FERGUSON, Architects, Boston, Mass.
Rushmer & Jennison, Associates, Utica, N. Y.

Hoyt Hardlead Made Especially for Roofing Purposes

It is used for roofing, flashings, cornice coverings and other building purposes where it is practical to use sheet metal.

It is rolled in sheets 24 in., 30 in., and 36 in. wide and 96 in. long, weighing $2\frac{1}{2}$, 3, 4, 6 and 8 pounds to the square foot.

The proper weight of Hoyt Hardlead sheets depends upon the purpose for which they are to be used. For roofing, cornice coverings and base flashings generally, the 3-lb. sheet is recommended, and for cap flashings and batten roofs where the battens are spaced 18 in. or less on centers the $2\frac{1}{2}$ -lb. sheet may be used.



**Prudential Life Insurance Building,
Newark, N. J.**

CASS GILBERT, Architect, New York, N. Y.
Hoyt Hardlead installed throughout; all roofs, flashings, ridges, louvres, crestings, finials, gutters, leaders



**Baptistry, Cathedral of St. John the Divine,
New York, N. Y.**

CRAM & FERGUSON, Architects, Boston, Mass.
Hoyt Hardlead roof, finials and gutter fascia

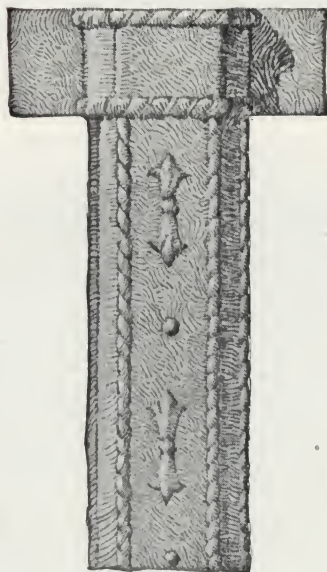
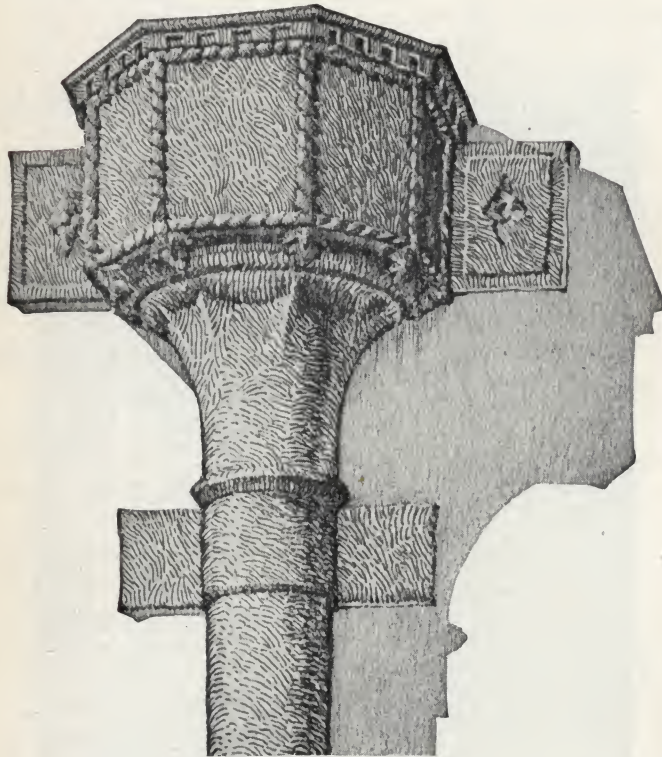


**One of the Twelve Hundred Spandrels for the Chicago
Tribune Tower**

These spandrels are 33x38 in. and were stamped in one piece of 4-lb. Hoyt Hardlead stamping metal

Ornamental Cast Leader Heads, Leader Pipes, Gutters, etc.

A number of designs are carried in stock and we are prepared to execute special designs in accordance with architects' drawings.



Seamless Conductor Pipe

Made from Hoyt Hardlead in the following sizes: 2x3 in., 3x4 in., 3½x5 in., 4½x4½ in., 3 in. round, and 4 in. round. It can be furnished smooth or finished with a hammered or rough cast surface, as desired.



Rolled Sheet Conductor Pipe

Made from Hoyt Hardlead rolled sheet in the following sizes: 2x2 in., 3½x3½ in., 2½x3¼ in., 2½x4¼ in., 3 in. and 4 in. octagon and 3 in. and 4 in. round, corrugated.



Rolled Sheet Gutter

Made from Hoyt Hardlead rolled sheet with reinforced beaded edge in the following sizes: 3 in., 4 in., 5 in. and 6 in., half round and octagon.

APOLLO STEEL COMPANY

Manufacturers of Apolloy Metal Sheets, Roofing and Siding

GENERAL OFFICES

APOLLO, PA.

SALES OFFICES

BOSTON, MASS.

BUFFALO, N. Y., Marine Trust Building

CHICAGO, ILL., 624 So. Michigan Boulevard

CLEVELAND, OHIO, 1655 Union Trust Building

ST. LOUIS, MO., 1712 Chestnut Street

CINCINNATI, OHIO, 1020 Union Trust Building

DETROIT, MICH., 2034 Dime Bank Building

LYNCHBURG, VA., 701 Krise Building

NEW ORLEANS, LA., 411 So. Peters Street

NEW YORK, N. Y., 1372, 50 Church Street

PHILADELPHIA, PA., 607 Otis Building

PITTSBURGH, PA., 2218 Oliver Building

SAN FRANCISCO, CAL., Hunter-Dulin Building

SYRACUSE, N. Y., Keith Building

Products

APOLLOY METAL (Copper Content) STEEL.

COMMERCIAL PURE IRON (Copper Content).

Galvanized

Roofing Sheets

One Pass Cold Rolled 1¼, 2, 2½, 3-in.

Blue Annealed

Corrugated

Single Pickled

2-V, 3-V, 5-V Crimp

Plain Roll Roofing

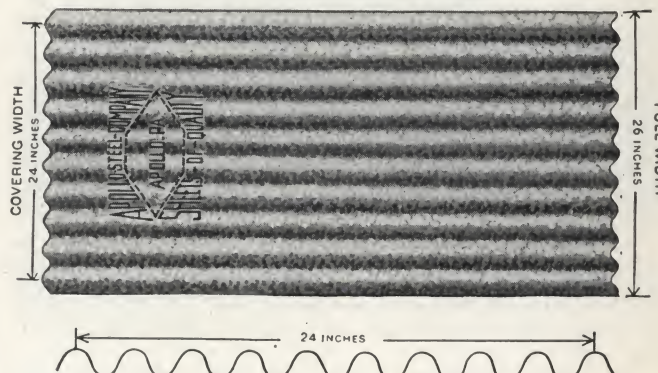
**APOLLOY
METAL**
COPPER CONTENT

rust-resisting properties. The value of this material is attested by the fact that a number of state-highway departments specify iron sheets exclusively.

Corrugated Steel Sheets

Made of best quality regular and copper content black and galvanized sheets.

Corrugated sheets are the strongest form of sheet metal and are used for roofing and siding. The corrugations make the sheet more rigid and allow for expansion and contraction, adding strength to the structure to which applied. They are manufactured from flat sheets made in our own plant.



2½-in. Corrugated Steel Sheets

Apolloy Metal, Its Manufacture

The new materials entering into the various stages of fabrication are carefully analyzed in our own laboratory, assuring the use at all times of materials of the proper composition for the ultimate purpose intended.

The fundamental sheet mill operation—hot rolling—is done on the most approved rolling mill machinery under the direction of plant superintendents who give each order their careful and individual attention.

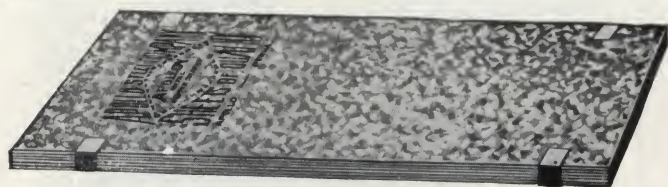
All sheets are rolled from soft ductile steel of special analysis to suit each individual requirement.

Apolloy Metal, Its Uses

Apolloy Copper Content Steel Sheets are manufactured in blue annealed, black and galvanized finishes. This brand has established for us an enviable reputation among our customers who have been using these sheets in the manufacture of their numerous products.

These sheets are especially recommended for exterior work such as roofing, siding, cornices, etc., for underground work such as vaults, culverts, tanks, etc., in fact, wherever the sheets will be exposed to the weather or other corroding agencies.

The extra cost of Apolloy Metal Copper Content Sheets is surprisingly low. Write to our nearest sales office for further particulars.

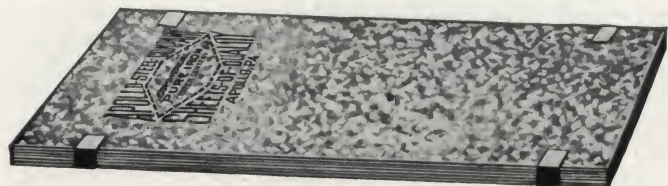


Apolloy Metal Copper Content Sheets

Commercial Pure Iron Copper Content Sheets

It is a known fact that the impurities in metal are the first to be attacked by corrosion. By eliminating impurities in-so-far as possible, it would follow that the resultant metal would have rust-resisting properties of the highest quality.

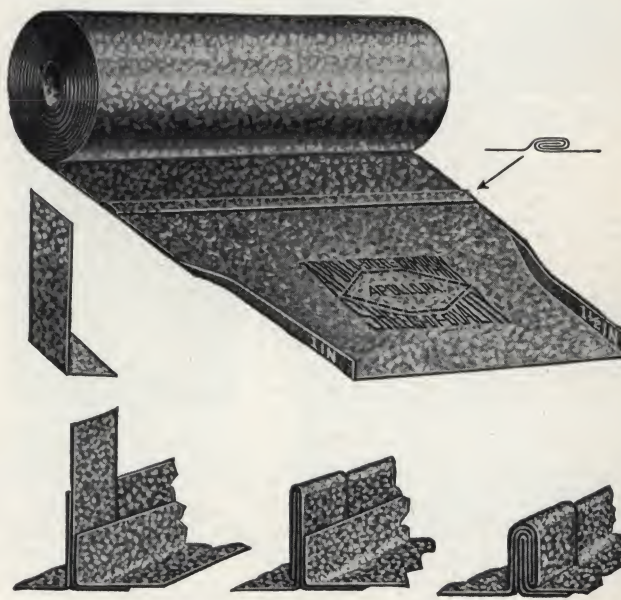
To supply the demand for this class of material we have specialized in commercial pure iron sheets. These sheets are especially suitable for use as corrugated metal culverts. Copper may be added in proper quantity and this imparts additional



Commercial Pure Iron Copper Content Sheets

Plain Roll Roofing

Black and galvanized; 28 gauge and lighter. Put up in rolls, of five sheets, full 50 ft., 26½-in. wide; each roll has covering surface of 100 sq. ft.



Plain Roll Roofing

THE AMERICAN ROLLING MILL COMPANY

Makers of ARMCO Ingot Iron

EXECUTIVE OFFICES MIDDLETOWN, OHIO

DISTRICT OFFICES

NEW YORK, N. Y., 50 Church Street
CHICAGO, ILL., People's Gas Building
PHILADELPHIA, PA., Franklin Trust Building

DETROIT, MICH., General Motors Building
PITTSBURGH, PA., Oliver Building
ST. LOUIS, MO., 901-2 Ambassador Building
CINCINNATI, OHIO, Union Trust Building

SAN FRANCISCO, CAL., Tenth and Bryant Streets
CLEVELAND, OHIO, B. F. Keith Building

Products

"ARMCO" INGOT IRON SHEETS: "ARMCO" Ingot Iron Galvanized Sheets, "ARMCO" Ingot Iron Galvanized Corrugated Sheets, "ARMCO" Ingot Iron Black Sheets, "ARMCO" Ingot Iron Blue Annealed Sheets, "ARMCO" Ingot Iron Formed, Galvanized Roofing Sheets.



Ingot Iron

(4) All work that is to be furnished hereunder shall be installed at the proper time and as rapidly as the progress of the surrounding work requires or permits.

(5) The sheet metal contractor shall verify all measurements given and shall obtain at the building such additional measurements, sizes and other required information for the correct installation of this work.

(6) All cutting, drilling, tapping or fitting of sheet metal work required for its installation or to receive or accommodate the work of other contractors shall be done in an accurate manner.

Rust Resistance

One of the five outstanding qualities of ARMCO Ingot Iron is its ability to resist rust. This is due to its unparalleled freedom from the impurities that promote rust. The impurities in ARMCO Ingot Iron never exceed 16-100ths of 1%.

Cost

Galvanized ARMCO Ingot Iron costs slightly more than ordinary galvanized steels. The labor cost is the big item in sheet metal construction. Costly repairs and replacements are postponed when ARMCO Ingot Iron is used.

Under all ordinary conditions, galvanized ARMCO Ingot Iron for roofs, roof drainage parts, etc., will last the life of the building at less than one-quarter the materials cost of copper or lead; and one-half the cost of zinc.

ARMCO Ingot Iron is the sheet metal of *lowest cost per year*.

Standard Specifications for Sheet Metal Work

(1) Furnish material and labor for completion of all sheet metal work required by drawings and specifications. All such work, unless otherwise specified, shall be made from ARMCO Ingot Iron galvanized sheets as manufactured by THE AMERICAN ROLLING MILL Co., Middletown, Ohio, and of gauge (see recommended gauges for different classes of work) except for parts otherwise indicated on drawings.

RECOMMENDED GAUGES FOR DIFFERENT CLASSES OF WORK

Installation	Gauge No. for residences	Gauge No. for offices and public buildings	Gauge No. for factories and warehouses
Roofing.....	26 to 28	26	18 to 24
Siding.....	24 to 26	22 to 26	20 to 26
Cornices.....	24 to 26	22 to 26	22 to 24
Skylights.....	24 to 26	20 to 26	20 to 26
Ventilators.....	24 to 26	18 to 24	16 to 24
Heating and ventilating ducts.....	22 to 26	16 to 26	16 to 26
Eaves troughs.....	24 to 26	24 to 26	22 to 24
Leaders.....	24 to 26	24 to 26	22 to 26
Flashing.....	26 to 28	26	may be lighter than roof
Valleys.....	24 to 26	24 to 26	same gauge as roof
Ridge roll.....	26 to 28	26	may be lighter than roof
Window frames.....	22 to 24	22 to 24	22 to 24
Window sash.....	24	24	24

The heavy gauges shown above should be used where unusually severe corrosive conditions are present.

(2) The iron shall be galvanized with a high grade zinc coating. This coating shall be clean and free from blisters and other mechanical defects.

(3) Each sheet shall be stenciled with the Blue ARMCO Ingot Iron trade-mark showing the gauge of the metal.

Standard Gauges and Sizes

ARMCO Ingot Iron Galvanized Sheets are carried in stock in the following sizes: Gauges 16, 18, 20, 22, 24, 26 and 28. Widths, 24, 26, 28, 30 and 36 in. Lengths, 96 and 120 in.

ARMCO Ingot Iron Black Sheets are carried in stock in even gauges from 14 to 26, inclusive, and in the same sizes as galvanized.

ARMCO Ingot Iron Corrugated Sheets for roofing and siding purposes are made with 5, 3, 2½, 1½ and ⅝-in. corrugations. For general building purposes we recommend and carry in stock a 2½-in. corrugated sheet, 26 in. wide (after corrugating) for siding, and 27½ in. wide (after corrugating) for roofing. This size covers 24 in. in the width and allows for a one corrugation lap for siding and a one and one-half corrugation lap for roofing.

These sheets may be had from stock in the following sizes: Gauges, 20, 22, 24, 26 and 28. Widths, 26 and 27½ in. Lengths, 60, 72, 84, 96, 108, 120 and 144 in.

All of the above sizes are termed standard sizes because they are carried in stock and used most frequently. All grades of sheets may be had in special sizes when an order is placed for 2000 lbs. or more of a size.

APPROXIMATE THICKNESS AND WEIGHT OF GALVANIZED ARMCO INGOT IRON

Gauge No.	Weight per sq. ft., lb.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.	Gauge No.	Weight per sq. ft., lb.	Approximate thickness, in.	Approximate thickness in decimal parts of an in.
28	.781	1/64	.0153	21	1.531	11/320	.0337
27	.844	11/640	.0169	20	1.656	3/80	.0368
26	.906	3/160	.0184	18	2.156	1/20	.0490
25	1.031	7/320	.0214	16	2.656	1/16	.0613
24	1.156	1/40	.0245	14	3.281	5/64	.0766
23	1.281	9/320	.0276	12	4.531	7/64	.1072
22	1.406	1/32	.0306	10	5.781	9/64	.1379

A Helpful, Practical Book—"Galvanized Iron for Roofs and Roof Drainage"

This book is a comprehensive compilation of information on the most approved method of galvanized iron roof and roof drainage construction. The complete index affords ready reference to any desired subject. The information, tables, scales, and working data contained in this book, make it an extremely helpful addition to any architect's or engineer's library.

It has been carefully edited in collaboration with capable architects and reviewed by The Producers' Research Council (affiliated with The American Institute of Architects).

We will send a copy without charge or obligation, to any architect or engineer who is really interested in having it for the help it is able to give.

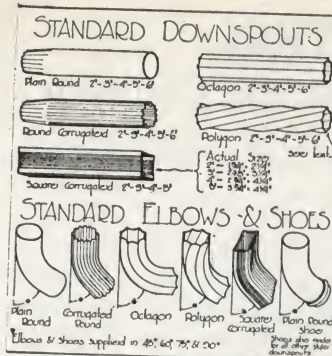


Fig. 1—Downspouts, Elbows and Shoes

The plain round and square corrugated designs are standard in the industry in the sizes noted. Other styles shown made up to order.

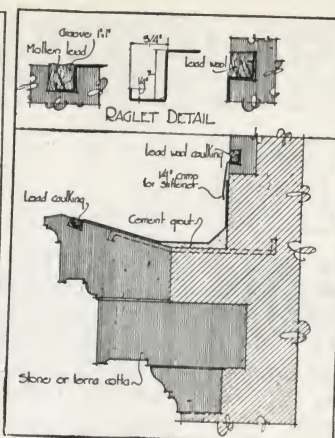


Fig. 2—Details Method of Securing and Flashing Gutter Linings on a Stone or Terra Cotta Bed

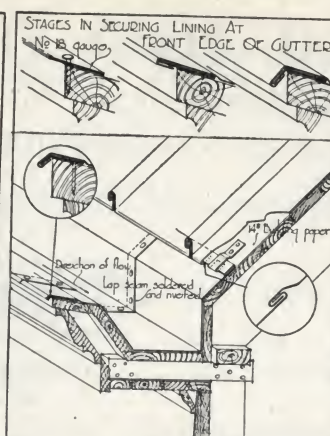


Fig. 3—Details a Typical Box Gutter in Connection with a Standing Seam Galvanized Iron Roof

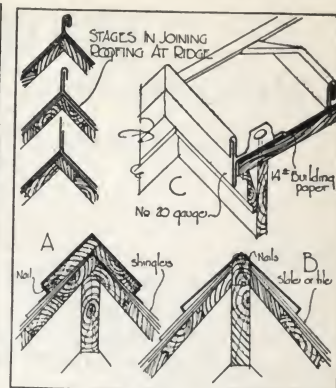


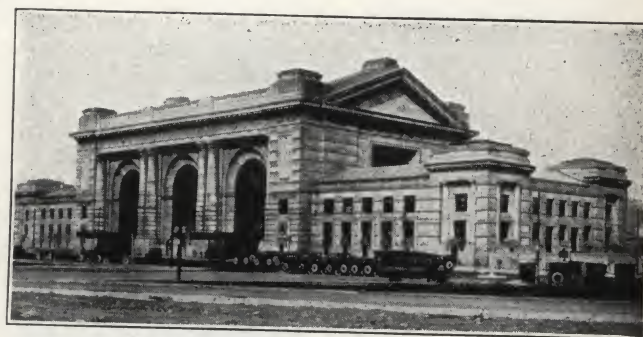
Fig. 4—A Ridge Capping of Satisfactory Construction

Nailheads should be soldered to the capping both in this capping and the one detailed in section B



Armco Ingot Iron Double Cross-Lock Roll Roofing

Especially adapted to roofs with less than 2-in. pitch to the foot, or when but 1-in. fall is given. Gauges, 26 and 28



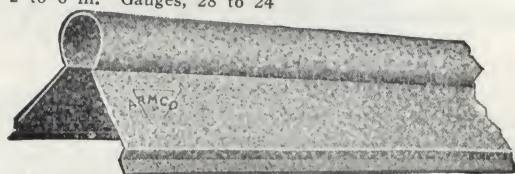
Union Station, Kansas City, Mo.

When the station was built in 1913, Jarvis Hunt, architect of Chicago, saw to it that the heating and ventilating investment was protected with rust-resisting ARMCO Ingot Iron. Now after 14 years' service, his judgment has been more than vindicated—there has not been a single replacement

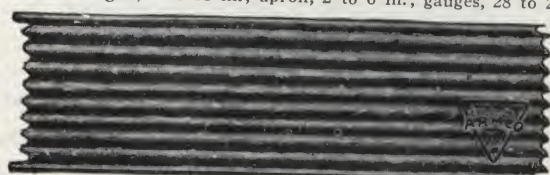
Square Corrugated Conductor Pipe
Sizes, 2 to 5 in. Gauges, 28 to 24.
Dimensions, 1 3/4 x 2 1/4 to 3 3/4 x 5 in.



Plain Round Conductor Pipe
Sizes, 2 to 6 in. Gauges, 28 to 24



Armco Ingot Iron Galvanized Plain Ridge Roll
Standard 10-ft. lengths. Sizes: roll, 1 3/4 to 3 in.; girt, 7 to 18 in.; apron, 2 to 6 in.; gauges, 28 to 24



Standing Seam Corrugated Roofing Sheets

Made in all standard sizes, gauges, and corrugations. Also supplied in 1 1/4 and 2 1/2-in. regular corrugated sheets, 5 to 10-ft. lengths, in 22 gauge and lighter

Distribution

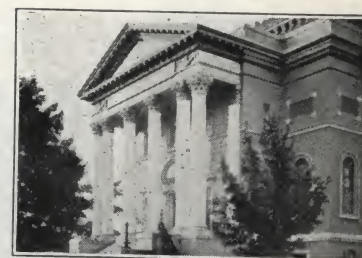
Distributors in all parts of the United States and Canada sell complete lines of ARMCO Ingot Iron galvanized sheets and sheet products, also in some instances, black and blue annealed sheets. Ingot Iron shops everywhere stock and use ARMCO Ingot Iron sheets and sheet products. Many of these shops are well equipped to work with architects on exacting sheet metal construction. If you desire, we shall be glad to give you the names of those distributors and shops in any territory in which you may be planning structures requiring any kind of sheet metal equipment.



Munroe Building, Chicago

HOLABIRD & ROCHE, Architects

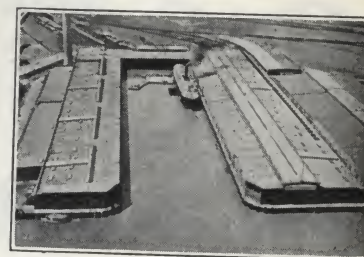
In 1912, this building was equipped with ARMCO Ingot Iron window frames. These are still serving today.



First Church of Christ, Scientist, Atlanta, Ga.

ARTHUR NEAL ROBINSON and EMMET DOUGHERTY, Architects

The ARMCO Ingot Iron cornice on this church has seen 14 years' service and is still in splendid condition.



Ocean Steamship Terminals, Savannah, Ga.

Installed by DOWMAN-DOZIER MFG. Co. ARMCO Ingot Iron corrugated roofing and siding has withstood salt corrosion for 12 years.

CENTRAL ALLOY STEEL CORPORATION

Manufacturers of Toncan Copper Mo-lyb-den-um Iron Rust and Corrosion Resisting Sheets
MASSILLON, OHIO

Products

TONCAN IRON SHEETS: Black, Blue Annealed, and Galvanized.

TONCAN IRON ROOFING: Roll, V-Crimped, Pressed Standing Seam and Corrugated.

TONCAN IRON SIDING: Corrugated, and Reproductions of Rock Faced Stone, Rock Faced Brick and Lapped Weatherboard.

Also Toncan Iron Corrugated Sheets, straight and curved, for use with concrete work and other special purposes.

Description and Uses

Toncan is a carefully made commercially pure iron alloyed with copper and mo-lyb-den-um to obtain the greatest possible resistance to rust and corrosion. Its long life and easy working qualities are a matter of common experience.

Toncan Iron is widely used for expanded metal lath, eaves trough, conductor pipe, ridge roll, valleys, flashing, cornice, balcony, marquise, window frames, skylights, tanks, ventilation, refrigeration—in fact, for every purpose which demands a durable sheet iron.



Roll Roofing

Painted or galvanized. Excellent for low pitched roofs. Covering width, 24 in. Each roll lays 100 sq. ft. on the building



Three V-Crimp Roofing

An attractive form of Toncan roofing, covering width 24 in.; gauges, No. 20 and lighter; also made with 2 and 5 V-form

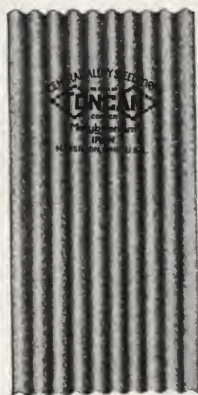
Expanded Metal Lath

Many architects specify Toncan lath for all lath work as an extra assurance of lasting service. It should always be used for stucco and other exterior or exposed work.



Toncan Expanded Metal Lath

Made in standard weights of 2.2, 2.5, 3.0 and 3.4 lb. per sq. yd. Sheets, 24x96 in., 9 sheets or 16 sq. yd. per bundle



Corrugated Sheets for Roofing and Siding

Gauges No. 10 and lighter; 1 1/4 and 2 1/2 in. corrugations are standard



Toncan Iron Conductor Pipe

Round corrugated, square corrugated and plain round conductor pipe. Lengths, 8 and 10 ft. All diameters. Elbows, miters and cut-offs to match



Toncan Iron Eaves Trough

Length, 10 ft. All widths; and gauges Nos. 28, 26 and 24



Corrugated Ridge Roll

2 1/2 or 1 1/4 in. corrugations. Lengths, 27 and 96 in.



Corrugated End Wall Flashing

Flat side on wall, 2 in. Corrugated apron, 4 in. Lengths, 27 and 96 in.



Advantages

In Toncan Iron lies the architect's most satisfactory solution for the sheet metal problem. It enables him to specify a moderate priced sheet metal of unquestionable durability—a durability proved by many years of use in thousands of structures and in every form of severe sheet

metal service.

Identification

The trade-mark shown above is stamped in two or three places on every Toncan Iron sheet and die stamped on eaves trough, conductor pipe, elbows, etc.

Sources of Supply

Jobbers and tinnners everywhere sell Toncan Iron sheets and products. On request, we will supply names of manufacturers or dealers who can furnish any special Toncan Iron product you may have in mind.

Specification Data

"All sheet metal work shall be of Toncan Copper Mo-lyb-den-um manufactured by the CENTRAL ALLOY STEEL CORPORATION, of Massillon, Ohio," is a safe specification; for Toncan meets all the requirements of modern sheet metal practice.

For trough and pipe, we recommend No. 26 gauge. For gutter, flashing, valleys, etc., No. 24 or, better still, No. 22 gauge. Roofing may be No. 26, 24 or 22 gauge. The heavier gauges should always be used where corrosive conditions are severe as along the sea coast or in a smoky atmosphere. Further information on Toncan Iron will be supplied promptly on request.

References

Thousands of installations in all parts of the country are proving the lasting qualities of Toncan Iron. A few are mentioned below. Ask for others.

Kansas City Star Building, Jarvis Hunt, Architect
Building for Stewart-Warner Speedometer Co., Chicago, Ill., L. G. Hallberg & Co., Architects
Commons Building, New Hampshire College, Prof. E. T. Huddleston, Architect
Aragon Hotel, Jacksonville, Fla., Rutledge Holmes, Architect
Lynchburg National Bank, Lynchburg, Va., Alfred C. Bossom, New York, N. Y., Architect
Grand Central Palace, New York, N. Y., Warren and Wetmore, Architects
Industrial Arts Building, Eastern States Exposition, Springfield, Mass., McClintock & Craig, Architects
Republic National Bank Building, Dallas, Tex., C. D. Hill & Co., Architects
U. S. Chamber of Commerce, Washington, D. C., Cass Gilbert, Architect



California Palace of The Legion of Honor, San Francisco, Cal.

G. A. APPLGARTH, Architect
30,000 sq. ft. of Toncan Skylight used here

THE NEWPORT ROLLING MILL CO., INC.

Sole Manufacturers of Gohi (Genuine Open Hearth Iron) Rust-resisting
Sheets, Roofing, Siding and Accessories

NEWPORT, KY.

Products

GOHI (GENUINE OPEN HEARTH IRON) includes Black and Galvanized Sheets, Plain or Corrugated; Corrugated Arches; Corrugated Awnings; Corrugated Ridge Rolls; Pressed Standing Seam Roofing; Plain Roll Roofing; Roll and Cap Roofing; Weather-board Siding; Beaded Ceiling; Beaded Siding; Brick Siding; Rock Face Brick Siding; Rock Face Stone Siding; Metal Shingles; Plain Ridge Roll; Cornices; Louvers; Eaves Trough; Conductor Pipe; Elbows and Shoes; Mitres; Cut-offs; Skylights and Metal Ceilings.

Description

GOHI (Genuine Open Hearth Iron) pure iron copper alloy rust-resisting sheets and formed products will analyze approximately 99.875% pure—considering as impurities the dangerous rust and corrosion agents,



namely: carbon, manganese, phosphorus, sulphur, silicon, nitrogen, hydrogen and oxygen. In addition, GOHI (Genuine Open Hearth Iron) has a copper content of not less than two-tenths (.2) of one per cent (1%) or over three-tenths (.3) of one per cent (1%). This addition of copper to the pure base metal produces a superior lasting and rust-resisting quality product.

Advantages

GOHI (Genuine Open Hearth Iron) is absolutely uniform in quality, being manufactured from the highest grade of selected materials, thus assuring one of the best rust-resisting metals for any and all conditions. GOHI will give longer life and is more durable than re-worked muck bar, charcoal iron, steel, or other iron sheet metal. On account of its superior working qualities, labor costs are reduced and are actually less than in working up steel or other iron sheets. Lasting qualities considered, GOHI is more economical than other sheet metal building materials you can specify.

Sources of Supply

Jobbers, dealers, hardware concerns, etc., everywhere sell GOHI (Genuine Open Hearth Iron) sheets and formed products. On request, we will supply names of distributors who can furnish GOHI in sheets or in the formed products specified above.

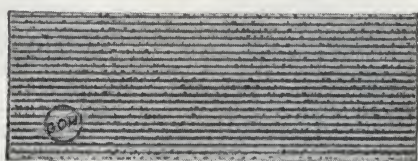
Service

GOHI has been produced on a foundation of quality, and knowing it to be as good as human ingenuity can make it, THE NEWPORT ROLLING MILL Co., INC., has directed all efforts to improved service.

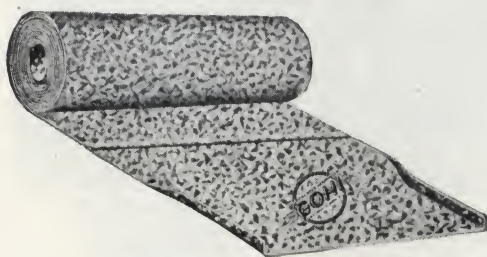
We recently had prepared by a firm of architects, a file folder containing a complete analysis and specifications of GOHI (Genuine Open Hearth Iron). This valuable information should be in the hands of every architect specifying quality sheet metal work. A copy is yours for the asking.

We have also available for your reference, leatherette folders containing sample gauges of GOHI which are mailed free upon request.

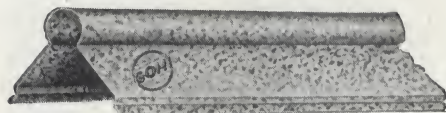
Regardless of whether you are buying many carloads or a small emergency order, you are assured of speedy service. Our organization has been built up to render prompt attention to sheet metal problems and you can depend on it.



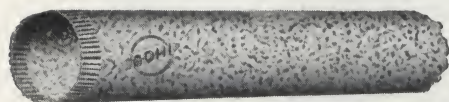
Corrugated Sheet



Roll and Cap Roofing



Ridge Finish



Conductor Pipe



Roof Gutter

Contributing Member

SHEET STEEL
TRADE EXTENSION COMMITTEE

SHEET STEEL TRADE EXTENSION COMMITTEE

Use of Sheet Steel for Roofs

Oliver Building
PITTSBURGH, PA.

For List of Supporting Members, see page A796

For Sheet Steel Cornices, see page A558; for Interior Uses of Sheet Steel, see pages A796-797

Advantages

Durability—Thousands of sheet steel roofs more than a quarter of a century old and still giving satisfactory service are sufficient evidence of durability.

Adaptability—There is a sheet steel roof for every style of architecture and for every type of building.

Beauty—Because of its wide adaptability with many varying types, sheet steel provides the architect a roofing



Batten Roof of Sheet Steel on the New Taylor-Allderdice High School, Pittsburgh
72,400 sq. ft. of sheet steel used on this job

material with which he can satisfy his artistic desires and attain those beautiful effects so necessary in roofing.

Economy—The long life and low maintenance cost of sheet steel roofing results in genuine roofing economy. Many steel roofs in service for twenty-five years and more have never had a cent spent on them for repairs.

Triple Protection—The sheet steel roof stands almost in a class by itself from the standpoint of protection against fire, lightning and water. It cannot burn. It keeps internal fires from spreading, and is proof against flying sparks and fire brands. Properly grounded it is absolutely proof against lightning. It is impervious. When properly and adequately coated it is not subject to corrosion. Heat and cold, expansion and contraction, inflict no damage.

Types

Sheet steel is available in the following forms which challenge architectural attention by their beauty of line and color and their adaptability in roofing residences, schools, business structures and churches:



Standing Seam Roof of Sheet Steel which Harmonizes with the Architectural Design of This Residence

Battens—In the newer type, the batten design has proportions which express the architect's conception of balance in light and shade. They can be readily decorated in pleasing color contrasts. Illustrations upon request.

Porcelain Enameled Steel Tile—This is the most recently developed type of sheet steel roofing. It appeals to the architect because of its diversity of form in harmonious and permanent colors. Illustrations upon request.

Standing Seam—The old Colonial type with which the White House at Washington, the New York City Hall and many others of our most distinguished historical buildings have been roofed, is receiving marked appreciation for its quiet dignity, and is being used on many important public buildings and notable residences.

Spanish Tile—These steel tile give the effect of the roofs of old Spain, with the advantage of much lighter weight and lower cost. Long life and freedom from breakage are additional merits.



Spanish Metal Tile Easily Lend Themselves to the Most Complicated Roof Designs

Gauges

For the standing seam and batten types of sheet steel roof, not less than No. 28 gauge galvanized or long terne sheets should be used. For tile roofs not less than No. 26 gauge should be used.

Maintenance

If appearance is maintained, no further maintenance is required.

Specifications

The SHEET STEEL TRADE EXTENSION COMMITTEE will furnish gratis any information on the types mentioned upon request.

Service

The research and engineering facilities of the SHEET STEEL TRADE EXTENSION COMMITTEE are at the service of any architect without obligation.

KLEIN & KAVANAGH

INCORPORATED

Masters in Roof Reproduction and Craftsmen in Metal
207-209 East 120th Street, NEW YORK, N. Y.

Products

"ANTIQUE FINISH" LEAD COATED COPPER LEADER PIPES, HEADS, GUTTERS, SWAN NECKS, ORNAMENTAL HAND WROUGHT and CAST LEAD WORK, ANTIQUE ROOF REPRODUCTIONS OF SLATE STONES and TILES.



work—lead coated copper, plain copper, lead or bronze—is fabricated, wrought or cast in our own plant to exacting requirements. Flashings and metal work generally are built-in at the building scientifically—with due allowance for contraction and expansion.

Chimneys are flashed through to the flue lining, all flashings built well into or through the walls and concealed from view, if desired, with absolute safety. Standing seam or batten roofs are installed in accordance with our special method (patent applied for) eliminating all soldering of joints, allowing full freedom for movement of the metal and insuring absolute weathertightness.

Specialized Roofing Service

We design, fabricate, assemble and erect, upholding, with startling fidelity, the infinite standard of right maintained by the old masters.

Our service precludes the misunderstandings that frequently arise when quarry, foundry, mill, roofer and sheet metal contractor each expresses his individual interpretation of the architect's specifications. *For we handle the entire roofing and metal problem from its inception.*

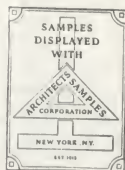


The slates or tiles are quarried or manufactured under our supervision in accordance with a pre-determined scheme, and the colors, texture, sizes, etc. are assembled and checked by our inspectors at their point of origin before shipment is made.

The success of the roof is predetermined by careful study of perspective from vantage points around the building. The color is distributed in accordance with accepted principles of color combination. Varying thicknesses are worked out to gradually decrease in weight from eave to ridge. Thus, the general ensemble has no suggestion of the "violence" which results when roofs are treated in a hit-or-miss, indifferent manner by allowing haphazard courses of color, thicknesses or sizes of slate or tile.

Exceptional Metal Work

Our "Antique Finish" lead-coated copper is made in *our own plant* under a patented process, and is a true reproduction of old cast lead. All of our metal



Roofing and Sheet Metal Specifications

The most comprehensive specification cannot express the interesting nuances, the effectively uneven character of the slates, the subtle refinement of detail that culminate in the truly correct roof on the French, English or Colonial residence.

We could suggest many paragraphs covering points of construction and description of results desired, but we have too often seen exquisite potentialities ruined by unfortunate interpretations of plans and specifications left to competitive bidders. Consequently, may we suggest your discussing and pre-determining in collaboration with our architectural consultants the treatment of your roofing and metal work and then incorporating in your specification the following clause under the heading of "Roofing and Sheet Metal Work":

The general contractor will allow the sum of \$..... for all roofing and sheet metal work indicated on the plans and necessary, in the opinion of the architect, to insure the weathertightness of the building. All labor and material required for this work will be furnished by KLEIN & KAVANAGH INC., and upon completion, they will deliver to the owner their guarantee, bonded if necessary, to make good any of their work which may prove defective within the period of 10 years from the date of completion.



Studio Building, Riverdale, N. Y.
Dwight James Baum, Architect

LYON, CONKLIN & CO. INCORPORATED

Manufacturers of Lyonore Metal Products

BALTIMORE, MD.

WASHINGTON, D. C., 930-932 E Street, N. W.

Products

"LYONORE METAL" GALVANIZED SHEETS, CONDUCTOR PIPE, EAVES TROUGH, ROOFING TERNE PLATE, etc.

Lyonore Metal
an alloy

TRADE-MARK

Lyonore Metal Galvanized Sheets

Adapted for all forms of sheet metal work, for ventilating ducts, or any of the uses listed. Because of the texture of the metal, the spelter coating adheres tightly and does not peel, even in the most difficult or sharp bending operation.

Lyonore Metal—Corrosion Resistance

A knowledge of the resistance of the alloy Lyonore Metal to chemical influences is of considerable practical importance.

Nearly all articles of metal are exposed to the action of gases contained in the atmosphere; besides nitrogen, there are oxygen, carbonic acid and aqueous vapors, such as steam and fog. In inhabited localities there is nearly always present sulphur, ammonia, etc. These gases together with moisture, rain or snow, readily create a condition that makes a metal exposed to them subject to the influence of electrolysis, the cause of rust, corrosion or disintegration.

Lyonore Metal is an alloy that is electrically balanced, the constituents being of such a nature and proportionately combined as not to be unduly influenced by electrolysis.

Its ability to resist the corrosive action generated by the gases mentioned above proves Lyonore Metal to be the most perfectly balanced alloy that science has been able to compose up to this period.

Several of the constituents entering into the composition of Lyonore Metal are of the same substance as the metal that was used by the Egyptians in the joints of the stone work of the Pyramids in Egypt. This metal has resisted corrosion for more than five thousand years.

Other Features—Lyonore Metal is of a finer texture, and more homogeneous than steel or iron. It is pliable, yet tough. Can be worked with less labor and expense and, when formed, holds its shape. Has a tensile strength of 48,000 lb. per sq. in. Its pliability and toughness make tighter seams possible and its finer texture holds galvanized coating better.

Lyonore Metal Terne Roofing Plates

Made in two brands, according to pounds coating: Lyon Brand and Glendale. Lyon Brand carries 40 lb. coating.

Glendale Brand will outwear any steel base plate which carries 40 lb. coating.

Both are made on Lyonore Metal Base of carefully selected, perfect sheets. Coated by the genuine *pure palm oil process*, with pure new tin and new lead, in the proportions of 1 part tin and 2 parts lead, making this a *genuine terne plate*. 1C thickness is generally used for roofing. 1X thickness for valleys and gutters.



Roof of Galvanized Lyonore Metal

Exposed to smoke and gases over retort in gas plant at Charlotte, N. C. In service 11 years and still in excellent condition



Southern Hotel, Baltimore, Md.

Lyonore Metal was used throughout. For ventilating ducts, spouting, refrigerator lining, etc.

Corrugated Sheets

Lyonore Metal is furnished in galvanized corrugated sheets in all standard gauges. Standard corrugations are $\frac{5}{8}$, $1\frac{1}{4}$, 2, $2\frac{1}{2}$, 3 and 5 in. Standard lengths are 5, 6, 7, 8, 9, 10 and 12 ft. Covering width is 24 in. Can also be furnished in pressed standing seam, V-crimped, weather board siding, beaded ceiling, brick and stone siding, etc. These sheets are strong, rigid, easily applied and but little subject to expansion and contraction.

Lyonore Metal Crimped Sheets for Cornice, Soffits, Panels, Conductor Pipe, etc.

Made in gauges Nos. 27, 26, 24 and 22. These sheets, crimped $\frac{1}{8}$ in., are especially suitable for cornice. They are stronger, not easily dented, and, when painted, give the appearance of stone. See illustration at bottom of page. Conductor pipe and eaves trough can also be made from crimped sheets.

Conductor Pipe

All size and gauges, plain round, corrugated round, plain square and corrugated square.

Eaves Trough

In all sizes, styles and gauge.

Standard Specifications for Tin Roofing

For Lyonore Metal Tin Roofing in standing seam, flat seam or ribbed. All tin roofing on this building shall be Lyonore Metal Base, Glendale Brand [Lyon Brand 40-lb. coated], 1C thickness for all roofing, and 1X thickness for valleys and gutters, to be done in accordance with the Standard Specifications of National Association Sheet Metal Contractors.

Standard Specifications for Sheet Metal Work

All galvanized sheet metal on this building shall be Lyonore Metal of gauges specified for each class of work.

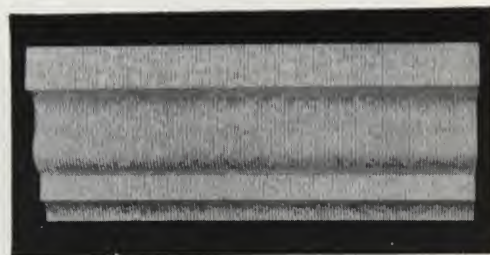
Note: For best results, we recommend that the following gauges be specified for various classes of sheet metal work.

For conductor pipes, hanging gutters and eaves trough.....	No. 26 gauge
For cornices	No. 24 gauge
For skylights	No. 24 gauge
For gravel strips and flashings.....	No. 26 gauge
For ventilating ducts and dust conveyors (inside work), specify gauge number according to size of duct as follows:	
16-in. diameter and smaller.....	No. 26 gauge
18-in. diameter	No. 24 gauge
Larger than 18-in. diameter.....	No. 22 gauge
For paneling and moulding.....	No. 24 gauge
For special work.....	No. 24 gauge

Literature and Samples

We will submit samples of various forms of Lyonore Metal and literature bearing on its use.

Write for File 12c7 containing valuable information for architects and engineers.



A Lyonore Cornice

Sample of cornice made from Lyonore Metal crimped sheets—the appearance of stone without the cost, and eliminating the menace of a heavy cornice cracking or breaking away, endangering pedestrians

N. & G. TAYLOR COMPANY

Manufacturers of Tin Plate of all Kinds

ESTABLISHED 1810
118TH YEAR

Liberty Trust Building, Broad and Arch Streets
PHILADELPHIA, PA.

WORKS
CUMBERLAND, MD.

Products

"TARGET AND ARROW" BRAND OF ROOFING TIN, formerly known as "Taylor's Old Style."

"Taylor's Extra Coated 40-lb. Copper Bearing, Open Hearth"; "Taylor's Fire Door Standard Terne"; with other brands of Roofing Tin, Terns, Bright Tin Plate and Black Plate.

Advantages of Tin Roofing

These can be summed up briefly as follows:

(1) Durable. (2) A time-tried, long established material. (3) Easily applied. (4) Adaptable to any kind of surface. (5) Moderate first cost. (6) Low cost of maintenance. (7) Easily and quickly repaired if damaged. (8) Loses nothing in appearance with age. (9) Light in weight. (10) Weatherproof. (11) Not affected by heat or cold. (12) Gives protection against lightning. (13) Incombustible and prevents spread of fire. (14) Can be painted any color.

Maintenance

A coat of paint every four or five years, to keep the surface in first class condition.

Use for first coat only metallic brown, Venetian red, iron oxide, red lead, or white lead, with pure linseed oil. Afterward any color to suit the color scheme of the building.

Each painting restores the roof to its original condition. With this slight attention a "Target and Arrow" tin roof will usually outlast the building it covers.

"Target and Arrow" Brand Roofing Tin

This is our highest grade and the same durable quality of roofing tin that this company has supplied to the American sheet metal roofing trade for more than 70 years. It is an old specialty, made by a process handed down from the early days of our business. The base plate is a special quality, developed in our complete works, following the best practice of former years.

Extreme durability is obtained by an oldtime coating process of ours, by which an exceptionally heavy coating is applied, rich in pig tin. The black sheets used are cut accurately to the finished standard size, 14x20 in. or 28x20 in. before tinning, to prevent uncoated edges. The finished sheets are closely inspected, and only the primes or perfect sheets are stamped with the "Target and Arrow" trade-mark.



Trade-mark Stamped on Each Sheet

This tin has in many cases lasted in good condition on the roof for more than 60 years.

Furnished in standard thicknesses, known as IC (pronounced *eyesee*), approximately No. 30 gage U. S. Standard; IX (pronounced *one-cross*), approximately No. 28 gage. Odd sizes can be made to order.

For Fireproof Buildings

The small amount of wood required for a light deck, supported by steel roof framing, and covered with tin, represents so small a fire risk as to be negligible in the case of fireproof buildings. The tin roofing protects the roof from exposure risks, and in the case of fire within the building prevents the flames from breaking through. Moreover, there is a considerable saving in using this type of roof in contrast with heavy, costly forms.

Distribution

"Target and Arrow" brand is carried in stock by leading wholesale hardware and sheet metal jobbers throughout the United States.

Specifications for Standing and Flat Seam Roofing

Form recommended by the National Association of Sheet Metal Contractors for the use of architects:

Tin Roofing Work—All tin used on this building shall be Taylor's "Target and Arrow" brand. No substitute for this brand will be allowed. Use IC thickness for roof proper, decks, etc., and IX thickness for valleys, gutters, flashings and spouts, as required by design. One coat of red or white lead, iron oxide, metallic brown, or Venetian red paint, with pure linseed oil, shall be applied to underside of tin before laying.

For Flat Seam Roofing—Edges of sheets to be turned ½ in.; all seams to be locked together and well soaked with solder. Sheets to be fastened to sheathing boards by cleats spaced 8 in. apart; cleats locked into seams and fastened to roof with two 1-in. barbed wire nails; no nails to be driven through the sheets.

For Standing Seam Roofing—Sheets to be put together in long lengths in shop; cross seam to be locked together and well soaked with solder. Sheets to be made up the narrow way in the rolls and fastened to sheathing boards by cleats spaced 1 ft. apart. Valleys and gutters to be formed with flat seam well soldered; sheets to be laid the narrow way. Flashings to be let into joints of brick or stonework, and cemented. If counterflashings are used, lower edge of counterpart shall be kept at least 3 in. above roof. Solder to be of best grade, bearing the manufacturer's name, and guaranteed one-half tin and one-half lead—new metals. Use rosin only, as a flux—never use acid.

Caution—No unnecessary walking over tin roof or using it for storage of material shall be allowed. In walking on the tin, care must be taken not to damage paint nor break coating of tin. Rubber soled shoes or overshoes should be worn by men on the roof.

Painting Tin Work—All painting of tin work to be done by roofer, using red or white lead, iron oxide, metallic brown, or Venetian red paint, with pure linseed oil. No patent dryer or turpentine to be used.

All paints to be applied with a hand brush and well rubbed on. Tin to be painted immediately after laying. A second coat shall be applied in a similar manner, two weeks later.

No deviation from these specifications shall be made unless authority be given in writing by the architect. Only a first class roof will be accepted.

Note: Extra copies of this form ready for insertion in building specifications will be sent on request.

ESTABLISHED 1870

THE AULD & CONGER COMPANY

Producers of Slate for Roofs, Floors, Terraces and Garden Walks

GENERAL OFFICES

1920 East 75th Street, CLEVELAND, OHIO

QUARRIES: POULTNEY, VT. AND BANGOR, PA.

Products

SLATE for Roofs, Floors, Terraces, Garden Walks, and for Structural Use.

Roofing Slates

Since the establishment of this company in 1870 many thousands of buildings have been roofed with our "Slates of Quality," and many floors, terraces, and garden walks installed. Our Architectural Service Department will gladly furnish samples of our slate and cooperate with architects with suggestions, if desired, as to size, color, thickness, texture, and method of application best suited to the type of building contemplated, all of which are important—taking into consideration location, rafter lengths, surroundings, etc., of the building.

We shall be glad to send you suggested specifications we have formulated for distinctive types of architecture.

Vermont Colored Slates

Our Mammoth Vein Weathering Greens, Purple Vein Slates, Unfading Greens, Unfading Mottled Grays, Unfading Clear Purples, etc., are all well known; as are our "Agecraft Rustics" assembled by us with extreme care to create a charming color-blend roof, we having in mind the necessity of varying the percentages of color exposure for the different lengths of rafters.

Pennsylvania Blue-black Slates

Our Genuine Bangor Slate is famous for its unfading and lasting quality and architects are requested to be careful in specifying as noted below, so that inferior material with some "Bangor" name will not be substituted.

Size—Thickness of Roofing Slate

In Vermont we make all sizes and thicknesses—standard (to average $\frac{3}{16}$ in.), $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 in.

In Pennsylvania, we make all sizes and standard thickness only (to average $\frac{3}{16}$ in.).

Roofing Slate Specifications

In specifying Genuine Bangor slate write "Genuine Bangor Slate, the slate to be labeled and with certificate of the Bangor Slate Association," and then see when the material is delivered to the building the slates have this label on them. Otherwise, they are not the Genuine Bangor slate that you specified. Insist on seeing, too, a certificate sent with every shipment.



ROOFING SLATE BEARING
THIS TRADE MARK IS GUARANTEED
GENUINE BANGOR SLATE
—BEWARE OF IMITATIONS—
B BANGOR SLATE ASSOCIATION
INC.

For "Agecraft Rustics"

Preparation—Slate roofer shall examine roof boards and advise carpenter of anything likely detrimental to the durability of the finished roof and shall see that any defects are corrected before applying felt. Carpenter shall apply a cant strip nailed about 2 in. above eaves and shall apply saddles back of chimneys and elsewhere required. Carpenter shall also build up forming where curved slate valleys are shown and place all blocking required by roofer. Roofer shall furnish and apply elastic cement wherever necessary.

Felt—Cover surfaces, including dormer cheeks, with asphalt felt weighing 30 lb. to 100 sq. ft., lapped 6 in. where joined (Note A). Where curved valleys are shown felt shall be of double thickness.

Slate—When surfaces are prepared as above, cover with Agecraft Rustic Slate, as quarried by THE AULD & CONGER COMPANY, Cleveland, Ohio, the thickness, colors, exposure, and method of laying to be as indicated on roof layout prepared by THE AULD & CONGER COMPANY and approved by the architect.



"Agecraft Rustics" Dave R. Jones Residence, Cleveland, Ohio
BLOODGOOD TUTTLE, Architect

Nails—Copper nails (Note B) of proper length shall be used.

Flashing—Sheet metal contractor shall furnish and roofer shall install 16-oz. soft rolled copper built-in flashings, as required, at closed valleys, chimneys, dormers, and necessary places. Flashing shall extend not less than 4 in. under slate and have not less than 4 in. exposed above the slate on a line at right angle to the roof. Roofer shall insert all aprons required. These to be furnished by sheet metal contractor. Sheet metal contractor shall apply counter flashing and make secure against leaks.

Open Valleys—Shall be 16-oz. soft rolled copper (Note C) 20 in. wide, nailed only at top. When applying slate care must be used that nails do not penetrate sheet metal valleys.

Closed Valleys—Shall be flashed with 16-oz. copper flashing over each course. Flashing to lap at least 2 in. and to extend 10 in. either side of valley.

Rounded Valleys—Are to be carefully fitted and laid with long slate, carefully flashed.

Ridges, Hips—Shall be laid mitered or Boston style if design so requires, ridges and hips shall have 16-oz. copper ridge and hip rolls (Note D) as shown.

Guarantee—Roofer shall furnish to keep all slate roof surfaces in a watertight condition for one year from completion.

Using Standard Slate in Agecraft Rustics, etc.

Preparation—Felt Guarantee, same as for Agecraft Rustics, with necessary modifications.

Slate—When surfaces are prepared as above cover with Agecraft Rustics (Note E) as quarried by THE AULD & CONGER COMPANY, Cleveland, Ohio; the colors, exposure and method of laying to be as indicated on roof layout prepared by THE AULD & CONGER COMPANY and approved by the architect.

Specification Notes

Note A: For standard slate we recommend a No. 1 Asphalt felt.

Note B: Away from salt air or for less expensive work galvanized or copper-clad nails.

Note C: Substitute zinc galvanized iron or tin, but copper is recommended.

Note D: Substitute 4-lb. sheet lead or galvanized iron.

Note E: Substitute, if desired, Purple Vein, Weathering Green, Unfading Mottled Gray, Genuine Bangor (see preceding page and insert full wording), one size, or random lengths and widths.

Specifications for Floors, Terraces, Walks, and Flat Roofs (Interlocking Slabs, Patent Pending)

THE AULD & CONGER COMPANY's Interlocking Floor Slabs (as illustrated—patent pending)—loose slate cast in reinforced slab form, approximately 3 ft. square and 1 in. thick, as per layout of THE AULD & CONGER COMPANY and approved by the architect.

Note: These slabs are made to conform exactly with the architect's desire for color, harmony, and design, and save about 75% labor cost over setting loose tiles and about one-half the cost of a concrete setting bed. These slabs are made for a perfect surface or as rugged a surface, as is desired.

Directions for Installing—(Where two inches, or more, exists from subfloor to finished floor level). Masonry slab to be

broom cleaned, wetted thoroughly, and sprinkled with dry cement. Put dry one-to-three mix (consistency of putty) on surface, tamp to 1 in. level, sprinkle with cement, and lay after wetting the backs of the Auld & Conger Company's Interlocking Slabs as numbered and designed on their layout. By following layout all cutting becomes unnecessary.

Specifications for Floors, Terraces, Walks (Individual Pieces)

For these purposes, natural split, or "Quarry Cleft" surfaces are desirable, but the standard rubbed surface can also be furnished. For floors and terraces our range of colors provides the eye-resting tones of nature and unequalled appearance. For outdoor work, random rectangular or irregular sizes and shapes give a most artistic effect.

Sizes—The size and shape of the pieces are determined by the arrangement and pattern desired. Any desired size and thickness of slate can be furnished.

Directions for Installing—The following are the recommended methods of laying slate floors, terraces, and walks:

On Soil with Grass Joins—Mark out location of walks and terraces and wet and tamp soil thoroughly, filling in all holes and depressions. Lay slate directly on soil. Where cinder subbed is required, excavate soil to 8 or 10 in. Fill with 6 or 8 in. of cinders well tamped and rolled, and cover with 2-in. layer of soil. Then lay slate and fill joints with soil.

Laid in Concrete on Earth—Mark out location and excavate to depth of 10 in. or more. Fill with cinders tamped to within 5 in. of level desired and top with 3 in. of cinder concrete. Follow immediately with setting mixture (3 parts sand, 1 part cement); level, sprinkle with portland cement and lay after applying putty coat to back of slate. Point all joints with concrete (2 parts sand, 1 part cement).

On Masonry Slab Laid in Concrete—On suitable waterproofing course place a concrete setting bed 2 to 2½ in. thick, with expansion joints extending full depth, 15 ft. apart in each direction and filled with calking or plastic compound. On this bed place setting mixture; level, sprinkle with cement and apply putty coat to back of slate then embed, pointing each joint with concrete. Where no waterproofing is required simply place from 1 to 2 in. of setting mixture directly on concrete slab; level, sprinkle with cement and lay after applying putty coat to back of slate.

To Replace Existing Wood Floors—Remove present floor, lower floor joints to depth required for construction of slate floor and construct on top of them a false wood floor of not less than 1½-in. thick by 6-in. wide boards, laid about ¼ in. apart and securely nailed to each joist. Cover false floor with two layers of asphalt saturated rag felt, place on this a 1 to 2-in. thick concrete setting bed; level, and follow immediately with a ½ to 2-in. setting mixture. After sprinkling with cement and applying putty coat to back of slate, pointing all joints with concrete (2 parts sand, 1 part cement).

Over Existing Wood Floors—Cover existing floor with two layers asphalt saturated felt. Lay wire mesh or metal floor lath on felt and cover with ½ to 2-in. setting mixture. Level off, sprinkle with cement, apply putty coat to back of slate and point all joints with concrete.



Interlocking Floor Slabs (Patent Pending), Midland County Court House, Midland, Mich.

BLOODGOOD TUTTLE, Architect



Interlocking Floor Slabs (Patent Pending), Terrace of Fred Wardwell Residence, Detroit, Mich.

J. W. CASE, Architect

BANGOR SLATE ASSOCIATION

BANGOR, PA.

MEMBER COMPANIES

BANGOR IDEAL SLATE MINING CO.
COLUMBIA BANGOR SLATE CO.

Sales Agents for above companies: THOS. DITCHETT ESTATE,
Bangor, Pa.

HOUSTON BROS. CO., Pittsburgh, Pa.

THE AULD & CONGER CO., Cleveland, Ohio

NORTH BANGOR SLATE CO., Bangor, Pa.

BANGOR WASHINGTON SLATE CO., Bangor, Pa.

OLD BANGOR SLATE CO.

Sales Agents for above:

VENDOR SLATE CO., Easton, Pa.

BANGOR QUARRY CO., Bangor, Pa.

EAST BANGOR CONSOLIDATED SLATE CO., East Bangor, Pa.

BANGORVEIN SLATE CO.

Sales Agent: GRANVILLE SLATE CO., Philadelphia, Pa.

Product

The members of the BANGOR SLATE ASSOCIATION are the Sole Producers of GENUINE BANGOR ROOFING SLATE—a blue-gray slate of the highest quality.

Genuine Bangor Slate

The reputation of Genuine Bangor Slate is so well established that for many years it has been the standard by which other slate has been judged. Without sacrificing tensile strength or hardness, this slate possesses toughness and flexibility to a degree far beyond that of the majority of slates. Genuine Bangor Slate is practically non-weathering, and years of exposure on the roof show no appreciable change in color.

Mill stock for structural purposes, Genuine Bangor Slate Flagging, and Blackboards, are also produced by some of the members of the Association.

Label and Certificate Protection

All Genuine Bangor Slate bears the trade-mark of the Association and all shipments are accompanied by a certificate of quality. Genuine Bangor Slate is guaranteed by the Association to conform to rigid specifications for material and workmanship. To insure the protection afforded by this guarantee, architects should insist on only slate bearing the Genuine Bangor label and request the contractor to furnish a certificate.



Look for Label Bearing
This Trade-mark on
Your Shipments
of Slate



Certificate Issued with Every Car of Genuine Bangor Slate

Selections of Genuine Bangor Slate

No. 1 Clear—The finest grade of blue-gray slate produced. Uniform throughout, as to color and texture, and free from knots and knurls that in any way interfere with the safe conveyance or the laying of the slate on the roof. Entirely clear stock. Maximum bend not to exceed $\frac{1}{8}$ in. in 16 in., nor $\frac{1}{4}$ in. for lengths from 16 to 24 in. The customary tolerance to be allowed for thickness. Corners to be square.

No. 1 Ribbon—Similar in all respects to No. 1 Clear stock except that one or more ribbons of darker material may cross the slate in such manner that when laid with the regulation 3-in. lap, the ribbons shall not be exposed to the weather. Fracture tests prove that the ribbon is stronger than the slate.

Genuine Bangor Architectural Slate—This grade has been established by the Association due to the demand for roofs of more character than may be obtained in the standard roof. The more pronounced texture and knurled surface of this slate show varying shades of blue-black and gray, making an especially attractive roof. It varies in thickness from about $\frac{3}{8}$ in. to, approximately, $\frac{1}{2}$ in. and is furnished in random widths. This grade possesses the durable qualities which have made Genuine Bangor famous.

To Specify Genuine Bangor Slate

Architects who desire Genuine Bangor Slate should specify only by the full name "Genuine Bangor Slate, with labels and certificate of BANGOR SLATE ASSOCIATION". This wording will protect the architect and his client against the substitution of inferior materials. Copies of complete specifications for roof boarding, felt, flashings, and slate work, will be furnished upon application to the Association.

Short Form Specifications "A"

On sloping surfaces (Specification "A")—All materials and labor in connection with the sheet metal and slate work shall be furnished and performed in strict compliance with Specification "A" of the BANGOR SLATE ASSOCIATION, Bangor, Pa.

The slate shall be Genuine Bangor Certificate Slate (grade and size), with labels and certificate of the BANGOR SLATE ASSOCIATION.

Stock Sizes Available at All Times

Due to the vast production of the Bangor Quarries, a complete stock of the sizes given in table and in standard thickness of approximately $\frac{1}{8}$ in. is available at all times. All shipments are made from quarries at Bangor or East Bangor, Pa.

STANDARD SIZES AVAILABLE AT ALL TIMES

Type	Sizes are in inches, length by width in the order given						
No. 1 Clear.....	24x14	22x12	20x12	18x12	16x12	14x10	12x10
	24x12	22x11	20x10	18x10	16x10	14x 8	12x 8
	.....	.....	.....	18x 9	16x 9	14x 7	12x 7
No. 1 Ribbon.....	24x12	22x12	20x12	18x12	16x12	14x10	12x 8
	.....	22x11	20x10	18x10	16x10	14x 8	.....
	.....	.....	.....	18x 9	16x 8	14x 7	.....
Bangor Architectural Slate.....	24x12	22x11	20x10	18x12	16x12	14x10	.....
	.....	.....	.....	18x10	16x10	14x 8	.....
	.....	.....	.....	18x 9	16x 8	.....	.....

QUANTITIES REQUIRED PER SQUARE FOR VARIOUS EXPOSURES

Size of slate, in.	Number per square	Exposure with 3-in. lap, in.	Nails per square 3d copper, lb. and oz.
24x14	98	10 $\frac{1}{2}$	1-4
24x12	115	10 $\frac{1}{2}$	1-7
22x12	127	9 $\frac{1}{2}$	1-9
22x11	138	9 $\frac{1}{2}$	1-12
20x12	142	8 $\frac{1}{2}$	1-12
20x10	170	8 $\frac{1}{2}$	2-2
18x12	160	7 $\frac{1}{2}$	1-15
18x10	192	7 $\frac{1}{2}$	2-6
18x 9	214	7 $\frac{1}{2}$	2-9
18x 8	277	6 $\frac{1}{2}$	3-3
16x12	185	6 $\frac{1}{2}$	2-4
16x10	222	6 $\frac{1}{2}$	2-12
16x 9	247	6 $\frac{1}{2}$	3-1
14x10	262	5 $\frac{1}{2}$	3-3
14x 8	328	5 $\frac{1}{2}$	4-0
14x 7	374	5 $\frac{1}{2}$	4-10
12x 8	400	4 $\frac{1}{2}$	4-15
12x 7	457	4 $\frac{1}{2}$	5-10
12x 6	534	4 $\frac{1}{2}$	6-9

THE CHAPMAN SLATE COMPANY

BETHLEHEM, PA.

Member of the National Slate Association

Products

Makers and shippers of "WILLIAM CHAPMAN" BLACK ROOFING SLATE in all regular stock sizes, also in graduated lengths and thicknesses and random widths.

Quarries

The quarries of THE CHAPMAN SLATE COMPANY were opened in 1850, and today, with a capacity of over 3000 squares per month, produce more roofing slate than any other single hard vein quarry operating in the country.

The Chapman product today is quarried from a depth of over 200 ft.; is made by highly skilled mechanics, many of whom have long been in the service of the company, and the entire output is most carefully inspected to insure the proper grading.

Heavy "Old English Cleft" Special Rough Slate

Owing to the numerous and constantly increasing demands from architects, the company has, for the past years, been making a heavy rough "Old English Cleft" slate ranging from $\frac{1}{4}$ to 1 in. in thickness, and in graduated lengths and random widths.

The artistic effect of a roof laid with the genuine "William Chapman" "Old English Cleft" special rough slate gives tone and character to a building which can not be produced by the use of any other roofing material.

For manufacturing plants or other places where particularly hard wear is required, the company recommends the use of "William Chapman" special rough slate, $\frac{1}{4}$ in. thick.

Standard Roofing Slate

The excellence of the "William Chapman" roofing slate lies in the toughness of the fiber, which is very hard and close grained, thus insuring a durability beyond any known limit of time. "William Chapman" roofing slate absorbs no moisture and will not decompose. Largely owing to these characteristics there is practically no breakage in transportation.

The stock of regular sizes is large and complete.

These slate are about $\frac{3}{16}$ in. thick, weighing approximately 680 lb. to the square, allowing for the standard 3-in. lap.

There are 14 different sizes ranging from 6x12 to 14x24 in. Special sizes will be made to order when required.

Labels

To prevent substitution of inferior quality slate, the company has instituted the practice of labeling about 2% of each shipment of genuine "William Chapman" roofing slate with a label, facsimile of which is repro-

duced herewith, on which is indicated the grade, whether No. 1 or No. 2.



"William Chapman" Slate Label

Colored Slate

Quotations furnished on colored slate upon request.

Shipping Facilities

The company ships direct from the Chapman quarries to every state in the Union, to Canada and Mexico, or to seaboard for export to Europe or South America.

With the present capacity, any size order for "regular" stock can be supplied promptly.

References

Herewith is given a partial list of buildings covered with "William Chapman" slate roofs:

Brooklyn Bridge Buildings, New York, N. Y.
 Holy Trinity Church, New York, N. Y.
 Central Park Buildings, New York, N. Y.
 Isabella Heimath Residence, New York, N. Y.
 Long Island Historical Society, New York, N. Y.
 Metropolitan Opera House, New York, N. Y.
 Philadelphia & Reading Railway Freight Station, Subway, Philadelphia, Pa.
 Roman Catholic Cathedral, New York, N. Y.
 Roman Catholic Church of the Epiphany, Philadelphia, Pa.
 St. George's Church, New York, N. Y.
 St. Vincent's Hospital, New York, N. Y.
 U. S. Military Academy, West Point, N. Y.
 First Presbyterian Church, Newark, N. J.
 Mt. St. Mary's Convent, Plainfield, N. J.
 St. Barnaby's P. E. Church, Philadelphia, Pa.
 The Orphanage, Paterson, N. J.
 Hackensack Water Co., New Durham and New Milford, N. J.
 Essex County (N. J.) Insane Asylum, Overbrook, N. J.
 Morris Plains Asylum, Morris Plains, N. J.
 U. S. Fort Terry, Plum Island, N. Y.
 U. S. Fort H. G. Wright, Fishers Island, N. Y.
 Convent Buildings, Lodi, N. J.
 State Capitol, Albany, N. Y.
 St. Ladislaus Polish Catholic Church, Philadelphia, Pa.
 Bethlehem Steel Co., Bethlehem, Pa.
 Donner Steel Co., Inc., Buffalo, N. Y.
 Consolidated Gas Co. of New York, New York, N. Y.
 Midvale Steel Co., Philadelphia, Pa.
 Bethlehem Fabricators, Inc., Bethlehem, Pa.
 Brethren Church, Ambler, Pa.
 Hotel Dennis, Atlantic City, N. J.

ESTABLISHED 1873

THE JOHN D. EMACK CO.**Thatchslate and Olde Stonesfield Roofs and Flagging**

ARCHITECTURAL SERVICE AND DISPLAY ROOMS

112 South 16th Street
PHILADELPHIA, PA.17 East 49th Street
NEW YORK, N. Y.

REPRESENTED BY

CHICAGO, ILL., BURT T. WHEELER BRICK Co., 1222 Builders Building,
228 North La Salle Street
DETROIT, MICH., THOMAS BROS. & Co. LTD., 415 Brainard Street
ATLANTA, GA., F. GRAHAM WILLIAMS BRICK Co., Candler BuildingBOSTON, MASS., MITCHELL-VANCE, INC., of New England, 11 Beacon
Street
ST. LOUIS, MO., JOHN J. WARD, Rialto Theatre Building
CINCINNATI, OHIO, BALDWIN-TARVIN COMPANY**Products**OLDE STONESFIELD ROOFS.
OLDE STONESFIELD FLAGGING.
THATCHSLATE.
Also Commercial Roofing Slate.**Olde Stonesfield Roofs**

Olde Stonesfield Roofs are inspired by the age-old stone roofs of the Cotswold district but offer the added feature of unlimited variety, for in Olde Stonesfield Roofs the greatest range of colors, size, and texture are

Olde Stonesfield Flagging

Interesting colors and textures in irregular, semi-irregular and random rectangular shapes for inside floors, terraces, walks, steps, coping, etc.

Olde Stonesfield Flagging is also offered cut-to-pattern assuring the designer in advance of the ultimate effect of the work.

Stocks

We carry large stocks of both roofing and flagging for immediate shipment.

Olde Stonesfield Roof
LEWIS BOWMAN, Architect

available and as designed by our Architectural Department fully meet the requirements of the individual building.

Thatchslate

In Thatchslate Roofs, designed and produced by THE JOHN D. EMACK Co., exclusively, the designer is offered a roof of rich color and texture at a cost between that of an ordinary commercial slate and the more expensive Olde Stonesfield Roofs.

Circulars

Circulars regarding Thatchslate, Olde Stonesfield Roofs and Olde Stonesfield Flagging will be mailed on request.

Architectural Service

We will be pleased to co-operate with you in the preparation of specifications or designs of roofs or floors, estimating cost or furnishing such information as may be desired.

Suggested Specifications for Olde Stonesfield Roofs and Thatchslate Roofs

(1) **Roofing**—All sloping roofs (and sides of all dormers), except where otherwise indicated on plans or elevations, shall be covered with slate as hereinafter specified.

(2) **Felt**—All surfaces which are to be covered with slate shall first be covered with an approved asphalt saturated felt weight 40 lb. [30 lb.] to the square. Lap well at all joints and fasten with the proper metal clips and nails to the roof sheathing.

(3) **Cant Strips**—At all eaves provide a wood strip of sufficient thickness to give the slate the proper cant. (The thickness of this strip is controlled by the thickness of slate at the eave.)

(4) **Slate** — *Note:* Use either paragraph A or B.

(A) Over the felt lay an Olde Stonesfield Roof designed and produced by THE JOHN D. EMACK Co., Philadelphia and New York. Roof to be laid in accordance with roof layout and instructions furnished by THE JOHN D. EMACK Co. and approved by the architect.

(B) Over the felt lay a Thatchslate Roof designed and produced by THE JOHN D. EMACK Co., Philadelphia and New York. Roof to be laid in strict accordance with roof layout and instruction sheet furnished by THE JOHN D. EMACK Co. and approved by the architect.

(5) **Head Lap**—All slate shall be laid with at least a 3-in. head lap.

(6) **Hips and Ridges**—Mitered hips shall be used throughout. Finishing or ridge courses shall be of slate of the same average exposure and widths as the courses of the roof immediately below. No long stretchers are to be used.

(7) **Valley**—*Note:* Use either paragraph C or D.

(C) All valleys, except where otherwise indicated, shall be round. Carpenter to build valley framing and roofer shall cover with slate in accordance with instructions and working drawing furnished by THE JOHN D. EMACK Co.

(D) Straight closed valleys shall be used as shown or indicated on the architect's drawings.

(8) **Flashing**—All flashing shall be of copper [lead] [galvanized iron] as specified under sheet metal.

(9) **Nails**—Slate shall be fastened to the roof with copper [re-dipped galvanized iron] nails of sufficient length to penetrate the sheathing at least $\frac{7}{8}$ in.

(10) **Cement** — A high grade elastic roofer's cement shall be used liberally in valleys, hips, ridges, at dormers and in any other place where necessary.

(11) **Guarantee**—The roofing contractor shall guarantee all workmanship and material furnished under these specifications free from defects for a period of one year and shall make good at



Thatchslate Roof

HERBERT SPIELAMANN, Architect

his expense all defects arising within this period of time.

Suggested Specifications for Olde Stonesfield Flagging.

For (here mention the rooms) floors as well as the exterior walks, terraces, and wherever indicated on the architect's drawings, furnish Olde Stonesfield Flagging produced by THE JOHN D. EMACK Co., Philadelphia and New York, in shapes as indicated on architect's plans and in colors as selected and approved by the architect.



Detail of Thatchslate Roof
NORMAN W. MCBURNEY, Architect

The interesting feature of THATCHSLATE, as shown on the left, is the exceptional, fine texture that is obtained at a minimum cost and you will note that the exposure of no two slates in any one roof are exactly alike.



Olde Stonesfield Flagging in Random Rectangular for Interior Floor

KNICKERBOCKER SLATE CORPORATION

E. J. JOHNSON, PRESIDENT

355 West 26th Street, NEW YORK, N. Y.

Products

ROOF SLATES; GARDEN FLAGGING; SLATE BLACKBOARDS; STRUCTURAL SLATE; SNOW GUARDS; SLATING NAILS.

Slaters' Tools.

Consulting Service

Technical knowledge has become a valuable factor in assembling proper color combinations, exposures and thicknesses in the Old European roofs, properly adapted to a given roof project.

This concern affords, through its consulting service, an experience of over 40 years in quarrying slate and working out the most advanced installation problems. Our service includes supplying architects with technical facts covering actual quarry possibilities in slate, specification suggestions and plans of layouts.

Individual building projects will be worked out to meet their respective requirements.

Old European Slate Roofs

The ordinary type slate roof while highly practical, yet because of the uniformity of dimension of the individual slates, its one color (generally black), failed to lend itself to the modern requirements of architecture.

Our Old European slate roof is all that modern artistic demands can possibly desire. Marked in texture, graduated in exposures and thickness, random in widths, colors placed haphazard throughout the roof, with more or less departure from symmetry of lines, gives a brief word picture of these beautiful roofs.

Colors range in reds, purples, grays, greens and blacks of varying shades, with some weathering to buffs. An interesting color feature of these roofs is the fact that they grow in beauty with age in direct contrast with manufactured roofings.

Cost will vary in range from that of the ordinary slate roof upwards.

Low cost roofs in this line can be worked out to contain some of the attractive features.

Each building project calls for individual treatment both in colors and arrangement on the roof. For this reason we make no standard suggestions, but offer our experience of 40 years in quarrying and assembling these roofs to bring out the best results.

We invite requests for detail features and advice.

Old European Terrace, Floor and Garden Flagging

The features of these floors are their pleasing texture and beautiful color effects which are everlasting. The colors are generally purple and green with black, red and buff introduced in such quantities as the individual job requires. The material offers a pleasing texture in its natural quarry surface. The individual pieces are either irregular shapes, varying in size from about 1 sq. ft. to 4 sq. ft.; or square and rectangular. The thickness approximates 1 in., which is sufficient for any purpose.

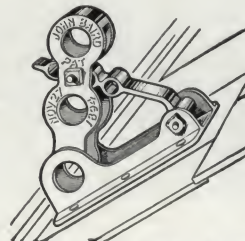
Snow Guards

The patent snow guard standard, in connection with $\frac{3}{4}$ -in. (outside measurement, 1 in.) galvanized gas pipe, composes the "pipe" or "rail" guard. This standard is adjustable to any pitch of roof. The plate is made the thickness of Standard No. 1 slate and of the same dimensions as the slate upon the roof where used, the plate taking the place of a slate and being well secured to the roof with wood screws or otherwise as may be desired.

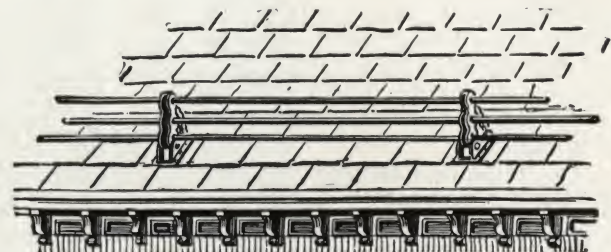
Standards with plates of greater thickness than Standard No. 1 slate will be made to suit heavier slate at an additional charge. Plates will also be made of suitable form for use on tile or other roofs.

Standards are placed along the eaves of all roofs from 5 to 6 ft. apart and are made for 3 pipes.

When ordering, specify the size of slate to be used on the roof (Standard No. 1 thickness is understood unless otherwise ordered).



Snow Guard Standard



Pipe or Rail Guard Complete

Slating Nails

The nails used for fastening slate should be of the most durable material, since most slate roof troubles are due to slates falling out because the nails have corroded. Cut yellow metal or copper wire nails are recommended.

Our nails are made up and shaped distinctly for slating purposes—the result of many years' experience.

Structural Slate

Furnished in various shapes and sizes for use for steps, platforms, risers, wainscoting, base, toilet slabs of all kinds, floors, electrical slabs, etc.

This can be supplied in regular ribbon black, clear black, light green and mottled purple and green.

The light green and mottled purple and green slates present a very fine appearance and are especially suitable for use in entrances, lobbies, stairways, etc., where architectural beauty is desired. They compare favorably with marble but are considerably cheaper.

Slate Blackboards

These are made from the best black slate with the highest grade of machine rubbed finish. Spaces made up of stated dimensions.

ESTABLISHED 1876

NORTON BROTHERS

E. R. NORTON, SOLE OWNER

Manufacturers of Roofing Slate

GRANVILLE, N. Y.

Products

COMMERCIAL STANDARD and ARCHITECTURAL ROOFING SLATE; GARDEN FLAGGING and FLOOR SLATE.

Quarries

The quarries of NORTON BROTHERS were opened in 1876. They are located in the towns of Wells and Pawlet, Vermont, where the finest veins of quality roofing slate exist. All Norton Slate is quarried and produced at these two locations and all shipping is done from Granville, N. Y., where large quantities of standard sizes and colors are available for immediate distribution.

Colors

All kinds of Norton Slate are available in the following colors: weathering green, unfading green, unfading mottled green and purple, purple and green variegated, silver gray green and mottled gray black.

Weathering Green—A commercial sea green which is exceedingly strong and tough and of excellent texture. Upon exposure to the elements some slates weather and are transformed into soft tones of brown, buff and gray while others retain their original shade. This weathering action of the elements serves to beautify a roof of this material and in no way affects the durability of the slate. Most widely known and used Vermont basic slate color.

Unfading Green—A true sea green. Whatever slight fading or weathering takes place is so uniform that a permanently green roof color is assured.

Unfading Mottled Green and Purple—No two slates have exactly the same markings or colors. They consist of slightly varying shades of purples, sometimes almost clear, frequently clouded with spots or traces of green, others with light and dark clouds of purple. Occasionally there are some having only a purplish tint that might otherwise pass for green slate.

Purple and Green Variegated—These slates are of a predominating purple tone, some having spots or streaks of green of varying size. In a small percentage, green may predominate with only tints of purple. Some change upon exposure to harmonious shades of brown, while others present an unchanged appearance.

Silver Gray Green—A unique and beautiful light colored slate. Basically green with shadings of silver and a darker tone of gray. A semi-fast color product.

Mottled Gray Black—Some are unfading and others weather. Most of the gray slates are mottled by streaks of darker gray and for this reason are often used to advantage with other slates.

These slates will make a very handsome appearance when used for the entire surface, without combining with others.

MEMBERS OF

**Commercial Standard Roofing Slate**

Because of the great demand for Vermont slate for standard roofing, NORTON BROTHERS have specialized in producing an excellent slate for this use.

The surface is straight and reasonably smooth the full length both front and back. Each slate is free from knots or knurls that in any way might interfere with the safe conveyance or the laying of the slate on the roof.

The corners are reasonably full so that no nailing strength is sacrificed and the roof may be laid watertight.

Made in the standard thickness of approximately $\frac{3}{16}$ in. and in lengths of 12 to 24 in.

Architectural Roofing Slate

The architectural slate can be furnished in various sizes, thicknesses and colors or combinations of colors to specifications. This slate is used extensively by architects and gives a beautiful effect as it weathers. It is of a rougher texture than the standard. Varying shades are frequently used to enhance the color effect, which, with the characteristics just mentioned, add interest in line and texture to the roof design, as well as harmonize with the general character of the building.

We especially recommend Norton's Renaissance, a natural stone slate of rough texture, which has a color-blend feature of unusual merit.

Samples and details gladly sent upon request.

Roofing Layouts and Estimates

NORTON BROTHERS with their 50 years' experience in the layout of roofs for many important installations throughout the country, are prepared to furnish layouts and cost estimates for any style of slate roofing. They also will be pleased to collaborate with architects in the preparation of layouts and specifications.

Garden Flagging and Floor Slate

Made to order or furnished from stock in irregular sizes. Can be furnished with split surface and natural edges, or split surface and trimmed edges. In mixture of colors if desired.

References

Slate furnished by us has been used on various buildings throughout the country, among others the following:
 Union College, Schenectady, N. Y.
 Great Meadow Prison, Comstock, N. Y.
 Middlebury College, Middlebury, Vt.
 Felsdale Estates, Winchester, Mass.
 State Fair Grounds, Syracuse, N. Y.
 Hartford Seminary Foundations, Hartford, Conn.
 Palisades Interstate Park Commission, New York, N. Y.
 Metry Club Gardens, New Orleans, La.
 Johns Hopkins University, Baltimore, Md.
 St. Josephs Church, Worcester, Mass.
 Home for Feeble Minded, Secaucus, N. J.

ESTABLISHED 1869

RISING & NELSON SLATE CO.

Miners, Makers and Shippers of High Grade Roofing Slate

QUARRIES AND MAIN OFFICE
WEST PAWLET, VT.

BOSTON OFFICE, 46 Cornhill

PHILADELPHIA OFFICE, 112 South 16th Street

NEW YORK OFFICE, 101 Park Avenue

CHICAGO OFFICE, 2554 West Harrison Street

DETROIT OFFICE, 2539 Woodward Avenue

LONDON OFFICE, 26 Martin Lane, Cannon Street

ARCHITECTS' SERVICE DEPARTMENT, 101 Park Avenue, NEW YORK, N. Y.

Products

"TUDOR STONE" and "TUDOR STONE JR." ROOFING SLATE.

COMMERCIAL ROOFING SLATE.

"TUDOR STONE" FLOORING SLATE and GARDEN FLAGGING.

"TUDOR STONE" SLATE TYLE.



TRADE-MARK

selected split finish; carborundum sawn edges, standard $\frac{3}{8}$ -in. joints allowed for. Full assortment of colors. Suitable for all types of interior or exterior floors.

Production

The fact that this company owns and operates numerous quarries in addition to controlling the production of a number of others insures quality and uniformity of result in all slate. This is especially true of architectural slate, which is quarried to order under trained architectural supervision.

Architectural Specialties

"Tudor Stone" Roofing Slate; also the following, which are variations of the "Tudor Stone" group: Golden Pheasant, Valenheli, Verde Unique, Yorkshire Gray, Cotswold, "Tudor Stone, Jr.," etc. These are distinct types, not ordinary slate parading under new names, as can readily be seen by comparison.

Commercial Roofing Slate

Sea Green, Unfading Green, Weathering Green, Mottled Green and Purple, Clear Purple, Purple Vein, Rustics, Red, etc., quarried in Vermont.

Genuine Bangor, Albion or Jackson Bangor, Washington Bangor, Franklin, Chapman, Peach Bottom, etc., quarried in Pennsylvania and elsewhere. Monson and Brownville, quarried in Maine. Buckingham, quarried in Virginia.

Flooring Slate and Garden Flagging

Split surface or rubbed surface, trimmed or sawn edges. Irregular shapes, random sizes, rectangular shapes and regular size pieces. In full range of weathering and unfading colors in all thicknesses.

"Tudor Stone" Slate Tyle

Manufactured in standard tile sizes from $1\frac{1}{4} \times 2\frac{1}{2}$ in. up to 12×12 in.; $\frac{1}{2}$ or 1 in. in thickness. Rubbed or

Samples and Booklet

Samples of any slate desired forwarded on request.

We have booklets and architectural leaflets showing examples of our products. We would be pleased to forward copies of these on request.



A Roof of Tudor Stone
DAVIS, DUNLAP & BARNEY, Architects

Architects' Service Department.

The Service Department established in the Architects Building, 101 Park Avenue, New York City, is under trained architectural direction, and is equipped and maintained by this company for the convenience of architects and others who may require information in reference to roof design and construction.

Architects are requested to make use of the facilities offered, either for preliminary work or for the preparation of complete roof layouts and estimates of costs.

This service is rendered without any obligation.

Specifications for "Tudor Stone" Roofing Slate

Preparation—Slatting contractor shall examine roof boarding and report to carpenter all defects which would be detrimental to the durability of the finished roof, and shall see that defects are remedied before applying felt.

Carpenter contractor shall furnish and apply a cant strip nailed about 2 in. above the eave line of the slate and shall put water shedding cant strips back of chimneys and up the sides of dormers and where else required. The carpenter contractor shall also build up forming where curved slate valleys are shown and furnish and place all blocking required by roofer.

Roofing contractor shall furnish and apply elastic cement where in his judgment the same is necessary.

Felt—Cover surface to be slated, including cheeks of dormers, with slater's asphalt impregnated roofing felt weighing 30 lbs. to 100 sq. ft. lapped 6 in. at joinings. (See Note 1.)

Where curved slate valleys are shown felt shall be double thickness.

Slate—All surfaces prepared for slate as above described shall be covered with "Tudor Stone" Roofing Slate, as made by the RISING & NELSON SLATE Co., West Pawlet, Vermont.

Thickness, exposure to the weather and character of laying shall be as indicated on roof layout prepared by the Architects, Service Department of the RISING & NELSON SLATE Co., under the direction of the architect. The contractor shall include in his estimate a sum sufficient to pay the expense of an expert from said Service Department to visit the work and assist the roofer in obtaining the architectural effect desired.

Nails—Nails shall be copper (see Note 4) slater's nails of sufficient length to adequately penetrate the roof boards using not less than 2 to each slate.

Flashing—The sheet metal contractor shall furnish and the slate contractor shall install 16-oz. soft rolled copper built-in flashings as required at closed valleys, chimneys, dormers and other necessary places. Flashing shall extend not less than 4 in. under slate and have not less than 4 in. exposed above the slate on a line at right angle to the roof and shall not be nailed to the vertical surface. Roofing contractor shall insert all aprons required, which will be furnished by sheet metal contractor. Sheet metal contractor shall apply counterflashing and make same secure against leaks.

Open Valleys—All open valleys shall be 16-oz. soft rolled copper (see Note 5), 20 in. wide, nailed at top only. In applying slate, care shall be used that no nails penetrate the sheet metal valleys.

Closed Valleys—All closed valleys to be flashed with 16-oz. copper flashing over each course. Flashing to lap at least 2 in. and to extend 10 in. either side of valley.

Round Valleys—To be carefully fitted and laid with special long slate. No metal used unless specially directed, but care must be taken to preserve continuity of roof color and texture.

Ridges—Ridges and hips shall be of slate laid mitered (or Boston style). If design should so require, ridges and hips should have 16 oz. copper hip and ridge rolls (see Note 6) as shown and detailed.

Guarantee—Contractor shall guarantee to maintain all slate roof surfaces in a water tight condition for a period of 2 years from completion.

Specification for Plain Hipped Roof with Valleys and Dormers Using Commercial Grade Slate

Preparation, Cement, Felt and Guarantee to be specified as described under heading "Tudor Stone" Roofing Slate with such modifications as may be necessary to meet the individual problem.

Slate—All surfaces prepared with felt as above described shall be covered with No. 1 Weathering Green (see Note 2) Roofing Slate, as furnished by the RISING & NELSON SLATE Co., West Pawlet, Vermont.

Slate shall be of random widths and 16 in. long (see Note 3); laid with 3-in. head lap so that distance to the weather shall be 6½ in.

Nails (see Note 4), **Valleys Flashing** and **Ridge** to be specified as described under heading "Tudor Stone" Roofing Slate.

Specification Notes

Note 1—For best commercial work 30-lb. felt is recommended. For slate not over ¼ in. thick 16-lb. felt may be used.

Note 2—Substitute, if desired, "Tudor Stone Jr." Weathering Green, Unfading Green, Mottled Green and Purple, Clear Purple, Red or Pennsylvania Slate.

Note 3—Substitute other lengths or uniform widths if desired, but note that commercial slate are made in lengths from 10 to 24 in., always in even inches, and that slate should have 3-in. head lap on second slate.

Note 4—Substitute for less expensive work away from seashore, galvanized iron or copper clad steel nails.

Note 5—Substitute zinc, galvanized iron or tin if desired. Copper is recommended. Curved slate valleys require special attention and when required should be specified to be watertight and of uniform appearance to adjoining slate.

Note 6—Substitute 4-lb. sheet lead or galvanized iron if desired, or specify slated "Boston" hips and ridges or mitered slated hips and ridges. Plumbing specifications should call for 4-lb. sheet lead flashings, 18-in. square, turned up 4 in. around all plumbing pipes, with separate lead cap flashing extended down to the slate and calked into first joint of pipe above the roof.

Specifications for Slate Floors, Terraces and Walks

Slate—The contractor shall furnish and lay all slate for walks, floors and terraces listed below. Slate shall be (here specify color, thickness, surface, size when necessary, shape of pieces, style of edges and width of joints).

On Soil with Grass Joints (Soil or Turf Subbed)—If ground is not well settled, wet and tamp thoroughly. Lay slate directly on soil in (here specify arrangement and pattern). Each piece of slate shall rest on a solid, even bed with the top surface level.

On Soil with Grass Joints (Cinder Subbed)—Mark out location of all walks and terraces to be laid with slate with grass joints and excavate to a depth of 8 to 10 in. Fill excavations with cinders from 6 to 8 in. deep, well rolled and tamped to an even surface. On top of cinder bed place a 2-in. layer of soil and on soil lay slate in (here specify arrangement and pattern). Fill all joints with soil to level of surface of slate and sow grass seed.

On Masonry Slab Laid in Concrete—Place from 1 to 2 in. (depending on final level) of setting mixture (3 parts sand with 1 part of cement). As soon as this setting bed is leveled, sprinkle with pure portland cement to perfect bond between bed and slate and lay slate in (here specify arrangement and pattern.) Thoroughly wet pieces of slate and firmly embed to desired level. Point all joints with concrete mixed 2 parts well-sieved sand and 1 part cement.

Cleaning Slate — (Note: Only required for slate floors with concrete mixture joints). Sponge all slate as set on exposed surface with clean water to remove mortar stains, and, if necessary upon completion, rub down with a solution 3 parts coal oil and 1 part linseed oil. (If light or weak solution of muriatic acid is needed and used for cleaning, care should be taken to wipe only exposed slate surfaces to avoid eating out cement joints.)

Completion—Upon completion, all slate shall be sound, whole and clean; the work shall be left smooth and in every respect a neat example of craftsmanship.



Courts of Massachusetts Mutual Life Insurance Building,
Springfield, Mass.

OLMSTEAD BROTHERS, Landscape Architects

VENDOR SLATE CO.

EASTON, PA.

BRANCH OFFICES

NEW YORK, N. Y., 101 Park Avenue
CHICAGO, ILL., Marquette Building

CLEVELAND, OHIO, 4500 Euclid Avenue
DETROIT, MICH., Hoffman Building
MANCHESTER, ENG.

PITTSBURGH, PA., 6600 Hamilton Avenue
PHILADELPHIA, PA., 112 So. 16th Street

ARCHITECTURAL DEPARTMENTS IN NEW YORK, N. Y. AND EASTON, PA.

QUARRY OPERATIONS

BANGOR, PA.

PEN ARGYL, PA.

SLATINGTON, PA.

MIDDLE GRANVILLE, N. Y.

GRANVILLE, N. Y.

POULTNEY, VT.

FAIRHAVEN, VT.

CONCENTRATION YARDS AND STORAGE WAREHOUSES: MIDDLE GRANVILLE, N. Y.

(For assembling and shipping Architectural Slate)

STORAGE WAREHOUSES: PITTSBURGH, PA. and ST. LOUIS, MO.

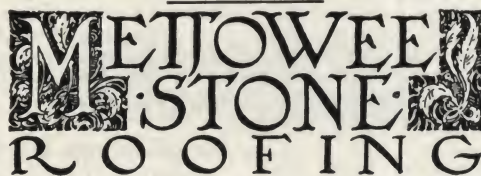
Production

PENNSYLVANIA BLUE-GRAY SLATE, including Genuine Bangor and Genuine Washington.

QUARRY CLEFT SLATE—a new creation in Architectural Slate exclusively Vendor.

METTOWEE STONE ARCHITECTURAL and COMMERCIAL ROOFING SLATE.

METTOWEE FLOORING and GARDEN SLATE.



Genuine Washington Big Bed and Provident Big Bed—A very high quality slate of a darker blue shade than Genuine Bangor. Very uniform in color and unfading.

Specified and accepted by the United States government because of its excellent quality and dependability of color.

This slate is produced in the Slatington region of Pennsylvania and on roofs of large area it is unequalled, owing to the absence of varying shades of color. This is due to the large size of the beds of slate from which it is produced.

Genuine Franklin Big Bed—This slate is produced in the Slatington region of Pennsylvania and is of the same general excellence as the other Big Beds. It is dependable in both color and strength.

Genuine Albion—This slate has an excellent reputation for strength and color.

Rough Textured Slate (Architectural)—Produced from selected beds that have a rough textured cleave.

Neither surface nor thickness is uniform (purposely so). Thickness varies from $\frac{3}{8}$ in. to full $\frac{1}{4}$ in., and this, combined with the rough surface, provides an architectural effect that is impossible with the smoother surfaced slates.

Quarry Cleft Slate—A mixture of different grades of Pennsylvania slate with irregular cleft butts producing a pronounced degree of ruggedness closely resembling the "thatched" lines of the original slate roofs used in England over 400 years ago. Admirably adapted to homes of English architecture and where subdued dignity and uniqueness without too much uniformity is desirable. Our literature will interest you.

Note: As the Monson, Buckingham and Peach Bottom slates are produced in very limited quantities, the VENDOR SLATE Co. can not offer the same degree of service as in the high grade slates of the Bangor and Slatington regions, but will be pleased to quote prices on request and give an approximate idea as to date of delivery.

Quarries

The VENDOR SLATE Co. is the largest slate organization in the United States. It operates and controls the output of the most important slate quarries in America, among them being the famous "Old Bangor" quarry, the Pen Argyl operations, the "Genuine Washington" and "Provident" quarries, the "Old Red" quarry and many Vermont Architectural Slate quarries.

Architects' Service Departments

The VENDOR SLATE Co. maintains architects' service departments in New York, N. Y., and Easton, Pa.

These departments are under the direction of trained architects and are maintained wholly for the use of architects and others requiring information concerning slate roof design and construction.

Pennsylvania Blue-Gray Slate

Where the architecture of a building requires a roof of uniform subdued tone with simple harmony, nothing answers so appropriately as Pennsylvania blue-gray slate. The beds in the region producing this slate are so numerous and varied that a difference in quality is quite manifest. Caution should therefore be exercised in an endeavor to see that the kind of slate specified is shipped.

For the protection of architects and owners, the VENDOR SLATE Co. issues a certificate of quality guarantee with each shipment of the several standard grades.

Classifications of Pennsylvania Blue-Gray Slate

In the following list, practically every slate of American origin is given under its basic name with a brief and accurate description of its physical characteristics.

Genuine Bangor—The highest quality slate produced in the blue-gray slates of Pennsylvania. It is unfading.

Genuine Bangor slate, while all produced from the same beds, is divided into two classifications as follows:

No. 1 Clear—Tolerably uniform as to surface. Thickness averages $\frac{3}{8}$ in. Straight, with square corners and entirely clear stock.

No. 1 Ribbon—Produced from the same beds of slate as No. 1 clear, but contains dark streaks entirely hidden when laid on the roof with the regulation 3-in. head lap.

Note: Genuine Bangor slate needs no further recommendation than its name. To protect architects and users against substitution of inferior grades such as Jackson Bangor, Albion Bangor, etc., the producers have formed the Bangor Slate Association, and with all shipments of Genuine Bangor slate is furnished a certificate of the Association.

"Mettowee Stone" Colored Roofs

Mettowee Stone is produced exclusively by VENDOR SLATE Co. It is quarried in the Penrhyn Hills lying along the border line of Vermont and New York.

Mettowee Stone is of exceptional beauty, ranking highest in quality and architectural excellence.

Mettowee Stone is produced in standard commercial thickness as well as heavy architectural thicknesses for roofs of low cost, yet it possesses individual character and refinement. Mettowee Stone is produced in the following colors:

Antique Red—A deep red containing markings of burnt sienna, quartz and streaks of moss green.

Florentine Red—Similar to antique red but of a lighter shade and without markings.

Verdelite Unfading Green—A slate of excellent quality, permanent in color and having a definite greenish cast.

Mottled Gray—A light gray slate having streaks of mottling of darker gray.

Dark Gray—An Oxford gray most suitable for reproducing antique effects.

It will weather slightly.

Clear Purple—A dark purple slate with minute green markings.

Slates in this range are produced in both unfading and weathering qualities.

Variegated Green and Purple—A beautiful slate of an opal blend in greens and purples. Light and dark shades.

Black—Produced in a variation of black, blue-black and dark gray.

Weathering Green—A tough, durable green-gray slate when newly quarried. An uncertain percentage will, after exposure, change to tans, buffs and browns.

Sea Green—A slate similar in color to weathering green when freshly quarried, but which will weather to yellows and tans.

Mottled Green and Purple—A slate of purple base with mottlings of green varying from, approximately, the size of one's thumb to sometimes half the slate. It is of weathering nature.

Rustics—Commonly termed "freak" slates. Not produced in thicknesses less than a scant $\frac{3}{8}$ or a full $\frac{1}{4}$ in. They are from top rock formation producing delightful variations in colors of bronze, browns, buffs, rustic greens, grays and blacks.

Specifications for Mettowee Stone Roofs—See

general specifications below for application of roofing slate.

"Mettowee Stone" Colored Flagging and Flooring

"Mettowee Stone" as used for flagging and flooring is a specially quarried slate. This product is ideally suited for this purpose because it is durable, beautiful in color and texture and lends itself to all types of architecture.

Descriptive Classification—Colors obtainable are variegated green and purple, unfading green, clear purple, weathering green, brown, gray, black and red.

Specifications—Descriptive literature showing many beautiful installations as well as specifications will be sent on request.

Specifications for Application of Roofing Slate

On Sloping Surfaces (Specification "A")

The following are based on the Standard Specifications for War Building Projects of the Building Materials Division of the U. S. War Industries Board, and on the normal essential points from other specifications: *The first section "Roof Boarding" should of course be transferred to "Carpenter Work."*

Roof Boarding—Roof boarding or sheathing to be $\frac{7}{8}$ in. thick, and not more than 8 in. wide, tongued and grooved and surfaced one side, and free from wanes, shakes, loose or large knots. The boards, to allow for swelling, are not to be driven up tight and are to be laid with the surfaced side against the rafters with tongues toward the ridge, and to be nailed with 10d nails, with all joints occurring over rafters or purlins.

Leave an even surface free from chips, loose nails, etc., and ready to receive the slater's felt.

Note: Another type of roof boarding, costing less, but presenting more joints and not offering the same even plane, consists of the regulation 1x10 or 1x12-in. unsurfaced common sheathing boards. In some localities, slate are laid on lathing strips, without sheathing or "felt."

Roofing Felt—All roof boarding (as specified under "Carpenter Work") shall be covered with one thickness of "slater's felt" weighing not less than 11 lb. for commercial roofs, and 30 lb. for architectural roofs, per 100 sq. ft., and laid in horizontal layers with joints lapped toward eaves at least 3 in. and tacked down.

Flashings—A base flashing course (of 16-oz. copper, 4-lb. lead, 1X-tin or prepared roll roofing weighing not less than 37 lb. per 108 sq. ft.), extending 4 in. on the roof (if showing—or full depth of top slate, if covered by same) and not less than 4 in. vertically, shall be laid against all chimneys, parapet and party walls, roof posts, and porch roofs where they connect with walls. Similar flashings, 4x4 in. by length equal to "weather" plus "lap," laid in with each course of slate, shall be carried up all rakes.

Where base flashings are not covered by slate or siding, a cap or counter flashing course (of 4-lb. lead, 16-oz. copper or 1X-tin) shall be tightly built into masonry at least 2 in. and shall cover the vertical leg of the base flashing at least 3 in. All vertical joints of cap flashings to be sealed tight with elastic roofing cement.

Note: Here enumerate any other flashings, such as at sides of dormer window frames, pans under sills of same, etc., referring to Figures on Service Sheets applicable and in the case of tin, specifying the manner of painting.

Valleys, Gutters, Spouting, etc.—*Note:* The design of the building will determine the specification requirements for any valleys, the gutter stops, hanging gutters, conductors or down-spouts that are to be provided.

Open Valleys—Provide 16-oz. soft rolled copper flashing 24 in. wide, nailed at top only.

Closed Valleys—Flash all closed valleys with 16-oz. copper flashing over each course. Flashing shall lap 2 in. and shall extend 12 in. on each side of the valley.

Rounded Valleys—Slate shall be carefully fitted and laid with special long slate. Flashing shall be slip or shingle flashing.

Note: In the case of open valleys the exposed width of the valley at the top should be stated as well as the width of flashing. The 4 in. total minimum open width in the case of a ridge which is any considerable distance below another, should be increased proportionately to the flow of water from the higher roof.

Note: If closed valleys are to be used, the flashing material should be inserted over each course of slate.

Note: Down-spouts should never discharge from one roof across the slate of another.

Slating—The main (and porch) roofs, the roofs and sides of dormer windows, and all other surfaces so indicated on the drawing shall be covered with (..... kind, grade and size) slate as furnished by the VENDOR SLATE CO., Easton, Pa., laid over the slater's felt.

(If slate are to be punched at the quarry, so state.) No broken or cracked slate shall be used and nails shall be driven so as not to produce a strain on the slate.

The slate shall project 2 in. at the eaves, and $\frac{1}{2}$ in. at all gable ends, and shall be laid in horizontal courses so that the third course shall lap 3 in. over the first, and each course shall break joints with the preceding one. (The lap shall be 4 in. on porch roofs.) The slate shall begin at the cornice, line or eave with a starting course canted $\frac{1}{8}$ in. so that the succeeding courses will have a flat contact. The slate shall be fastened to the roof boards with broad flat headed galvanized (copper or yellow metal) "slate roofing" nails, two to each slate and of sufficient length to penetrate roof boarding 1 in. All exposed nailheads shall be covered with elastic roofing cement of same color as the slate.

Slate at the eaves, ridges (valleys, hips, etc.), shall be cut and laid so that their bond pattern shall be preserved. The ridge course shall be laid double saddled (or combed).

Top course of slates of all ridges and of any tight hips shall be laid in elastic roofing cement. (Slates at other hips and valleys to be laid in elastic roofing cement, when and as so specified.)

On completion all slate must be sound, whole and clean and the roof shall be left in every respect tight and a neat example of workmanship.

On Flat Surfaces, Embedded in Hot Asphalt (Specification "F")

All loose rubbish, chips and nails shall be swept from the roof by the contractors preceding the roofer, and the roof surface left perfectly clean. Ends of all sheathing boards to rest on rafters or purlins properly nailed and secured. Sheathing boards shall be free from loose knots and holes, and properly graded to outlets, by the carpenter and contractor.

Application—First—Lay one thickness of sheathing paper or unsaturated felt weighing not less than 5 lb. per 100 sq. ft., lapping the sheets at least 1 in.

Second—Over entire surface lay two plies of tarred felt, lapping each sheet 17 in. over preceding one, and nail as often as is necessary to hold in place until remaining felt is laid.

Third—Coat entire surface uniformly with coal tar pitch.

Fourth—Over entire surface lay three plies of tarred felt, lapping each sheet 22 in. over preceding one, mopping with coal tar pitch the full 22 in. on each sheet, so that in no place shall felt touch felt. Such nailing as is necessary shall be done so that all nails will be covered by not less than two plies of felt. Use an average of 80 lb. of coal tar pitch to 100 sq. ft. of roofing.

Fifth—Spread over the entire surface a uniform coating asphalt (Trinidad or equal) and coal tar pitch in proportions of 50% each, using an average of 50 lb. to 100 sq. ft., into which while hot, thoroughly embed the slate; grade, size inches by inches (grade and size to be inserted, 10x6 to 12x10 in. recommended); slate to be perfectly dry when placed.

Flashings—Shall be constructed as shown in detailed drawing of building.

Note: Specifications for use over concrete and for embedding in plastic compound (cold) will be furnished on request.

J. W. WILLIAMS SLATE CO.

Producers of Highest Quality Slate Roofs and Slate Specialties

MAIN OFFICE

Drake Building, EASTON, PA.

VERMONT OFFICE, POULTNEY, VT.

ARCHITECTURAL SERVICE DEPARTMENT, 103 Park Avenue, NEW YORK, N. Y.

Production (Slate Roofing)

The J. W. WILLIAMS SLATE Co.—with the production of “Verdelite Unfading Green” slate at the Penrhyn quarries in Vermont, Unfading Purple, the beautiful and varied weathered effects in Penrhyn Stone, from the same regions, and the “Blue-Greys” from the quarries which it operates in Pennsylvania—is in position to give the best possible service.

Architectural Roof Design

The Company's organization with its ten years' experience in the layout of roofs for numerous important projects throughout the United States, and its intimate knowledge of the possibilities connected with the slate produced and available in the Vermont and Pennsylvania quarries, is prepared to collaborate with the architectural profession in the preparation of specifications for the artistic roofing of any style of architecture.

A department for this service is maintained at 103 Park Avenue, New York City.

Penrhyn Stone

Penrhyn Stone is the product of a series of quarries operating in the Penrhyn Hills on the border of the State of Vermont.

The wonderful texture and coloring of this material allows of harmonious combinations that are adaptable to any type of architecture or period reproduction. The various shades and variegated colorings of purple, gray, green, brown, etc., are so intermingled and weathered that a newly laid roof has all the aged appearance that is characteristic of the roofs on the ancient castles and homes in England.

Penrhyn Stone is produced by skilled craftsmen. It is quarried, split, and trimmed entirely by hand into sizes and thicknesses required by each individual roof, as determined by a study of the architect's plans. Either dark or colorful effects can be produced just as the architect desires or period reproduction demands. The nature of the rock does not admit of being split into commercial thickness and it is, therefore, particularly suited for roofs where texture is the paramount feature.

Verdelite Unfading Green Slate

Produced at the Penrhyn quarries in the State of Vermont and sold exclusively by the J. W. WILLIAMS SLATE CO.



This slate is of a beautiful dark green color. The quality is excellent, of architectural texture, dependable and pleasing in color, and never fades or weathers. Equally as ef-

fective when laid in graduated thicknesses or restricted to a single thickness in graduated lengths.

It is produced in both commercial and architectural thicknesses and is especially suitable for structures that are of a plain or severe type of architecture, and especially so for roofs of large area. Among the many buildings on which Verdelite Unfading Green has been used are the following:

Netherlands Embassy, Washington, D. C.
United States Veterans Hospital, Tupper Lake, N. Y.
New York State Hospital Buildings, Thiells, N. Y.
Southern Theological Seminary, Louisville, Ky.
Home for Aged, Salisbury, Md.
Shriners Hospital for Crippled Children, Philadelphia, Pa.
St. Patrick's Church, Jersey City, N. J.
Dalhousie University, Halifax, N. S.
St. Dominic's Church, San Francisco, Calif.
Wilmington High School, Los Angeles, Calif.
High School, South Orange, N. J.
New York Public School, Eltingsville, S. I., N. Y.

Rough Cleft Blue-Grey Slate

Although the use of Pennsylvania Blue-Grey slate is usually confined to a smooth surfaced slate of standard thickness, the demand for a heavier rougher slate of architectural quality has become insistent. To meet this demand we are producing a Rough-Cleft slate in thicknesses from $\frac{1}{4}$ to 1 in. in varying lengths and widths. For graduated exposures in either a single thickness or graduated thicknesses.

Specifications for Graduated Architectural Slate Roofs

In specifying graduated thicknesses, the incorporation of commercial thickness ($\frac{3}{16}$ in.) for the upper section of the roof, although more economical, should be avoided, if texture is to be maintained—the minimum should be not less than $\frac{1}{4}$ in. Commercial thickness slate comes from beds that lack the necessary texture and color for harmonious intermixture with the slates of a heavier thickness, and, while they make an admirable roof when used alone, their use with the more textural slate is liable to cause a marked difference or “band” on the completed roof.



W. R. Lewis Residence, Beverly Hills, Calif.

ALBERT FARR, Architect, San Francisco, Calif.
Roofed by W. R. TOBIAS, Los Angeles, Calif.

Penrhyn Stone for Floors, Garden Walks, Garden Seats, Wainscoting, Base, etc.

The wonderful applicability of slate for both interior and exterior effects, with its beautiful and especially effective yet subdued natural colorings, is now fully recognized by the architectural profession.

It has the advantage over other materials in that it can be used with either a rough cleft surface in any degree of roughness desired, or with a rubbed finish similar to a marble tile. The range of colors obtainable is extensive and when carefully selected and blended the result is exceptionally striking and artistic.

The use of slate for terrace and porch floorings in random irregular shapes in mixed colorings is coming more and more into use in America. In Europe, it has been used for centuries—as a reference to illustrations of the floorings and walks of these old structures will testify.

For steps, risers, coping and window sills, slate has many advantages over other materials—it does not absorb moisture, and the colorings can be selected to harmonize with the slate roof.

Suggestions for Installing Garden Walks, Outdoor and Interior Floors

On Soil with Grass Joints (Soil or Turf Sub-bed)—Mark out location of all walks and terraces to be laid with grass joints. If ground is not well settled, wet and tamp thoroughly. Fill any holes or depressions with thoroughly tamped soil, and lay slate directly on soil. Each piece of slate should rest on a solid even bed with the top surface level.

Cinder Sub-bed—Excavate to a depth of 8 to 10 in. Fill excavations with cinders from 6 to 8 in. deep, well rolled and tamped to an even surface. On top of cinder bed place a 2-in. layer of soil and on soil lay slate. Fill all joints with soil to level of surface of slate and sow grass seed.

When Set in Cement—Excavate walks to depth of 6 in., fill in 4 in. with cinder concrete. When this is thoroughly hardened, build up the remaining 2 in. with cement—using a mixture of 3 parts sand and 1 part cement. Grout all joints before cement hardens and point up all joints in color desired.

Stepping Stones—Place stone in desired position on lawn, cut around edge with sharp pointed trowel, lift out sod, remove sufficient earth to permit setting of stone about $\frac{1}{2}$ in. above finished level; tamp well, fill in around edges with earth and sow with seed.

Terrace Floors, Interior Floors, Porch Floors, etc.—Bring rough concrete finish to within 2 in. of desired level for finished floor. Remaining 2 in. shall be built up with cement—3 parts sand 1 part cement. Set each piece of slate separately. Grout all joints before cement hardens and point up all joints.

Over Existing Wood Floors—(a) Cover existing floor with 2 layers of asphalt saturated rag felt of not less than commercial 14-lb. weight. Each sheet of felt shall lap over preceding one, and shall be nailed only as is necessary to hold it in place.

(b) Lay wire mesh or metal floor lath on the felt and, depending on level desired, cover with from $\frac{1}{2}$ to 2 in., of setting mixture—3 parts sand, 1 part cement. After this bed is leveled sprinkle with pure portland cement and bed slate thereon, thoroughly wetting each piece of slate before bedding. Point all joints with concrete mixed 2 parts well sieved sand and 1 part cement.

Cleaning Slate (Floors Laid with Concrete Mix-



Residence and Grounds of Dr. Ernest Cadgine,
Englewood, N. J.

FLAVIO B. GROSSO, Architect
Veranda floor, walks and roof of Penrhyn Stone

ture Joints)—Sponge all slate, as set, on exposed surface with clean water to remove stains and, if necessary upon completion, rub down with a solution 3 parts coal oil and 1 of linseed oil. If light or weak solution of muriatic acid is needed and used for cleaning, care should be taken to wipe only exposed slate surfaces to avoid acid eating out cement joints.

Suggestions as to Thickness, Surface, Finish, Shapes and Size of Slabs

Penrhyn Stone is especially well adapted for all underfoot surfaces, either interior or exterior, and once laid it requires little or no expense for maintenance. A natural cleft surface is the most desirable for all installations whether the design is in random rectangles or irregular shaped slabs.

For stepping stones and garden walks a roughish surface is invariably required by Landscape Architects but for terrace and porch floors a comparatively smooth surface (though natural cleft) should be selected so as not to interfere with the free use of the porch furniture.

Where a sub-base of cement is used the thickness of the slabs need not be more than half inch but where the Stone is laid in soil a thickness from $\frac{3}{4}$ to 1 in. is advisable.

The maximum size of the slabs should be determined by the dimensions of the space to be covered—large areas lend themselves to the use of individual slabs of a dimension that could not be successfully used on smaller areas.

Penrhyn Stone in rectangular shapes can be furnished with a rubbed surface finish similar to marble—this finish combined with the varied colorings makes a most artistic floor.

ESTABLISHED 1901

O'BRIEN BROTHERS SLATE COMPANY, INC.

Quarriers and Manufacturers of Roofing Slate

OFFICE

GRANVILLE, N. Y.

NEW YORK, N. Y., 120 East 41st Street—Telephone, Ashland 5150

Products

ROOFING SLATE, FLOOR SLATE and GARDEN FLAGGING.

Service

Architects and engineers are invited to consult with our Service Department at 120 East 41st Street, New York, N. Y., for information and specifications in the preparing of details for a graduated thick slate roof. We are also prepared to make sketches and offer suggestions for the use of slate in landscape work.

**Production**

All orders executed under our personal supervision, assuring our clients that the years of our experience as slatemakers have gone into the preparing of their roof.

Unfading Green

Emerald Unfading Green is admitted to be the greenest colored slate produced. It is of a dark green color and never changing. This slate is furnished with an absolute guarantee not to change color.

Unfading Mottled Green and Purple

Unfading mottled green and purple slate produces a roof full of warmth and life. An effect of either green or purple predominating can be produced, if so desired. This slate should be given consideration by architects who desire to obtain the best in a slate roof.

Unfading Gray

A gray-green slate with irregular shaped dark

splotches. Some slate are a solid gray with no markings.

Rustic Gray

A very desirable colored slate to blend with other colors. Dark streaks run through the slate. Some fade to a brown and beautiful buff color.

Vermont Black

Some are a gray-black, while others are real shiny "Niggerhead Blacks." This slate is unfading and used to the best effect in a heavy roof.

Weathering Green

The commercial sea green makes a very durable watertight roof at the least possible expense. After a few month's exposure on the roof some fade to a brown and buff color while others retain their original gray-green color.

Architectural Slate

By blending the various Vermont colored slates in the proper percentages, an effect can be obtained similar to the autumn foliage. This type of roof should be planned in conjunction with our Architectural Department to secure the proper coloring and thickness of slate suitable for the roof being planned.

Garden Flagging

Natural cleft, irregular flagging is being used extensively for landscape work. This can be obtained in any desired pattern as shapes cut to size or in rectangular shapes. Can be furnished in all colors.

Samples

Small size samples will be mailed free on request.

F. C. SHELDON SLATE COMPANY

GRANVILLE, N. Y.

BRANCH OFFICES

CHICAGO, ILL., Builders Bldg., 228 N. La Salle St. COLUMBIA, S. C., 17 Carolina National Bank Bldg. DETROIT, MICH., 1115 Francis Palms Bldg.
CINCINNATI, OHIO, 35 Poinciana Apartment NEW YORK, N. Y., 101 Park Avenue
MONTREAL, QUE., 9 Olier St. TORONTO, ONT.

PLANTS AT POULTNEY, PAWLET AND RUPERT, VERMONT

The Company and Its Service

We are generally recognized as the largest individual producers of colored roofing slate and slate products of every kind for both commercial and architectural purposes, from quarries actually owned and operated under our personal supervision. This not only enables us to maintain the uniform quality which has established the superiority of Sheldon's slates, but insures prompt and satisfactory execution of all commissions entrusted to us.

Exclusive Specialties

Sheldon's Semi-Weathering Mottled Purple and Green—A predominating purple tone when first manufactured, some having spots or streaks of green of varying size. A uniform percentage change upon exposure to harmonious shades of brown, while others present an unchanged appearance.

Sheldon's Unfading Mottled Purple and Green—A mixture of green and purple tones in each individual slate. No two alike. Some with more green than purple—others vice versa—of steadfast color and durability.

Sheldon's Unfading Green and Gray—The green is a sage green. The grays can be had in light and dark shades; the former practically clear and of a light gray tone; the latter mottled with dark streaks or clouds.

Sheldon's Clear Arabian Red—Exclusive and distinctive. Strictly unfading. Production facilities ample to insure the prompt execution, within reasonable time limits, of all orders, either for roofing or structural purposes. Washington County, New York, is the only place in the world slate of this color has been found in deposits of commercial value.



Sheldon's Hard Vein Freaks—

Just what the name implies—freak slates—from rock formations centuries old, of a character that will not permit the manufacturing of any under $\frac{3}{8}$ -in. thickness and from this up to 2 in. for architectural purposes. A great array of colors are available, comprising gray-blacks, opals, bronzes, buffs and browns, grays, blue-grays and others, so varied and unique that when displayed en masse, one is reminded of a beautiful tapestry.

Sheldon's Olde English Special Rough Cleft—Furnished in any individual color or combination of colors; random lengths and widths and promiscuous thicknesses ranging from

$\frac{1}{8}$ to $\frac{3}{8}$ in. The use of these slates, in accordance with our layout and specifications, guarantees the finest low priced architectural roof extant.

Sheldon's National Black—A strictly high grade Sheldon product. Guaranteed absolutely unfading. Delivered to many localities at a considerable saving in cost over Maine, Peachbottom, or Buckingham.

Sheldon's Slate Flagging—In all sizes, colors, shapes and finishes for interior and exterior uses.

Sheldon's Semi-Weathering Green and Gray Slates

Sheldon's Semi-Weathering Green and Gray are produced from the Sheldon mines in Vermont, the largest in the district, from the deep slate formations of the Cambrian period. A uniform percentage remains unchanged; the balance, upon exposure to the elements, weather to soft tones of brown and buff—all blending together in natural harmony with no suggestion of sharp contrasts.

Prompt deliveries guaranteed. Any size or thickness.



Exact Reproduction at Full Maturity of Sheldon's Semi-Weathering Green and Gray Roofing Slate of Standard Commercial Thickness Averaging $\frac{1}{8}$ in.

Strength, Absorption and Acid Tests—Made by Cambria Steel Company, Johnstown, Pa., and certified by S. M. Marshall, Engineer of Tests, March 26, 1914, to establish the strength and absorption of *No. 1 Commercial Semi-Weathering green and gray slate*. The results are a correct basis for comparison as to real strength when compared to other roofing material.

Thickness, in.	Width, in.	Load, lb.	Span, in.	Breaking stress, lb.
0.165	10	385	8	17,000
0.165	10	435	8	19,200
0.160	10	395	8	18,500

Some specimens of the slate were put in water for 24 hours and others in a 5% sulphuric acid solution for the same period of time, to determine the absorption and loss in acid action.

Gain in weight 24 hours in water	Loss in weight 24 hours in 5% acid solution	
	Actual loss	Corrected for absorption
0.49% (less than ½ of 1%)..	0.29%	0.39%

Sheldon's Slate for Architectural Purposes

All of the slate described, herewith, are available, and are being extensively furnished from the Sheldon quarries, in thickness ranging from ¼ to 2 in., and in graduated, or random sizes as desired.

Layout Suggestions for Architectural Slate—

A—20% each 1, ¾, ½, ⅜ and ¼-in. thickness.

B—20% each ¾, ½, ⅜, ¼ and ⅓-in. thickness.

C—10% 1 in., 15% ¾ in., 20% ½ in., 25% ⅜ in., 30% ¼-in. thickness.

Sheldon's Olde English Architectural Slate Combination No. 12

As shown below in actual natural colors, consists of a combination of various thicknesses, sizes and colors, designed particularly for producing the finest type of architectural roof.

These slate can be furnished in any range of thicknesses and exposures, either in medium or extremely rough textures. The same combination of colors is also available in random rectangular flagging for flooring, garden walks, etc.

The illustration shows a range in thickness from

D—10% ¾ in., 15% ½ in., 20% ⅜ in., 25% ¼ in., 30% ⅓ in. thickness.

Sizes as desired. Lower percentages of thick and higher percentages of thin slate than in graduation "C" and "D" are not recommended. Percentages are based on length of rafter. Heavier slates can be furnished when required up to 2-in. thickness.

Shipping Weight in Pounds per Square—

Commercial ⅓ in. 700, ¼ in. 1000, ⅜ in. 1500, ½ in. 2000, ¾ in. 3000, 1 in. 4000, 1 ¼ in. 5000, 1 ½ in. 6000.

Waveline Roof

Here is something new—we call it the Waveline roof. Available in Semi-Weathering Green and Gray, Unfading Mottled Purple and Green, and Arabian Red. Applied with standard 3-in. lap, same as the ordinary slate roof. Nominal thickness ⅓ to ¼ in. Can be furnished in other thicknesses when required.



The Waveline Roof

1 to 1 ¼ in. with exposures varying from 10½ to 5½ in. The slate is of medium texture.

Due to the extent of our quarrying operations and production facilities, timely deliveries are assured. Simply specify—"Roofs to be covered with Sheldon's Olde English Slate Combination No. 12" (following with maximum and minimum thicknesses and exposures) "as manufactured by F. C. SHELDON SLATE COMPANY, Granville, N. Y., in accordance with detailed layout to be furnished by them and approved by architect."



Olde English Architectural Slate Combination No. 12

C. G. BOSTWICK

Manufacturers of Snow Guards for Roofs

69 Bartholomew Avenue
HARTFORD, CONN.

Products

"CAMPBELL" PATENTED SNOW GUARDS for slate, tile, and other steep roofs.

"Campbell" Patented Snow Guards

The "Campbell" is a positive snow guard that stays put and will not break, bend nor wear out. It is made of pure copper only and will last as long as the building upon which it is installed.

An especially valuable feature of the "Campbell" snow guard is that it can be installed on roofs already laid, without breaking or removing slates.

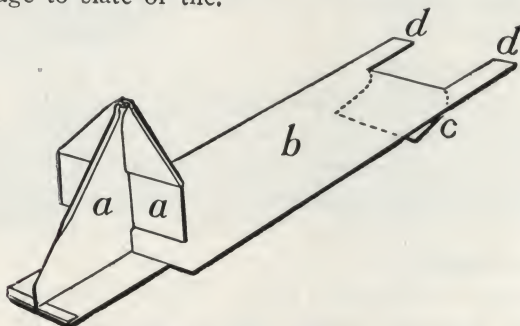
Construction Details

The snow stop or guard head (a) is so designed and constructed that it can not bend or collapse under the weight of the snow or ice.

The broad, flat, thin supporting strap (b) gives a distributed bearing, does not lift the slates and positively will not cause them to break.

The hook end (c) on the supporting strap is broad and will not split nor injure the slates and stays put.

The fingers (d) on the hook end are designed for quick and easy installing on roofs already slated without damage to slate or tile.



Number of Guards to Set, Per Square

This varies according to the size of the slates, pitch of the roof and special needs.

For graduated, random slate roofs, space the guards from 16 to 24 in. apart horizontally and so spaced up and down as to properly stagger in alternate courses. The following table is worked out by this method:

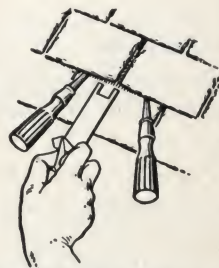
Size of slate, in.	Guards required per square	Where to place guards	
		Horizontally	Perpendicularly
12x6	60	Every 3rd slate	Every 3rd course
12x7	50		
12x8	40		
14x7	45	Every 3rd slate	Every 5th course
14x8	40		
14x10	35	Every 2nd slate	Every 4th course
16x8	30		
16x9	60	Every 2nd slate	Every 2nd course
16x10	55		
16x12	45		
18x9	50		
18x10	45		
18x12	40		
20x10	40		
20x12	35		
22x11	35		
22x12	30		
24x12	30		

Directions for Installing

The only tools required are two screwdrivers. Push a screwdriver under the butt of the slate at each side of the joint where the guard is to be installed. Then



First Operation



Second Operation



Finished and in Place

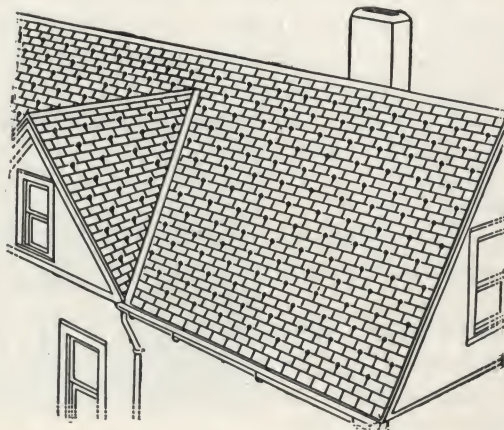
push the guard into place, remove the screwdrivers and continue with the succeeding guards in a like manner.

If the guards are securely hooked on the slates no staging will be required after the first course has been installed.

Start installing at the eaves and work up to the ridge, using the guards as a foothold to work on. However, as a precaution, it is well to have a rope or plank.

Architects' Specification

Install "Campbell" Patented Snow Guards, as manufactured by C. G. Bostwick, Hartford, Conn., spaced not more than 24 in. nor less than 16 in. apart, and so spaced up and down that they will properly stagger in alternate courses.



Spacing of Snow Guards on Typical Roof

CLASON WIRE SNOW GUARD FOR ROOFS

Manufactured Only by

THE M. N. CARTIER & SONS CO.

Cartier Building, 275 Canal Street
PROVIDENCE, R. I.

Product

WIRE SNOW GUARDS for slate, tile, metal and other steep roofs.

Their Purpose

To lessen chances of damage suits against owners of property by increasing both personal and property safety.

There are many buildings so situated that the use of snow guards is essential to personal safety; there are more cases where the use of snow guards could protect the surrounding roofing and sheet metal work against costly damages.

Sliding snow and ice often injure roofings, and puncture or tear away gutters, etc. The use of our snow guards forestalls these dangers, as they hold the ice and snow where they form. They are a cheap and unobtrusive preventive against damage.

Important Notation

We note a growing tendency to permit the installation of three, four, or five courses of snow guards near the roof eaves. The result is that a few guards are compelled to hold not only the weight of snow and ice which they are located to care for, but also to withstand the tremendous tearing force of slides starting from the roof surfaces above.

No guards will withstand such conditions, and their installation in such a manner precludes the *purpose* for which they are used. When specifying our guards please do so according to our table and *insist* upon the roofer following the specification.

Manufacture

We make our guards in our own plant, and are not dependent upon the facilities or services of others.

These guards are manufactured either from pure copper wire or galvanized steel wire, both selected for ductility and stiffness. No copper-covered steel wire is used.

Practicality

Our wire snow guards combine strength, long service, economy and unobtrusive design.

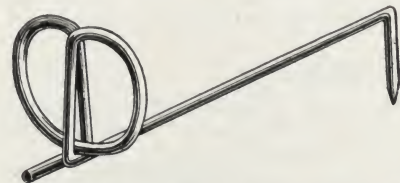
Types of "Clason" Snow Guards

- New roofs, 1 and 2-in. points.
- Hook and friction for old roofs.
- Solder-to-metal-roof.
- Special for Spanish tile.

The "Clason"

The "Clason" has been for years the standard guard, and is the strongest guard made.

Note from the illustration that the "butterfly" loops brace and strengthen each other, while the extension brace lends additional strength.



"Clason" Snow Guard for New Roofs

Number Per Square

The following table gives the approximate number of snow guards which may be safely specified for use in each 100 sq. ft. of roof surface:

ROOF PITCH	NUMBER OF GUARDS
One-quarter	50
One-third	75
One-half	125

Towers, and steeper roofs than above indicated, may require special consideration.

How to Specify

Apply to all pitched roofs "Clason" [for old roofs "Clason Special"] Snow Guards, as made by THE M. N. CARTIER & SONS Co., Providence, R. I. The guards to be made from pure copper [galvanized steel] wire. (Here specify the number of guards required per square, dependent upon the pitch of the roof and other special conditions.)

In applying the snow guards, the eaves course of the roofing material shall be laid as usual, but the next course shall be laid with the joints slightly open to receive the shank of the snow guard.

After striking the line for the third course of the roofing material, place the guards in the joints, with the loop just below the lap of the course, and drive the prong into the roof decking; then lay the course, leaving only the loop exposed.

Care must be used to insure having the shank well sunk into the joints, so that the following course of roofing material will lie flat and not bear upon the guard.

(Note: The architect or engineer may omit at his discretion the method of application of the guards.)

HAWTHORNE ROOFING TILE

MANUFACTURED BY
HAWTHORNE ROOFING TILE CO.

Builders Building, 228 North La Salle Street
CHICAGO, ILL.

HAWTHORNE PACIFIC TILE CO.
3326 San Fernando Road, Los Angeles, Cal.
HAWTHORNE ROOFING TILE CO. OF MICHIGAN
Box 125, Ferndale Branch, Detroit, Mich.

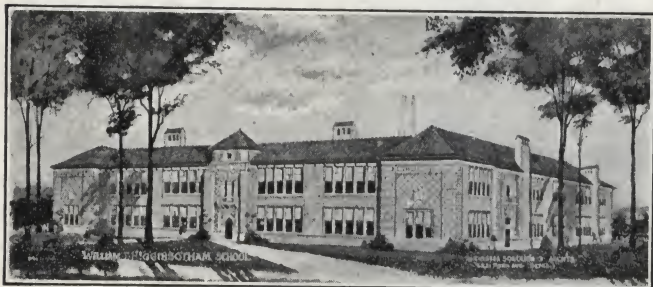
HAWTHORNE ROOFING TILE CO. OF NEW YORK
507 Fifth Avenue, New York, N. Y.
SOUTH HILLS HARDWARE CO.
1018 W. Warrington Avenue, Pittsburgh, Pa.

Hawthorne Roofing Tile—A National Product

HAWTHORNE Roofing Tile offers the architect a permanent tile roof at a moderate cost. It is a perfected product, always true to shape, that can be applied to any sloping roof.

No longer need motives of economy spoil good design by substituting inferior roofing. HAWTHORNE Tile has taken beautiful and permanent roofs out of the luxury class.

HAWTHORNE Tile is permanent. It is made of concrete by a unique patented method on automatic power machines producing a tile at reasonable cost, superior in strength, imperviousness and beauty. The tile is colored with pure metallic oxides



William F. Higginbotham Public School, Detroit, Mich.
N. CHESTER SORENSON & Co., Architects

that are integral with the tile and are guaranteed not to craze, dust or fade.

HAWTHORNE Tile is beautiful. It is made in two styles, Spanish and French. Our Los Angeles plant is also manufacturing the popular Cuban Tapered Mission tile with the hand finished effect. The impervious surface is always clean; rain washes the dirt off and not in. The tile is produced with an exceptionally pleasing matt finish in thirteen colors.

Bright red	Standard green	Yellow
Dark red	Light green	Chocolate
Orange	Dark green	Slate gray
Tan	Bright blue	Natural gray
Purple	Velvet blue	

The wide range of color tones enables the architect to obtain any color blend effect he desires.

HAWTHORNE Tile is economical. The roof costs but very little more than a cheap, perishable roof. It costs much less than any other type of permanent roofing. Maintenance expense is eliminated and re-roofing problems never arise when HAWTHORNE Tile is used.

HAWTHORNE Roofing Tile provides perfect roof protection. It is weatherproof. Extensive laboratory tests made by the

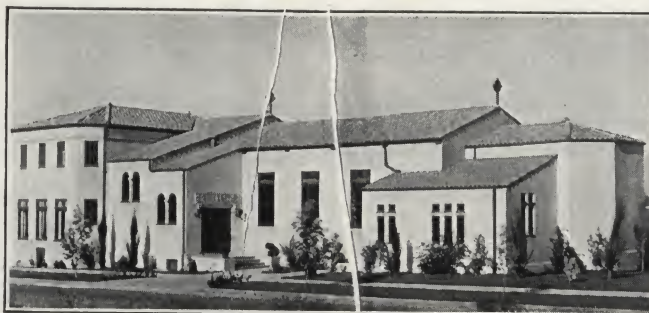


Residence, Kenilworth, Great Neck, L. I., N. Y.
GEORGE BARNES, Architect

Lewis Institute Laboratories, Chicago, prove that HAWTHORNE Tile is waterproof and practically non-absorbent.

Because of the form of HAWTHORNE Tile and interlocking method of laying, it is impossible for wind to dislodge or loosen any of the tile. On the other hand, expansion or freezing does not produce cracking. It lies so closely and so tight that water and snow can not be driven underneath.

HAWTHORNE Tile provides exceptional roof insulation. The method of laying HAWTHORNE Tile, on battens raising the tile well above the felt, provides an enclosed air space giving a thermos bottle effect to the roof. This exceptional insulation feature makes for cool, comfortable upper chambers during the heat of midsummer and also makes possible a substantial saving in winter's fuel bills. HAWTHORNE Tile supplies ample roof insulation without the use of any further insulating medium in the roof construction.



Messiah Evangelical Lutheran Church, Los Angeles, Cal.
RUDOLPH MEIER, Architect

The Logical Method of Laying Roofs

A HAWTHORNE Tile Roof is a roof without nails.

The tile are so designed that they interlock, securely, tightly and firmly in place. It is impossible for them to be loosened by wind or vibration. Unlike other tile, slate, or rigid shingles, HAWTHORNE Tile can not break because nailed too tight, nor can they loosen or cut the nails through wind action or vibration.

The average roof of other tile, slate, or rigid shingles, requires from 7000 to 10,000 nails, and it is not possible for any man to drive all these nails just right; anything else spells loosening or breakage.

HAWTHORNE Tile are absolutely secure. Each tile is held securely, interlocked with its neighbors at sides, above and below. Thus there is no chance for loosening. By means of this approved, advanced method of laying a roof, loss through breakage due to poor nailing is entirely overcome, and it is a



Edgebrook Country Club, Chicago, Ill.
HALL, LAWRENCE & RATCLIFF, INC., Architects

simple, easy matter to replace an accidentally broken tile, without loosening or disturbing all the tile around it. And new tile so placed is as secure as the original.

Hawthorne Tile Used from Coast to Coast

The geographical location of HAWTHORNE Tile plants ensures quick delivery of all orders, large or small, with minimum of transportation expense, to all parts of the country.

Suggested Specification Clauses for Use of Architects Specifying Hawthorne Roofing Tile

All sloping roofs shall be covered with Red (or other color) French [Spanish] HAWTHORNE Roofing Tile of shade approved by the architect and finished with HAWTHORNE special tile at ridges, hips and gables (and eaves in Spanish tile). Specials to be nailed with copper nails. All to be laid in accordance with the Standard Practice of the HAWTHORNE ROOFING TILE CO.

Before laying the tile, roof sheathing is to be covered with an approved slater's asphalted felt weighing not less than 30 lb. per square, securely nailed with flat headed nails, lapped not less than 3 in. at intersections, and doubled at valleys, hips and ridges. All flashings to be installed before tile is laid, and all stucco work, pointing or other finish on dormers and other vertical surfaces that rise above roof to be completed before tile laying is started.

Standard Practice of Hawthorne Roofing Tile Co. for Laying Hawthorne Tile Roofs

Roof framing should be of sufficient strength to support roof tiling. Weight of tile as laid on roof is not more than 8½ lb. per sq. ft. In residence construction 2x6-in. rafters, 20-in. centers are sufficient to support HAWTHORNE Tile on ordinary spans; but, in cases where 2x4-in. rafters are used, it is recommended that collar beams be used to stiffen the roof. It is important that valleys and headers should be of ample size and securely framed together. Rafters should be covered with close sheathing.

As total thickness above roof sheathing to under side of the tile is about 1¼ in., it is necessary to place gable rake boards so they project about 1¼ in. above roof boarding to receive the gable tile, as shown on detail drawings. Total width of this board may be 4, 6 or 8 in., to suit design of roof.

The best method of finishing eaves for French tile is to place a tilting fillet 2 in. high under the first roof board. The lowest tile will then lay right on the roof boarding and set snugly in the gutter. A more common practice is to lay sheathing just as for other roofs; the roofer then sets his lowest furring strip on edge in order to give proper tilt to the tile. This results in the tile showing a little higher above the edge of the gutter. This is not objectionable. In the case of Spanish tile no tilt is required, as eave closer furnished with the tile finishes edge.

Felt—Over the sheathing roofer will lay slater's asphalted felt weighing at least 30 lb. per 100 sq. ft. Felt should be lapped 3 in. or more at intersections and doubled at valleys, hips and ridges, securely nailed down with flat headed nails. Where moulding gutters are used felt should be brought up over back edge of the gutter.

Sheet Metal Work—Before laying any tile, all sheet metal work for flashings, gutters, valleys, etc., should be installed.

Flashings of 16-oz. copper should be used. Roofers often use galvanized iron flashings and valleys, but this is not recommended, as the life of sheet iron flashings is short.

Weeper and Hanger Strips—When all flashings and felt have been laid the weeper strips are placed. They are laid at right angles to the eaves, about 2 ft. apart over the entire roof. Ordinary plasterer's lath are suitable for this purpose. They should be securely nailed to the roof boarding with ⅞-in. shingle nails.

Over weeper strips horizontal 1x2-in. battens or hanger strips are placed. They are placed parallel to the eaves and securely nailed through weepers to the sheathing using 6d wire nails.

Hanger strips must be accurately and evenly spaced in order that lines of the tile may be regular. Before laying strips, roof from eaves to ridge should be measured to determine spacing of hanger strips. Tile are usually laid 12 in. to the weather, but if distance from ridge to eave is not an even number of feet, it will be necessary to slightly increase or decrease spacing of the hanger strips from 12 in. on centers.

It is important that the lines of hanger strips should be absolutely horizontal and that spacing from eave to ridge should be uniform. Roofer usually measures the distance and marks out the lines in chalk before placing these strips.

On all hips and ridges a 1x4-in. strip is set vertically and securely nailed to the sheathing below. Ridge and hip tile are nailed to these, so that their weight does not bear on the roof tile.

In some cases where pitch of roof is very flat or very steep, a 1x4-in. strip is not sufficient to keep ridge and hip tile clear of the tile below or it may bring it too high. In this case, width of strip shall be slightly increased or decreased in order that the hip and ridge tile may set close to the surface of the field tile and yet allow its weight to be carried on the strip.

Tile Laying—Tile are laid in horizontal rows starting at lower left-hand corner; lugs of the tile hook over the hanger strips. Each succeeding tile interlocks with the preceding tile. Upper rows of tile overlap the row immediately below by not less than 2½ in. Gable starters and finishers are used on all gable rakes. If length of roof is not an even multiple of 8 in., the last tile nearest the gable finisher may be cut to fit and gable finisher bedded with cement mortar on to it.

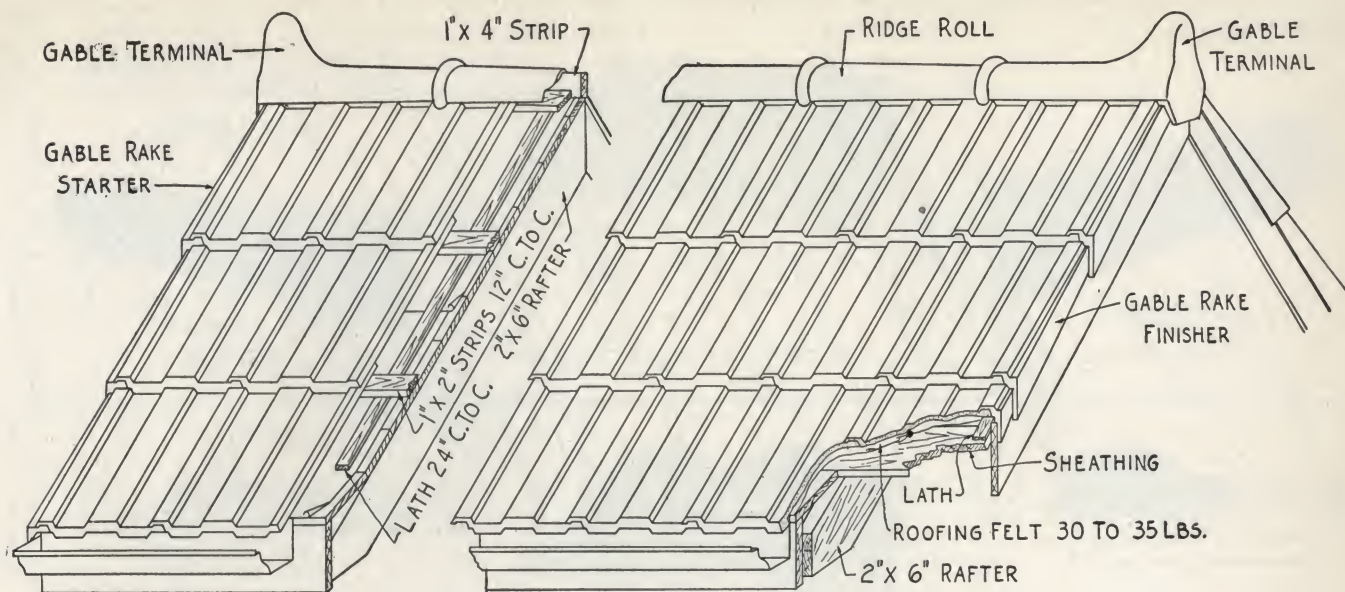
Tile should be neatly and carefully cut to fit hips and valleys. Tile on either side of valleys should be cut so that they show straight parallel lines. Rough and unsightly edges should not be permitted. Edges should be 6 in. apart at all points except in the case of very long slopes (30 ft. or more), in which case width at eaves should be slightly increased and gradually tapered to 6 in. at top.

Hip and ridge tile should be nailed to the 1x4-in. strip and bedded and pointed up with colored cement mortar, using the same color as that used in the manufacture of tile. With Spanish tile, ridge closers and eave closers are used to finish tile at ridges and eaves; pointing at ridges is unnecessary.

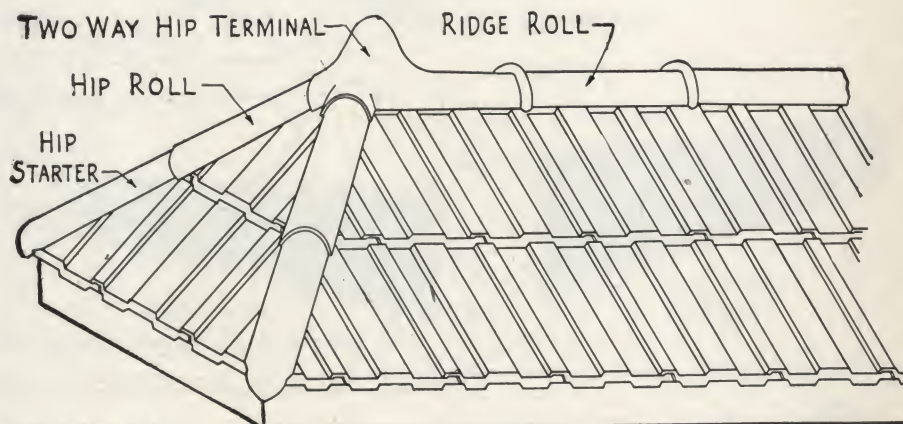
Note: The above practice does not apply to the installation of Mission tile as manufactured by the Los Angeles plant. The office of the Los Angeles plant will be pleased to furnish architects with complete details and specifications for laying this tile.



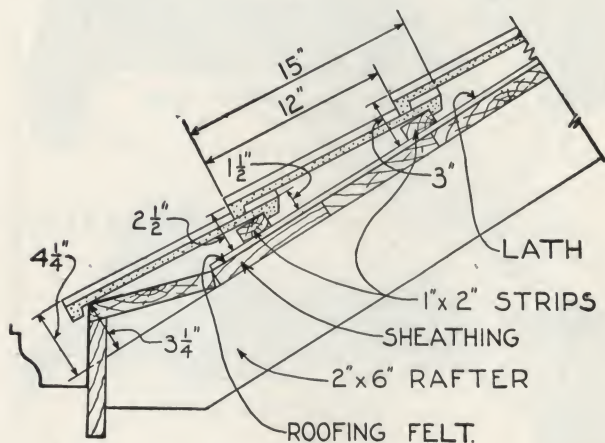
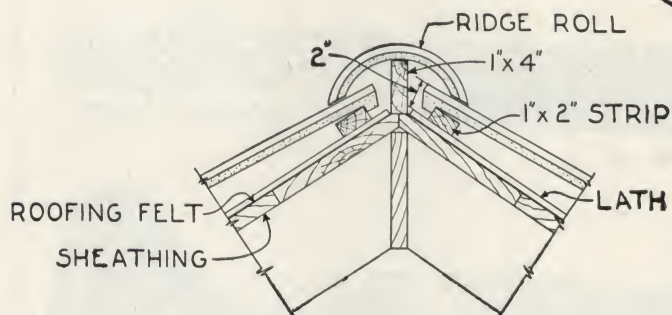
First Baptist Church, Pittsburgh, Pa.



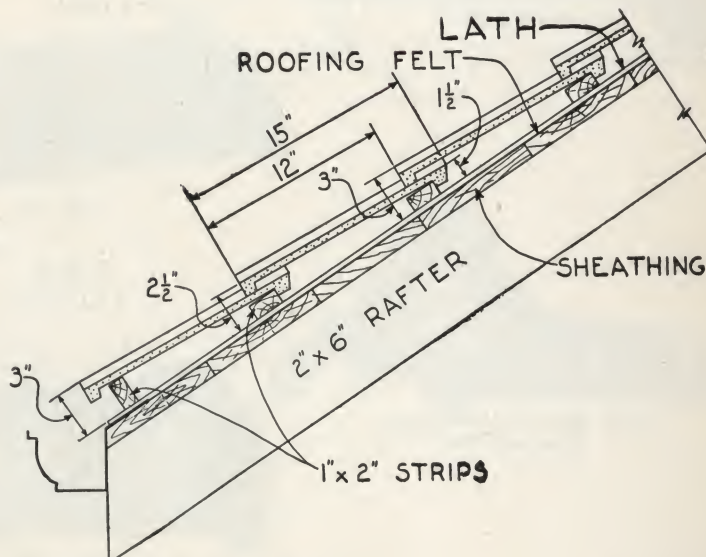
Lock Joint of Hawthorne French Tile



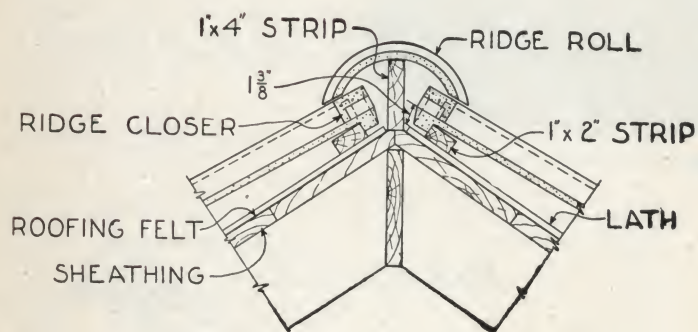
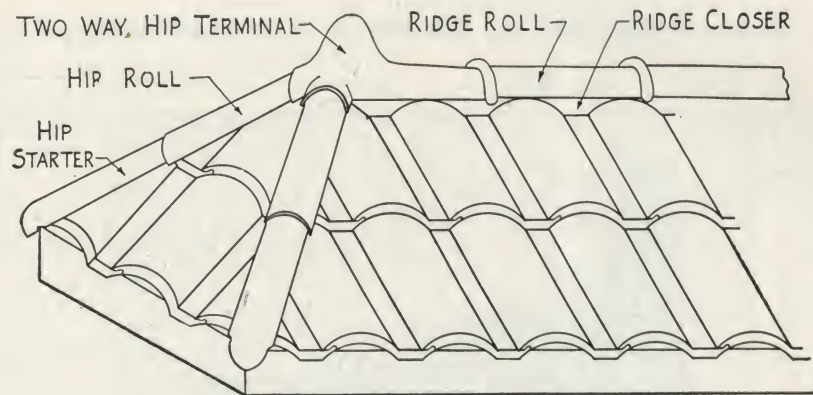
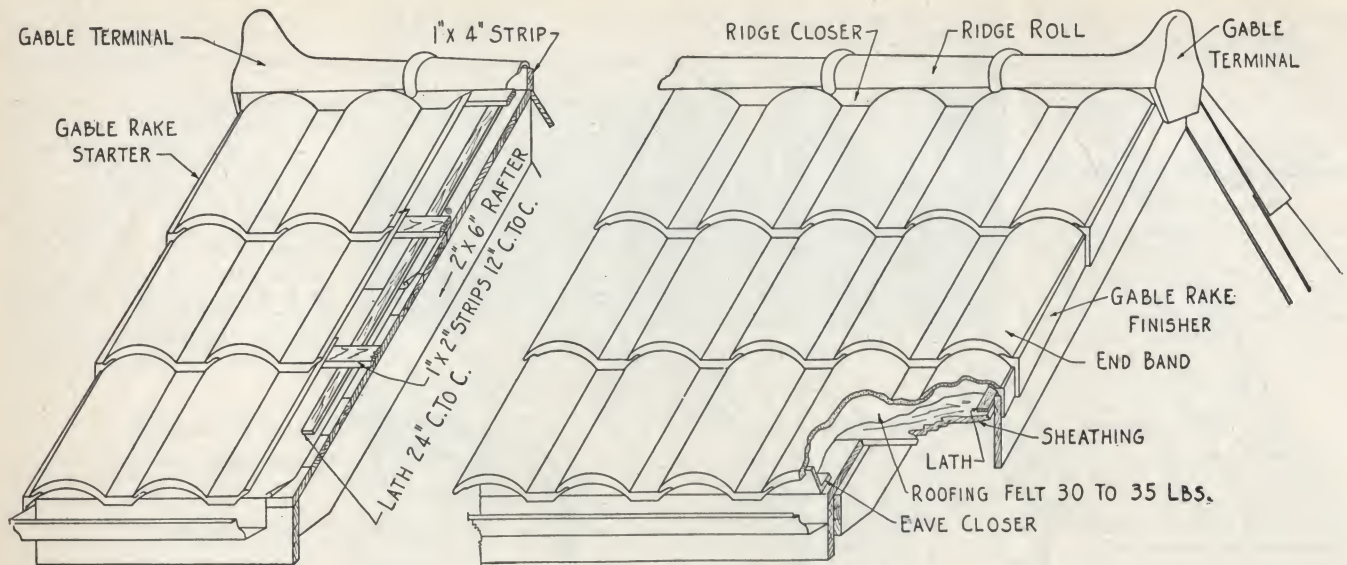
Hawthorne Special Tile for gable rake starters and finishers, ridge and hip rolls and terminals, illustrated on second page following.



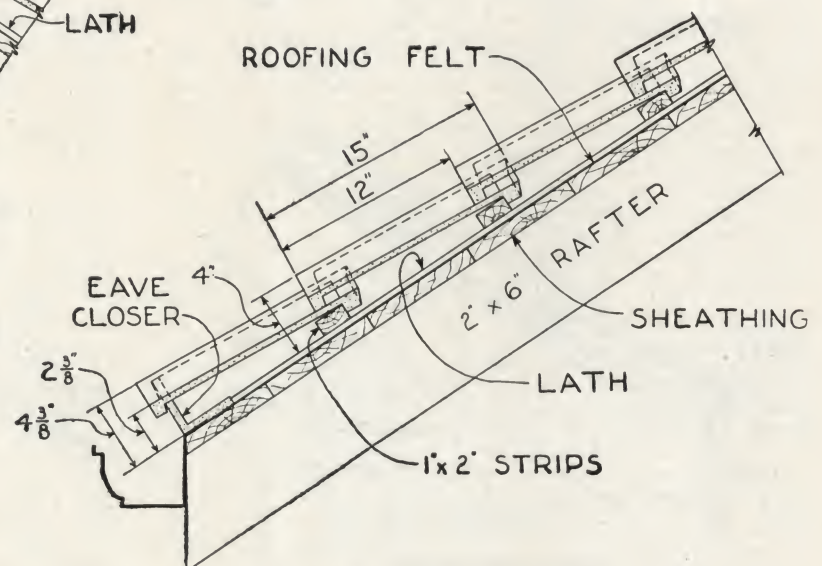
Standard Eave Detail



Details of Hawthorne French Roofing Tile



Hawthorne Special Tile for gable rake starters and finishers, ridge and hip rolls, terminals, and ridge and eave closers, illustrated on following page.



Details of Hawthorne Spanish Roofing Tile

Hawthorne

French Tile



Gable Rake
Starter



Size, $9\frac{1}{4} \times 15$ in. Exposure, 8×12 in.
Weight per square, 825 lb.
150 tile per square



Gable Rake
Finisher

Hawthorne

Spanish Tile



End Band



Size, $9\frac{1}{4} \times 15$ in. Exposure, 8×12 in.
Weight per square, 825 lb.
150 tile per square



Eave Closer



Ridge Closer



Gable Rake
Starter



Gable Rake
Finisher

Hawthorne

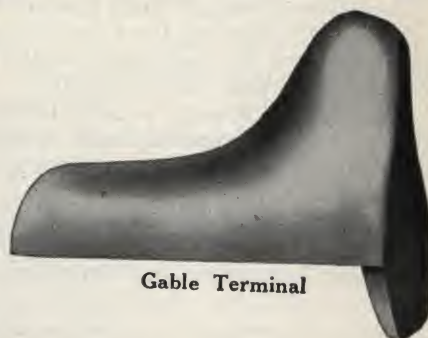
Ridge and Hip Tile



Hip Starter



Gable Terminal with Bead



Gable Terminal



Hip Roll

Can also be used for Ridge



Hip Terminal with Bead



Ridge Roll

Can also be used for Hip



Hip Terminal

B. MIFFLIN HOOD BRICK COMPANY

Manufacturers of Roof Tile

ATLANTA, GA.

SALES OFFICES

DEPT. S, DAISY (HAMILTON COUNTY), TENN., Roof Tile and Floor Tile
ATLANTA, GA., 686 Greenwood Avenue, N. E., Brick and Chemical Stoneware

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CHATTANOOGA, TENN., Post Office, Daisy, Tenn.
GREENVILLE, S. C., Chamber of Commerce Building

MEMPHIS, TENN., 270 Shrine Building
RALEIGH, N. C.
NEW ORLEANS, LA., 406 Canal-Commercial Bank Building

GREENSBORO, N. C., P. O. Box 550
PHILADELPHIA, PA., Hood Tile Co., DeLong Building, 13th and Chestnut Streets

REPRESENTED BY LEADING ROOFERS, TILE AND BRICK DEALERS IN PRINCIPAL CITIES

Products

TRUE MISSION ROOF TILE; TAPERED MISSION ROOF TILE; FLAT ENGLISH SHINGLE TILE.

Also manufacturers of Brick for all architectural and structural uses; Fireplaces, Steps, Briquettes, Landscape Tile, Garden and Terrace Tile, Heavy Traffic Tile, Non-slip Ramps, Brick and Stucco Inserts, Chemical Stoneware, Cylindrical Spiral Ring Tower Packing.

For Floor Tile, see page B1497.

Mission Tile

"Riviera"—A true reproduction of the old Spanish Mission roof tile as seen along the Mediterranean, produced in a soft mingling of fire flashed (autumn foliage) shades and also rugged enough in manufacture to relieve the mechanical straight line and painted color effect of ordinary red tile.

Mission tile is made in 15-in. lengths, 11-in. exposure to weather. Can also be laid in random courses with varying weather exposures.

Specials—Eave closures, starter tile, and eave pan tile with water opening for concealed gutter. Regular field tile is used for saddling hips and ridge. No terminal pieces are used unless specified.

Textures—"Riviera" is manufactured, either in the smooth or vertical combed rough texture.

Body—Made from shale and clay, hard burned and well vitrified.

"Habana"—A straight barrel mission type like "Riviera" in size and shape, but especially made of a porous terra cotta clay and shale body, in a very soft

range of pastel shadings from light buff, through the reds to dark chocolate browns; to simulate the color and texture of the old handmade Cuban Tiles.

Texture—One texture only, a dull, die surface, non-reflecting.

Special Fittings—Same special fittings as used for "Riviera."

"Habana Tapered"—A tapered mission tile like old handmade Cuban tapered, manufactured in full range of soft weathered shades like colors of Habana Straight Barrel Mission.

Texture—One texture only, a dull surface, non-reflecting.

Body—Terra cotta clay, and shale.

Shingle Tile

"Sussex"—Smooth, flat English shingle; shale body; hard burned; same fire flashed colors as "Riviera"; 9x12 in. (See chart for data.)

"Devonshire"—Rough combed texture. Otherwise same as "Sussex." (See chart for data.)

"Normandy"—Smooth, flat shingle; clay and shale body; colors same as "Habana" Mission. Made of same material; 6x13 in. (See chart for data.)

"Interlocking"—Smooth, flat rib, light weight shingle for cheap residence or commercial use.

American "S" (or Spanish "S")

Pan and roll in one piece; shale body; red and fire flashed colors; smooth or rough texture. (See chart for data.) All standard fittings also furnished. A commercialized imitation of true Spanish Mission.

DATA CHART—ROOF TILE

Name	Kind	Body	Size, in.	Texture	Exposure to weather, in.	Pieces per square	Weight per square, lb.	Weight each, lb.
"Riviera"	Mission	Shale and Clay	8x15	Smooth Rough	11	230	1400	6
"Habana"	Mission	Clay and Shale	8x15	Smooth	11	230	1400	6
"Habana Tapered"	Mission	Clay and Shale	7½x15 7x18	Smooth Smooth	12 15	250 225	1250 1350	5 6
"Sussex"	Shingle	Shale and Clay	9x12	Smooth	4½	370	1700	4½
"Devonshire"	Shingle	Shale and Clay	9x12	Rough	4½	370	1700	4½
"Normandy"	Shingle	Clay and Shale	6x13	Smooth	5	500	1625	3¼
American "S"	Pan-roll	Shale	10x13	Smooth Rough	10½	180	900	5
Interlocking	Shingle	Clay and Shale	8x13	Smooth	10	215	1000	4½

Complete Data Sheets cheerfully furnished on request.

GLADDING, McBEAN & CO.

MERGED WITH
LOS ANGELES PRESSED BRICK CO.

Largest Manufacturers of Clay Products in the West

621 South Hope Street
LOS ANGELES, CAL.

PRINCIPAL SALES AGENCIES

SAN FRANCISCO, CAL., GLADDING, McBEAN & Co., 660 Market Street
PORTLAND, ORE., PACIFIC BUILDING MATERIALS Co., 210 Thompson Street
SEATTLE, WASH., SAVAGE-SCOFIELD Co., 1733 Westlake Avenue, North
HONOLULU, H. I., LEWERS & COOKE, LTD.
PHOENIX, ARIZ., VERNON L. CLARK BUILDING MATERIAL Co., 343 North First Avenue
TUCSON, ARIZ., J. KNOX CORBETT LUMBER & HARDWARE COMPANY
SALT LAKE CITY, UTAH, S. A. ROBERTS & Co., 222 Dooly Building

Member of American Face Brick Association

Products

FACE BRICK: Wire Cut, Dry Pressed and Enameled.

ARCHITECTURAL TERRA COTTA.

ROOFING TILE.

FIRE CLAY REFRACTORIES.

HOLLOW TILE.

PROMENADE OR QUARRY TILE.

PALACIO HAND MADE FLOOR TILE.

Also manufacturers of:

Garden Pottery.

Drain Tile.

Flue Lining.

Sewer Pipe and Fittings.

Radial Chimney Blocks.

Note: All data refers to products of the Southern Division of GLADDING, McBEAN & Co. Information concerning products of the Central and Northern Divisions may be obtained from these offices.

For Decorative Faience Tile, see pages B1438-1439.

Face Brick

Sizes—The size of wire cut brick is $2\frac{3}{8} \times 8\frac{3}{8} \times 3\frac{7}{8}$ inches, and of pressed or enameled brick $2\frac{3}{8} \times 8\frac{3}{8} \times 4$ inches.

Styles—*Wire Cut Brick, Smooth Texture*—In buff, gray, old gold and various tones of flashed.

Rough Texture—Ruffled (horizontal texture) and rug (vertical texture) in a wide variety of colors.

Dry Press—Buff, cream, gray, old gold and red.

Enameled—White, ivory, granitex, pulsichrome, mottled, red, green, black and blue.

Architectural Terra Cotta

We are prepared to handle contracts for architectural terra cotta of any size, in any desired texture or color.

Roofing Tile

This company manufactures a very wide variety of patterns and colors in roofing tile.

Colors—The Spanish, Italian and Shingle are made in the various shades of red only. The Mission and Granada are made in shades of red, also old gold, purple,

and gunmetal, mixed with red (known as "Varicolor").

Trim—Hips, hip starters, ridges, finials, rakes, eave enclosures and end bands are made in various styles to fit the different designs of tile.

Fire Clay Refractories

Machine and hand made standard sizes.

Special shapes of any kind made to order.

We also furnish fire clay and grog.

Hollow Tile

Sizes— $2 \times 12 \times 12$ in. to $12 \times 12 \times 12$ in.

Load-bearing type in Heath Unit tile.

Promenade and Palacio Hand Made Floor Tile

Uses—These quarry tile, because of the great variety of patterns, sizes and shapes, adapt themselves to every use, indoor and out.

They are in use in living and dining rooms, halls and sun parlors in residences; in corridors and lobbies of hotels; in commercial offices and showrooms; in terraces and garden walks, on treads and risers of stairs and around swimming pools.

Sizes—*Palacio Hand Made*— $2\frac{3}{4} \times 2\frac{3}{4}$ in., $4\frac{1}{2} \times 4\frac{1}{2}$ in., 5×11 in., 6×6 in., $6 \times 12\frac{1}{4}$ in., $7\frac{3}{4} \times 13\frac{1}{2}$ in.; diamond, $4\frac{1}{2} \times 13\frac{1}{4}$ in.; elongated hexagon, 9 in.; hexagon 9 in.; octagon 12×12 in., $12 \times 12 \times 2$ in., 12×14 in., $12 \times 14 \times 2$ in., 12×18 in.

Palacio Hand Made Floor Tile are approximately $1\frac{1}{4}$ in. thick.

Diagonal halves are available for the following sizes: $2\frac{3}{4}$ in., $4\frac{1}{2}$ in., 6 in. Hexagon long halves and shorts, 9 in.

Promenade Tile— $2\frac{3}{4} \times 2\frac{3}{4}$ in., $2\frac{3}{4} \times 6$ in., $2\frac{3}{4} \times 9$ in.; elongated hexagon 3×9 in., 3×12 in., $4\frac{1}{2} \times 4\frac{1}{2}$ in., $4\frac{1}{2} \times 9$ in. 6×1 in., 6×6 in., 6×9 in., $6 \times 12\frac{1}{4}$ in., 9×9 in.; also 9-in. hexagon, 9-in. hexagon long halves and 9-in. hexagon short halves; 12×12 -in. octagon.

Promenade Tile are approximately 1 in. thick.

Diagonal halves for the following: $1\frac{3}{4}$ in., $2\frac{3}{4}$ in., $4\frac{1}{4}$ in., 6 in., 9 in.